



IEEE HNICEM 2021

13th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management

November 28 - 30, 2021
Full Online

*THEME: Pandemic to Opportunity – Research Innovations
Towards COVID 19 Solutions*

The **International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management (HNICEM)** is one of the premier international technical conferences of the Asia Pacific Region.

HNICEM has been held since 2003 and provides an important forum for researchers and engineers from industry, and professors and graduate students from the academia to network and to discuss new ideas and development in emerging areas of electrical and electronic engineering, computers science and related topics. The conference features plenary and invited talks by eminent scientists and engineers, tutorials, paper presentations and poster sessions.

The 13th HNICEM or IEEE HNICEM 2021 is being organized by the IEEE Computational Intelligence Society, Philippines Chapter. All published research articles are submitted to IEEEExplore and indexed in SCOPUS.

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Message from the General Chair



Prof. Elmer P. Dadios, Ph.D.
General Chair – IEEE HNICEM 2021
Chair – 2021 R10 Awards and Recognition Committee
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I am honored and privileged to serve as the General Chair of the 13th IEEE International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (IEEE HNICEM 2021). The IEEE HNICEM 2021 is organized by the IEEE Computational Intelligence Society (CIS) and IEEE Robotics and Automation Society (RAS), Philippines Chapter. It is one of the premier IEEE technical conferences in the Asia Pacific Region.

The IEEE HNICEM 2021 is a cross-disciplinary conference that brings together technologists, engineers, scientists, investors, governments, academia and various industries to promote discussions on technology developments to improve the life of the people. The theme for this year, "**Pandemic to Opportunity – Research Innovations Towards COVID 19 Solutions**", tackles relevant opportunities and challenges brought by the global Covid-19 pandemic. This conference aims to share insights on the future of sustainability, safety and human interaction with the planet. It reflects the relevance of IEEE HNICEM in providing a sense of direction for science, technology, society and environment for future earth.

This year, HNICEM received a total submission of 326 technical papers, with an acceptance rate of 62.88%. The papers we received were from 24 different institutions across 11 different countries including; Canada, Italy, Japan, Myanmar, Portugal, Sudan, Taiwan, United Kingdom, United States, Vietnam and Philippines. We want to ensure that only quality papers are accepted and presented in this conference.

The highlights of this year's conference are six (6) plenary lectures from world renowned distinguished scientists; and 205 technical papers presentations categorized into online parallel sessions. This diversity provides ample opportunities for the development of new ideas that are needed to meet the numerous technological, economic and environmental challenges that we face.

On behalf of the IEEE HNICEM 2021 organizing committee, I would like to express our deepest appreciation to the members of the International Advisory Board. We are forever grateful to you. The members of the International Advisory Board are experts in their field of endeavors and have provided help and guidance throughout the long period of planning for this conference. We are also grateful to the international scientific committee who provided assistance in reviewing and ensuring that only good quality papers are accepted in this conference.

I would like to extend my sincerest appreciation to the committee chairs: Prof. Marcelo Ang, Prof. Alvin Culaba, Prof. Argel Bandala, Prof. Ryan Vicerra, Prof. Laurence Gan Lim, Prof. Edwin Sybingco, and our working committee composed of Ms. January Bencan, Dr. Ronnie Conception, Dr. Andres Mayol, Engr. Jason Españaola, Dr. Renann Baldovino, Dr. Robert Billones, Dr. Edison Roxas, Dr. Ira Valenzuela, Dr. Pocholo Loresco, Dr. Noel Gunay, Dr. Jay Robert Del Rosario, Dr. Reagan Galvez, Engr. Ana Antoinette Illahi, Engr. Richard Tan Ai and to all researchers of the Intelligent Systems Laboratory.

Also, I would like to thank all the IEEE volunteers, the session chairs, and most of all the presenters and contributors who made this conference a great success. Their wholehearted support and participation have contributed to the achievement of the objectives of this conference.

Welcome Everyone Stay Safe and Healthy Always.

PLENARY SPEAKER



Prof. Toshio Fukuda, P.h.D.

Meijo University, Japan

IEEE President and CEO

Prof. Toshio Fukuda is Professor Emeritus of Nagoya University and Professor of Meijo University and Waseda University. He is mainly engaging in the research fields of intelligent robotic system, micro and nano robotics, bio-robotic system and industry applications in robotics and automation. He was the President of IEEE Robotics and Automation Society (1998-1999), and IEEE President (2020). He was Editor-in-Chief of IEEE/ASME Trans. Mechatronics (2000-2002). He was chairs of many conferences, such as the Founding General Chair of IEEE International Conference on Intelligent Robots and Systems (IROS, 1988), IEEE Conference on Cyborg and Bionic Systems (CBS, 2017), IEEE Conference on Intelligence and Safety of Robots (ISR, 2018). He has received many awards such as IEEE Robotics and Automation Pioneer Award (2004), IEEE Robotics and Automation Technical Field Award (2010). IEEE Fellow (1995). SICE Fellow (1995). JSME Fellow (2002), RSJ Fellow (2004), VRSJ Fellow (2011).

PLENARY SPEAKER



Prof. Joel L. Cuello, Ph.D.

Professor of Biosystems Engineering
Vice Chair, International Association for Vertical Farming (AVF)
The University of Arizona, U.S.A.

Professor of Biosystems Engineering and Director of the Global Initiative for Strategic Agriculture in Dry Lands (GISAD) at The University of Arizona in Tucson, Arizona, U.S.A. He is also currently Vice Chair of the International Association for Vertical Farming (AVF).

A globally recognized expert in the engineering of sustainable biological and agricultural systems, his technical expertise in both engineering and biology provides the platform for engineering designs in various agricultural and biological systems with emphasis on optimizing biological and agricultural productivities while fostering resource sustainability and environmental protection.

Prof. Cuello has designed, constructed and implemented varied types of engineered agricultural or biological systems, including those applied to bioregenerative space life support, vertical farming, plant tissue culture, micropropagation, industrial mass production of algae and plant cell and microbial cultures for production of biomass, nutraceuticals, pharmaceuticals, etc. He is the Principal Inventor of the patented algae photobioreactor series -- the Accordion photobioreactors -- as well as the Vertical Farming systems -- V-Hive Vertical Green Box and Mobile & Modular Cultivation Systems for Vertical Farming.

Prof. Cuello conducted his postdoctoral research in the Controlled Ecological Life Support System Division at NASA John F. Kennedy Space Center in Cape Canaveral, Florida as a U.S. National Research Council Postdoctoral Research Associate. He earned his Ph.D. in Agricultural & Biological Engineering, with Minor in Chemical Engineering, from The Pennsylvania State University in 1994. He also earned two M.S. degrees (Agricultural & Biological Engineering; Plant Physiology) from The Pennsylvania State University. He obtained his B.S. in Agricultural Engineering (cum laude) from the University of the Philippines at Los Banos. He is a Lifetime Visiting Professor at Zhejiang University in Hangzhou, China and a Faculty Fellow at De La Salle University and Ateneo de Manila University in the Philippines.

Prof. Cuello has published over 60 refereed journal publications and 11 book chapters, and has delivered over 300 professional presentations around the world. As major advisor, he has graduated 26 Ph.D. and M.S. students, and has mentored three postdoctoral research associates, five international visiting Ph.D. candidates and 10 international visiting scientists and professors. Prof. Cuello has lectured and has been invited as Guest or Keynote Speaker around the world, including in Brazil, China, South Korea, Israel, Palestine, Germany, United Kingdom, Canada, Chile, Mexico, Norway, Philippines, India, Italy, Jordan, Egypt, Japan, Australia, Spain, Singapore, Thailand, Qatar, Saudi Arabia and the United Arab Emirates.

He is an active member of a number of scientific and professional societies, having served as officer of technical committees for the American Society of Agricultural and Biological Engineers (ASABE) and the Institute of Biological Engineering (IBE). He recently served as President of the Arizona Chapter of the ASABE. He also serves on the Scientific Advisory Board for Biopharmia, LLC based in Oslo Norway, C-Trade based in Tucson, Arizona, and Torus-Med, Inc. in Phoenix, Arizona. He has also been serving as Scientific Technical Adviser for the King Abdulaziz City for Science and Technology (KACST) in Riyadh, Saudi Arabia since 2011 and the Annual Global Forum for Innovations in Agriculture in Abu Dhabi, UAE since 2014, among others.

He has developed and currently teaches the courses “Globalization, Sustainability and Innovation” and “Integrated Engineered Solutions in the Food, Water, Energy Nexus” at The University of Arizona.

Prof. Cuello has been inducted as member of three U.S. professional honor societies, including the U.S. Honor Society of Agriculture, the U.S. Honor Society of Agricultural and Biological Engineering, and the U.S. National Honor Society of Engineering. He was elected to the Philippine-American Academy of Science & Engineering in 2012, and was the 2012 Recipient of the Excellence in Global Education Award by The University of Arizona’s Global Initiative Program. Prof. Cuello is a 2015 Recipient of the Tech Launch Arizona I-Squared (Innovation and Impact) Award for his innovative work on various algae production systems. He was also elected as Corresponding Member of the National Academy of Science and Technology – Philippines in 2016.

PLENARY SPEAKER



Prof. Kaoru Hirota, Ph.D.
Tokyo Institute of Technology, Japan
Beijing Institute of Technology, China

Prof. Kaoru Hirota is currently a professor emeritus at Tokyo Institute of Technology and a professor at Beijing Institute of Technology. His research interests include fuzzy systems, intelligent robotics, image understanding, and quantum computing. He received many awards, e.g., “Henri Coanda Medal, Grigore MOISIL Award, and Chinese Government Friendship Award”, honorary/adjunct professorships from e.g., “de La Salle University (Philippine), the University of Nottingham (UK), and Chinese University of Geosciences Wuhan (China)”, and Honoris Causa from “Bulacan state university (Philippine), Budapest Technical University (Hungary), Szechenyi Istvan University (Hungary), and Technical University of Kosice (Slovakia)”. He organized more than 10 international conferences/symposiums as founding/general/program chairs. He has been publishing 329 journal papers, 56 books, and 622 conference papers.

PLENARY SPEAKER



Prof. Raouf Naguib
Liverpool Hope University
UK

Prof. Raouf Naguib is a Visiting Professor at Liverpool Hope University, UK, and the Director of BIOCORE Research & Consultancy International, UK. Prior to this he was Professor of Biomedical Computing and Head of the Biomedical Computing and Engineering Technologies Applied Research Group at Coventry University, UK. He has published over 380 journal and conference papers and reports in many aspects of health informatics, environmental health, social health, biomedical and digital signal processing, biomedical image processing and the applications of artificial intelligence and evolutionary computation in cancer research. He has also published a book on digital filtering, and co-edited a second book on the applications of artificial neural networks in cancer diagnosis, prognosis and patient management. He was awarded the Fulbright Cancer Fellowship in 1995-96 when he carried out research in the USA, at the University of Hawaii in Mānoa, on the applications of artificial neural networks in breast cancer diagnosis and prognosis.

Prof Naguib is a member of several national and international research committees and boards, and has served on the Administrative Committee of the IEEE Engineering in Medicine and Biology Society (EMBS), representing Region 8, and the Society's Distinguished Lecturers Committee and Infostructure Committee, as well as the UK EPSRC Peer Review College. He also represented the IEEE-EMBS on the IEEE-USA Committee on Communications and Information Policy. He currently serves on several international review panels, including the European Commission, Qatar National Research Fund, UAE National Research Foundation and the Canadian Foundation for Innovation (CFI).

In 2003, Prof Naguib was appointed as Adjunct Research Professor at the University of Carleton, Ottawa, Canada, and in 2005 he was appointed as Honorary Professor at De La Salle University, Manila, Philippines.

PLENARY SPEAKER



Prof. Marcelo H. Ang Jr., Ph.D.

Professor, Mechanical Engineering Department
Acting Director, Advanced Robotics Centre
National University of Singapore.

Prof. Marcelo H. Ang, Jr. received his BSc and MSc degrees in Mechanical Engineering from the De La Salle University in the Philippines and University of Hawaii, USA in 1981 and 1985, respectively, and his PhD in Electrical Engineering from the University of Rochester, New York in 1988 where he was an Assistant Professor of Electrical Engineering. In 1989, he joined the Department of Mechanical Engineering of the National University of Singapore where he is currently a Professor and Acting Director of the Advanced Robotics Center. His research interests span the areas of robotics, mechatronics, autonomous systems, and applications of intelligent systems. He teaches robotics; creativity and innovation; applied electronics and instrumentation; computing; design and related topics. In addition to academic and research activities. He is also actively involved in the Singapore Robotic Games as its founding chairman, and the World Robot Olympiad as member of its Advisory Council. Some videos of his research can be found in: <http://137.132.146.218/marcelo/videos/>

PLENARY SPEAKER



Prof. Oussama Khatib, P.h.D.
Robotics Laboratory
Department of Computer Science
Stanford University, USA

Prof. Oussama Khatib received his PhD from Sup'Aero, Toulouse, France, in 1980. He is Professor of Computer Science and Director of the Robotics Laboratory at Stanford University. His research focuses on methodologies and technologies in human-centered robotics. He is a Fellow of IEEE, Co- Editor of the Springer Tracts in Advanced Robotics (STAR) series, and the Springer Handbook of Robotics. Professor Khatib is the President of the International Foundation of Robotics Research (IFRR). He is recipient of the IEEE RAS Pioneer Award, the George Saridis Leadership Award, the Distinguished Service Award, the Japan Robot Association (JARA) Award, the Rudolf Kalman Award, and the IEEE Technical Field Award. In 2018, Professor Khatib was elected to the National Academy of Engineering.

**13th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management
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DAY 1	Sunday	November 28, 2021 IEEE HNICEM 2021
8:50 AM	9:20 AM	OPENING PROGRAM
<i>Welcome Remarks</i>		Prof. Dr. Elmer Dadios General Chair - IEEE HNICEM 2021 De La Salle University, Manila, Philippines
9:30 AM	10:30 AM	PLENARY LECTURE 1 <i>Topic</i> AI Robots and Moon Shot Program
<i>Speaker</i>		Prof. Dr. Toshio Fukuda Meijo University, Japan Professor Emeritus of Nagoya University, Japan IEEE President and CEO (2020)
<i>Moderator</i>		Prof. Dr. Marcelo Ang, NUS
10:35 AM	11:35 AM	PLENARY LECTURE 2 <i>Topic</i> Advances in Transformative On-Demand Crop Production for Both Earth and Extraterrestrial Applications
<i>Speaker</i>		Prof. Dr. Joel Cuello Department of Biosystems Engineering, The University of Arizona, U.S.A.
<i>Moderator</i>		Prof. Dr. Alvin Culaba, DLSU
LUNCH BREAK		
2:00 PM	3:00 PM	PLENARY LECTURE 3
<i>Topic</i>		Fuzzy Control and Its Application to Nano-Drive Controller For Stepping Motors
<i>Speaker</i>		Prof. Dr. Kaoru Hirota Beijing Institute of Technology, China Prof. Emeritus, Tokyo Institute of Technology, Japan
<i>Moderator</i>		Prof. Dr. Argel Bandala, DLSU
3:05 PM	4:05 PM	PLENARY LECTURE 4 <i>Topic</i> Some Insights into the Impact of COVID-19 on Global Air Quality
<i>Speaker</i>		Prof. Dr. Raouf Naguib Liverpool Hope University, UK
<i>Moderator</i>		Prof. Dr. Laurence Gan Lim, DLSU
4:10 PM	5:10 PM	PLENARY LECTURE 5 <i>Topic</i> Towards Human-Inspired Robotic Manipulation
<i>Speaker</i>		Prof. Dr. Marcelo Ang Jr. National University of Singapore, Singapore
<i>Moderator</i>		Prof. Dr. Ryan Vicerra, DLSU
5:15 PM	6:15 PM	PLENARY LECTURE 6 <i>Topic</i> Deep-Sea Robotics Exploration
<i>Speaker</i>		Prof. Dr. Oussama Khatib Stanford University, USA
<i>Moderator</i>		Prof. Dr. Elmer Dadios, DLSU
6:20 PM	6:40 PM	Briefing of Parallel Presentations Prof. Dr. Argel A. Bandala, DLSU
DINNER BREAK		
7:30 PM	9:00 PM	Cultural Show

IEEE HNICEM 2021 PARALLEL SESSIONS

Day 2 (Nov. 29)

Biomedical Robotics and Health Technologies		
Session: A1	November 29, 2021 - 0900-1000 Parallel Room 1	
Paper ID No.	Authors	Paper Title
3	Mark Joseph Enojas	Towards the Development of Pneumatically Actuated Soft Robotic Hand
105	Rex Paolo Gamara, Romano Neyra and King Harold Recto	Behavior-Based Early Cervical Cancer Risk Detection Using Artificial Neural Networks
1	Ira Flores, Gary Chris Lacdang, Chessa Undangan and Jetron Adtoon	Smart Electronic Assistive Device for Visually Impaired Individual with Image Processing
Session: A2	November 29, 2021 - 1015-1115 Parallel Room 1	
Paper ID No.	Authors	Paper Title
44	Jeric Bustarde, Juan Miguel Cruz, Khaled Kim Dayap, Kyla Marie De Leon, Armi Yabut, Florante Jr Poso, Kevin Lawrence De Jesus and Mark Ondac	Negative Air Pressure Isolation Room for COVID-19 Patients in the Philippines: A Simulation of the Proposed Design using SolidWorks
53	Dionis Padilla, Viendelle Joakeen Bruces and Emmanuel Jandusay	Two-Cell Contractions of a Filipino Braille Recognition Using Extreme Learning Machine
54	Khayam Khan, Ahmed Elabbas and Carlos Iv Hortinela	Classification of Otitis Media Infections using Image Processing and Convolutional Neural Network
268	Ana Antoniette Illahi	Development of a Sign Language Glove Translator Using Microcontroller and Android Technology for Deaf-Mute
Session: A3	November 29, 2021 - 1300-1400 Parallel Room 1	
Paper ID No.	Authors	Paper Title
64	Niño Merencilla, Estrelita Manansala, Eyriel Czar Balingit, Jan Bryce Crisostomo, John Carlo Montano and Hermogenes Jr. Quinzon	Smart Stick for the Visually Impaired Person
68	Nino Pilueta, Honeylet Grimaldo, Maribel Misola, Ricky Sandil and Moises Jardiniano	VIP-Guide: Development of Pedestrian Crossing Guide for the Visually Impaired People
98	Rosemarie Pellegrino, Aubrey Tarrobagao and Dave Lester B. Zulueta	Automated RBC Morphology Counting and Grading Using Image Processing and Support Vector Machine
103	Jennifer Dela Cruz, Ivan Lesley Mercado and Maria Krysia Nicole Algabe	Deriving Heart Rate and Respiratory Rate from Pulse Oximetry Using Neural Networks
Session: A4	November 29, 2021 - 1415-1515 Parallel Room 1	
Paper ID No.	Authors	Paper Title
104	Pocholo James Loresco, Mark Anthony Teodoro and Daryl David	Classification of Filipino Braille Codes with Contractions Using Machine Vision
135	Mark Christian Manuel, Jocelyn Villaverde and Jobenilita Cunado	Design and Fabrication of an Arduino-based Self-balancing Walking Robot's Lower Limb
156	Jessie Balbin, Martin Mababangoob and Emmanuel Jaeson Coronel	Detection of Outer Throat Infection using Deep Convolutional Neural Network
271	Marife Rosales, Ronnie Concepcion II, Edwin Sybingco, Argel Bandala, Ryan Rhay Vicerra and Elmer Dadios	Vital Signs Evaluator and Blood Type Identification using Deep Learning for Blood Donation
Session: A5	November 29, 2021 - 1530-1630 Parallel Room 1	
Paper ID No.	Authors	Paper Title
219	R-Jay Relano, Kate Francisco, Mike Louie Enriquez, Ronnie Concepcion II, Ryan Rhay Vicerra and Argel Bandala	A Bibliometric and Trend Analysis of Applied Technologies in Bioengineering for Additive Manufacturing of Human Organs
13	Teodoro Jr. Revano	iVital: Mobile Health Expert System with Wearable Vital Sign Analyzer
276	Margie Arda, Sherwin Guinaldo, Isidro Permites and Carl John Salaan	Object Detection as a Technological Adjunct to the Manual Counting Protocol during Surgery

Computer Science, Data Science, and Algorithms		
Session: B1	November 29, 2021 - 0900-1000 Parallel Room 2	
Paper ID No.	Authors	Paper Title
41	Christian Docdocil, Horlanz Myer Espinosa and Jocelyn Villaverde	Using Unevenly Spaced Time Series Data Set in a Convolutional Reconstruction Autoencoder Algorithm
50	Jayson James Mayor	EC Health Medical Clinic and Diagnostic Center Appointment System
241	Alvin Ken Steven Chua Jr., Ellysa Pua, Elmer Dadios and Robert Kerwin Billones	AI To Predict Price Movements in the Stock Market
62	Dionis Padilla, Evan Joy Celino and Jairus Mingua	Classification of Fire Related Tweets on Twitter Using Bidirectional Encoder Representations from Transformers (BERT)
Session: B2	November 29, 2021 - 1015-1115 Parallel Room 2	
Paper ID No.	Authors	Paper Title
52	Elbert Moyon, Jaymer Jayoma and Edsel Matt Morales	Design and development of a web GIS-based visualization and analytical platform for Farm-to-Market Road projects of the Philippines's Department of Agriculture
74	Daniela Luanne Abo, Harold Alcabasa, Mary Anthoinette Amorin, Juan Paulo Migriño and Oliver Medina	Tracelet: Contact Tracing and Physical Distancing Device with Blockchain Technology for Pamantasan ng Cabuyao
193	Isaiah Jassen Tupal, Reggie Gustilo and Melvin Cabatuan	Modelling New Cases of Covid-19 in the Philippines using Polynomial and MLP Regression
240	Immanuel Jose Valencia, Elmer Dadios and Robert Kerwin Billones	A Maximization Model for Food Aid Distribution using Integer Linear Programming
Session: B3	November 29, 2021 - 1300-1400 Parallel Room 2	
Paper ID No.	Authors	Paper Title
176	Ria Sagum, Abbigaile Anne Michico Cariño, John Isaiah Monteza and Jerome Tabia	Application of Associative Classifier for Data Sparsity in Predictive Analysis Recommendation
51	Geliza Marie Alcober and Teodoro Revano Jr.	Twitter Sentiment Analysis towards Online Learning during COVID-19 in the Philippines
253	Roger Luis Uy, Stanley Vincent Lim, Steven Edward Lim, Carlos Louis Ting and Aaron Eldrich Wong	SIMD Implementation of Modified Zhang's Three-Frame Alignment Algorithm
233	Daniel Dasig Jr, Denver Jhon Calantoc, Eleonora Claricia, Mary Ann Taduyo, Paulino Gatpandan and Rudolph Val Guarin	Clustering and Predicting of Smartphones Features using Gaussian Mixture Model Algorithm

Computer Vision, Artificial Intelligence and Intelligent Systems		
Session: C1	November 29, 2021 - 0900-1000 Parallel Room 3	
Paper ID No.	Authors	Paper Title
77	Meo Vincent Caya, Emmanuel Arturo and Chezjon Bautista	Dog Identification System Using Nose Print Biometrics
242	Abraham Chua, Christian Rei Mercado, John Phillip Pin, Angelo Kyle Tan, Jose Benito Tinhay, Elmer Dadios and Robert Kerwin Billones	Damage Identification of Selected Car Parts Using Image Classification and Deep Learning
154	Jennifer Cruz, Mark Manuel, Rj Lawrence Tiu, Roderick Tud, Marvin Verdadero, Mark Edison Acosta, Ram Christian Yap and Francis Jeremiah Arrozaal	Development and Application of an Omni-Directional Robot for the Detection of Combustible and Toxic Gases
88	Elisa Malasaga, Abraham Magpantay, Ming-Che Hsieh, Lexor James Basilen, Hazel Czarine Cleofas, Danilo Esquivel, Dialani Olama and Jennifer Contreras	Complete Blood Count (CBC) Analysis Mobile Application
Session: C2	November 29, 2021 - 1015-1115 Parallel Room 3	
Paper ID No.	Authors	Paper Title
252	Andric Angelo Orenicia, Jerahmeel Coching, Allen Philip Matias, Elmer Dadios, Renann Baldovino and Robert Kerwin Billones	A Comparative Study on the Use of Raw and Filtered Images for Multi-class Image Classification
243	Liane Angelo Acero, Jonathan Daniel Ong, Christalline Jhine Shi, Elmer Dadios and Robert Kerwin Billones	Strawberry Quality Classification Utilizing Convolutional Neural Network
136	Jesus Jr Martinez, John Kenneth Basilio and Jerome Maniacup	Face Mask and Face Shield Detection Using Image Processing with Deep Learning and Thermal Scanning for Logging System
86	Rhonnel S. Paculanan, Reginald S. Cheng, Shaneth C. Ambat and Rossana T. Adao	IoTFisher: A Fish Feeder Mechanism with Timer/ GSM based
Session: C3	November 29, 2021 - 1300-1400 Parallel Room 3	
Paper ID No.	Authors	Paper Title
83	Meo Vincent Caya, Miguel Ephraim Caringal and Kchristopher Allen Manuel	Tongue Biometrics Extraction Based on YOLO Algorithm and CNN Inception
251	Jon Borbon, Jeanette Javier, Jony Llamado, Elmer Dadios and Robert Kerwin Billones	Coral Health Identification using Image Classification and Convolutional Neural Networks
60	Philippe Garrine Lim, Rajbir Girn and Jocelyn Villaverde	Gender Classification Hand Recognition System Using Key-Point Detection with Deep Neural Network
148	Beau Gray Habal, Pierre Edwin See Tiong, Marc Renzo Amarga, March Johnnel Balen, Leslee Juco and Jim Ryan Pasatiempo	Dog Skin Disease Recognition Using Image Segmentation and Gpu Enhanced Convolutional Neural Network
Session: C4	November 29, 2021 - 1415-1515 Parallel Room 3	
Paper ID No.	Authors	Paper Title
169	Joseph Aldrin Chua, Laurence Gan Lim, Jose Martin Maningo, Argel Bandala, Ryan Rhay Vicerra, Elmer Dadios and Jeremias Gonzaga	Swarm Collision Avoidance using Moving Particle Semi-Implicit Method
23	Jocelyn Villaverde, Bryan James Andujar and Nica Jo Ferranco	Recognition of Feline Epidermal Disease using Raspberry-Pi based Gray Level Co-occurrence Matrix and Support Vector Machine
29	Ramon Garcia, Danielle Dumaliang and John Moises Rigor	Coin Identification and Conversion System using Image Processing
25	Paula Christina Garrovillo, Jesse Alemania, Daryl Diego, Kenneth Llagas, Kate Fatima Tenorio, Aldrin Soriano and Florante Andaya	Disinfectant Synthesizer using Electrolysis for Automatic Utilization of Sanitation Kiosk
Session: C5	November 29, 2021 - 1530-1630 Parallel Room 3	
Paper ID No.	Authors	Paper Title
259	Mike Louie Enriquez, Ronnie Concepcion II, R-Jay Relano, Kate Francisco, Andres Philip Mayol, Jason España, Ryan Rhay Vicerra, Argel Bandala and Elmer Dadios	Prediction of Weld Current Using Deep Transfer Image Networks Based on Weld Signatures for Quality Control
82	Meo Vincent Caya, Steven Boncolmo and Emerson Calaquian	Gender Identification Using Keras Model Through Detection of Face
89	Elias Austria, John Andre Abengana, Jaime Anne Marie Josue, Jeremiah Ostea and Franz Louie Sumalinog	Car Damage Detector: A Comparative Study of Haar Cascade Classifier Algorithm and Convolutional Neural Networks
278	Isaiyah Jassen Tupal and Melvin Cabatuan	Vision Based Hand Tracking System Development for Non-Face-to-Face Interaction
Session: C6	November 30, 2021 - 0900-1000 Parallel Room 3	
Paper ID No.	Authors	Paper Title
153	Vladimir Ibañez, Jocelyn Villaverde and Mark Christian Manuel	Design And Control Of A Wireless Six Degree Freedom Robotic Arm
165	Michael Angelo R Alicando, Gabriel M Ramos Jr and Conrado F Ostia Jr	Bearing Fault Detection of a Single-phase Induction Motor Using Acoustic and Vibration Analysis Through Hilbert-Huang Transform
244	Lathaniel Xavier Joseph Ablan, Xinai Batiller, Giolo Rei Mababangloob, Elmer Dadios and Robert Kerwin Billones	Automated Tungsten Inert Gas Welding Process using Fuzzy Logic Operation

264	Mari Grace Corruz, Emil Filipina, Maria Julia Santiago, Sheila Mae Uy, Cristian Lazana and Argel Bandala	BahurApp: Development and Implementation of Coral Bleaching Monitoring Application Using Convolutional Neural network
Session: C7	November 30, 2021 - 1015-1115 Parallel Room 3	
Paper ID No.	Authors	Paper Title
40	Yusuke Kubono, Shun Nishide, Xin Kang and Fuji Ren	Prediction and Generation of Multiple Complex Drawing Figures From Partial Drawing Sequences
191	Michael Pacis, Ian Antonio and Isaiah John Banaga	Under Voltage Load Shedding Algorithm using Fast Voltage Stability Index (FVSI) and Line Stability Index (LSI)
263	Maria Gemel Palconit, Ronnie Concepcion II, Jonnel Alejandrino, Edwin Sybingco, Ryan Rhay Vicerra, Argel Bandala and Elmer Dadios	Fish Centroid Matching using Modified k-Dimensional Tree Nearest Neighbor Search in Stereo Images
279	Alma Maria Jennifer Gutierrez and Melvin Cabatuan	A Framework on the Development of an IoT Based Eye Tracking Device: A review study
Session: C8	November 30, 2021 - 1300-1400 Parallel Room 3	
Paper ID No.	Authors	Paper Title
236	Febus Reidj G. Cruz and Earl Quinn Christian Marcos	Development of Predictive Machine Learning Model using Neural Network for Threshold Value Determination of Buildings
92	Noel Linsangan, Franz Elijah Decinal and Von Errol Ang	Volume Approximation Using Kinect Sensor
180	Jullian Dominic Ducut, Alezander Mikhail Galindo and Ira Valenzuela	Neuro-Fuzzy based Safe Landing Control System for UAVs
274	Moheddin Sumagayan, Earl Ryan Aleluya, Christian Cahig, Lester Librado, Rohanni Mangorsi, Margie Arda, Carl John Salaan and Noel Estoperez	You Only Look Once on Power Line Components: A Multi-Class Detection Using Unmanned Aerial Vehicle
Session: C9	November 30, 2021 - 0900-1000 Parallel Room 1	
Paper ID No.	Authors	Paper Title
275	Margie Arda, Earl Ryan Aleluya, Christian Cahig, Lester Librado, Moheddin Sumagayan, Karl Martin Aldueso, Cherry Mae Galangque and Carl John Salaan	Semantic Segmentation Models for Crack Detection: Using Shelled Unmanned Aerial Vehicle Imagery
281	Jay Robert del Rosario, Bandala Argel, Janel Assumpta Angeles, Aldwin Cabebe, Janssen Co and Don Emmanuel Santamaria	Development of a Multi-Object Detection and Human Tracking System from Cooperative Dual Cameras in an Unmanned Aerial Vehicle
258	Vincent Jan Almero, Maria Gemel Palconit, Jonnel Alejandrino, Ronnie Li Concepcion, Ryan Rhay Vicerra, Edwin Sybingco, Argel Bandala and Elmer Dadios	Development of a Raspberry Pi-based Underwater Camera System for Inland Freshwater Aquaculture
4	Froilan Jimeno II, Briely Jay Briz, Marvin Roy Artiga and Randy Angelia	Development of Smart Waste Bin Segregation using Image Processing

Education, Media, Knowledge, and Business Platforms		
Session: D1	November 29, 2021 - 0900-1000 Parallel Room 4	
Paper ID No.	Authors	Paper Title
6	Teodoro Jr Revano and Beau Gray Habal	An Online Examination System Applying Browser /Server Architecture for Online Class
205	Mike Louie Enriquez, R-Jay Relano, Kate Francisco, Ronnie Concepcion II, Ryan Rhay Vicerra and Argel Bandala	TPACK: Technology, Pedagogy, and Content Knowledge for Paraeducator in the Context of Sustainable Development Goal 4
57	Philip Alger Serrano and Joseph Jessie Oñate	Integration of RESTful API to Student Information System for Secured Data Sharing and Single Sign-on
Session: D2	November 29, 2021 - 1015-1115 Parallel Room 4	
Paper ID No.	Authors	Paper Title
17	Manuel Garcia and Teodoro Revano	Assessing the Role of Python Programming Gamified Course on Students' Knowledge, Skills Performance, Attitude, and Self-Efficacy
280	Niña Ana Marie Jocelyn Sales, Nathaniel Villanueva, Matthew Robert Evangelista, Joshua Luigi Emmanuel Cestina and Jhona Camba	The Development of a Visual Novel Role-Playing Game [VN RPG] as an Open Educational Resource [OER] for Philippine Literature Educators Administering the "Noli Me Tangere" Module
249	Manuel Belino, Hans Felix Bosshard, Ivan Henderson Gue, Jerome Lopena and Diana Rose Rivera	Implementation of Project Study Courses at the Mechanical Engineering Program of FEU Tech During the COVID-19 Pandemic
Session: D3	November 29, 2021 - 1300-1400 Parallel Room 4	
Paper ID No.	Authors	Paper Title
66	Lance Robert Gonzales, Mark Joseph Garvida, James Andrew Pugeda, Ron Jimmuel Mendoza, Joseph Cedric Josef, Janice Abellana and Heintjie Vicente	AlertQC: A Web and Mobile Disaster Utility and Incident Report Management System for Quezon City Disaster Risk Reduction and Management Office
91	Dominador Acasamoso, Ernie Avila and Norman Ficundo	PUPRBLMS: Development And Acceptability of a Proposed Library Management System
215	Elliezar Alegre, Justine Michael Artagame, Anthony John Balase, Nicole Marie De Asis, Precious Abby Guevarra and Julian Robert Obamos	Body Pain Assessment on Sitting Time of Fifth Year Engineering Students of Pamantasan ng Cabuyao During E-Learning Setup
Session: D4	November 29, 2021 - 1415-1515 Parallel Room 4	
Paper ID No.	Authors	Paper Title
16	Teodoro Jr Revano	Designing Human-Centered Learning Analytics Dashboard for Higher Education Using a Participatory Design Approach
93	Dominador Acasamoso, Ernie Avila and Spenzer Vargas	Development And Acceptability of a Student Daily Attendance Monitoring System
192	Elpidio Villarosa	Developing a Record Archiving System in Eastern Visayas State University
Session: D5	November 29, 2021 - 1530-1630 Parallel Room 4	
Paper ID No.	Authors	Paper Title
67	Edrick Escala, Mharlex Basillo, Lea Andrea Nicolas, Maverick Dela Rosa, Kim Rabe, Miguel Louis Cruz, Abraham Magpantay and Heintjie Vicente	E-Commerce System for Anywhere Fitness PH With Sentiment Analysis
95	Arlene Mae Celestial-Valderama, Mengvi Gatpandan and Mary Ann Taduyo	Strengthening Module Development to Full Online Modality: Faculty and Student Adaptation in the Pandemic Era
181	Lyra Nuevas, Jenerey Añover, Lily Mae Golong and Michelle Raganit	AMBUAPP: Ambulance Response Application
Session: D6	November 30, 2021 - 0900-1000 Parallel Room 4	
Paper ID No.	Authors	Paper Title
107	Kristoffer Camille Cacayuran, Charlie Marzan and Emely Munar	Android-Based Mobile Grade Viewer Application Using PHP
182	Lyra Nuevas, Dindo Obediencia, Deborah Brosas and Diane Remot	ACMS: An Android-Based Class Management System
124	Jonah Jahara Baun, Anne Sherine Constantino, Steven John Valentin, Ceejay Lapuz, Cristian Lazana, Argel Bandala and Ryan Rhay Vicerra	e-hAC: Interactive Health Access Card Dispenser Kiosk to aid Outpatient Queuing in Jose Reyes Memorial Medical Center
Session: D7	November 30, 2021 - 1015-1115 Parallel Room 4	
Paper ID No.	Authors	Paper Title
195	Alezander Mikhail Galindo, Ira Valenzuela, Jullian Dominic Ducut and Elmer Dadios	Application of Neuro-Fuzzy Logic on the NewsVendor Inventory Model
175	Melba Besa	Mga Kwento ni Lola Basyang: An Augmented Reality on Selected Philippine Folklore
177	Ria Sagum, Renz Russell Agapito, Khalid Bayao and Jeremiah Casitas	Tagalog Text Normalization with Slang Word Detection and Classification of Type of Slang Word Using Support Vector Machine

Environment, Energy, Transporation, and Infrastructure		
Session: E1	November 29, 2021 - 0900-1000 Parallel Room 5	
Paper ID No.	Authors	Paper Title
28	Nolan Concha, Stephen John Clemente, Ron David Lance Añonuevo, Allyssa Rose Carpio, Aneza Venus Sales and Mel Christine Sto. Domingo	Development of Earthquake Liquefaction Maps of Laguna, Philippines
119	Michael Pacis, Ciarra Alegria Alfonso and Glenn Magwili	Implementation of a Hybrid Plant-Shaped Energy Harvester Using Flexible Polyvinylidene Fluoride (PVDF) Piezoelectric and Solar Film
185	Reggie Gustilo, Robert Martin Santiago, Gerald Arada, Elmer Magsino and Edwin Sybingco	Performance Analysis of Machine Learning Algorithms in Generating Urban Land Cover Map of Quezon City, Philippines Using Sentinel-2 Satellite Imagery
15	Tun Tun Oo, Roy Francis Navea, Aaron Don M. Africa and Ryan Rhay Vicerra	Design the Climate Change Hybrid grid with Wind generator and PV module by using Fuzzy Logic
Session: E2	November 29, 2021 - 1015-1115 Parallel Room 5	
Paper ID No.	Authors	Paper Title
39	Janice Abellana and Ephraimuel Jose Abellana	Applying Heatmaps for Health Hazard Indicators Living Near the Philippine National Railway (PNR) Trains in the National Capital Region (NCR)
198	Daeuk Kim, Ryan Robin Mendoza, Karen Faye Chua, Mark Andrew Chavez, Ronnie Concepcion II and Ryan Rhay Vicerra	A Systematic Analysis on the Trends and Challenges in Autonomous Vehicles and the Proposed Solutions for Level 5 Automation
37	Ramon Garcia, Raven Dapiton and Jan Russel Gonzaga	Determination of Unsound Concrete using Non-Destructive Testing in a Smooth Concrete through various Image Processing Techniques
45	Sophia Chloe Caress, Angela Abigail Belen, Ivan John Esguerra, Harian Dea Wakan, Florante Jr Poso and Melvin Solomon	Rainfall And Meteorological Drought Forecasting in Albay, Philippines Using Artificial Neural Network
Session: E3	November 29, 2021 - 1300-1400 Parallel Room 5	
Paper ID No.	Authors	Paper Title
117	Glenn Magwili, Ella Mae Ronquillo, Dionel Mondejar and Carla Maria Fiel	Development and Characterization of Energy Harvester using Electromagnetic Linear Generators in Bicycle Shock Absorbers
206	Carey Louise Arroyo, Chrischell Lucas, Gabriel Joshua Giray, Christopher Marzel Llorente, Ronnie Concepcion II and Ryan Rhay Vicerra	Light Emitting Diode Systems for Artificial Photobioreactors Used in Algal Biofuel Production: A Systematic and Trend Analysis
208	Heinrick Aquino, Ronnie Concepcion II, Andres Philip Mayol, Argel Bandala, Alvin Culaba, Joel Cuello and Elmer Dadios	Prediction of Moisture Content of Chlorella vulgaris Microalgae Using Hybrid Evolutionary Computing and Neural Network Variants for Biofuel Production
58	Dennis Michael Garcia, Andrea Nicole Ramos, Mark Vincent Santos, Christian Loyd Tayson, Ivan Karl Camacho, Florante Jr Poso and Mark Ondac	Seepage Simulation Analysis for Isotropic Soils of Homogeneous Embankment Dams
Session: E4	November 29, 2021 - 1415-1515 Parallel Room 5	
Paper ID No.	Authors	Paper Title
81	Rafael Dimaculangan	Development of Load Moment Control and Monitoring System for 2nd-Hand Mobile Heavy Load Cranes
218	Kate Francisco, Ronnie Concepcion II, R-Jay Relano, Mike Louie Enriquez, Ryan Rhay Vicerra and Argel Bandala	Systematic Analysis of the Implementation of Sustainable Development Goals on Energy, Industrialization, Infrastructure, and Innovation: A Multifaceted Philippines
228	Christian Hail Mendigoria, Ronnie Concepcion II, Ryan Rhay Vicerra, Andres Philip Mayol, Alvin Culaba, Elmer Dadios and Argel Bandala	Optimization of Vacuum Drying Properties for Chlorococcum infusionum Microalgae Moisture Content Using Hybrid Genetic Programming and Genetic Algorithm
Session: E5	November 29, 2021 - 1530-1630 Parallel Room 5	
Paper ID No.	Authors	Paper Title
254	Robert R. Bacarro, Vrian Jay V. Ylaya, Vicente Z. Delante and Ryan Rhay P. Vicerra	Development and Analysis of Footstep Power Harvester – A Case Study for the Viability Of the Device in Surigao City
128	Darwin Cruto, Lemuel Gabriel, Derrick Gomez, Stephen John Clemente, Florante Jr Poso and Villamor Jr. Abad	Impacts of COVID-19 Pandemic Crisis in the Transportation Sector: A Classification Analysis in Regard with Preferred Modes of Transportation Using Random Forest Algorithm
121	Michael Pacis, Conrado Ostia and Bryan Lee	Steady State Estimation of Power Distribution Networks with Distributed Generation using Integrated DC Load Flow and Weighted Least-Square Algorithm
266	Botond Hamori, Raouf N.G. Naguib, Quynh Thi Nguyen and Nghia Ton	Impact of COVID-19 on Air Quality in Hanoi and Ho Chi Minh City, Vietnam
Session: E6	November 30, 2021 - 0900-1000 Parallel Room 5	
Paper ID No.	Authors	Paper Title
257	Vicente Z. Delante, Vrian Jay V. Ylaya, Robert R. Bacarro and Ryan Rhay P. Vicerra	Analysis of Wind Power Potential Using the Developed Windmill with Data Logger

230	Amir Bracino, Danielle Grace Evangelista, Ronnie Concepcion II, Andres Philip Mayol, Elmer Dadios, Ryan Rhay Vicerra, Alvin Culaba, Cynthia Madrazo and Aristotle Ubando	Chemical Reaction Optimization (CRO) of Deep Neural Network (DNN) Model for Characterization of Algae Drying Kinetics
255	Robert R. Bacarro, Vrian Jay V. Ylaya, Vicente Z. Delante and Ryan Rhay P. Vicerra	Analysis of Water Leaking Pipes Using Impulse Radar: A Case Study in Surigao City, SDN Philippines
131	Michael Pacis, Allyzah Bernardo and Sean Chu	Phasor Measurement Unit (PMU) based Power System State Estimation with Distributed Generation (DG) using Integrated Alternating Current (AC) Load Flow with Weighted Least Square Algorithm
Session: E7	November 30, 2021 - 1015-1115 Parallel Room 5	
Paper ID No.	Authors	Paper Title
144	Riah Ann Fermin-Cayanan, Gorgonio Vallesteros II, Ronan Cadmiel Castro and Mark Adrian Lunaria	Hybrid Renewable Energy Resources Utilizing Hybrid PSO and Cuckoo Search Algorithm
245	Via Dominique Balcita, Althea Tiffanie Bejar, Thomas Peter Goy, Elmer Dadios and Robert Kerwin Billones	A Case Study on Waiting Line Management for the Land Transportation Office of the Philippines
129	Kristine Ruth Aniceto, Jeremiah Joshua Macam, Eric Iesten Salmorin, Ziah Kiyana Sison, Mark Paolo Mission, Ivan Karl Camacho and Florante Jr Poso	Seasonal Mapping and Air Quality Evaluation of Total Suspended Particulate Concentration Using ArcGIS-Based Spatial Analysis in Metro Manila, Philippines
161	Analyn Yumang, John Aldreen Arellano and Mich Hartell Mendiola	Fuzzy-Controlled Based Methane and Electricity Measurement on Anaerobic Digestion of Musa Subspecies' Peels
Session: E8	November 30, 2021 - 1300-1400 Parallel Room 5	
Paper ID No.	Authors	Paper Title
158	Dane Mark Abad, Amiel Llanda, Derick Ticsay, Rodin Valenzuela, Paulo Rafael Meris, Mark Christian Manuel, Jennifer Dela Cruz and Marvin Verdadero	Water Quality Assessment Using Microcontroller-based Robot in Aquaculture Consideration in Samal River
164	Japheth Jay Vergara and Thesa Vergara	PWM Speed Control of Brushless DC Motor for Inrush Current Regulation of Solar Water Pumping System
133	Mark Justine Balbenta, Anton Dominic Capistrano, Jandec David, Hans Tenaja, Florante Jr Poso and Melvin Solomon	Generation of Flood Hazard Maps in Marikina City Using GIS-MCDA Interval Rough AHP (IR'AHP)
149	Michael Pacis, Godfrey S. Arevalo and Adrian P. Agtalaao	Energy Harvesting on Playground Slide with Implementation of Lead Zirconate Titrate (PZT) Cantilever and Gear System with IoT Monitoring
Session: E9	November 30, 2021 - 1015-1115 Parallel Room 2	
Paper ID No.	Authors	Paper Title
163	Angelica De Leon and Febus Reidj Cruz	Water Level Monitoring and Flood Warning System using Light Detection and Ranging (LiDAR) Sensor with Hybrid Renewable Solar-Wind Power
173	William Buenaventura, Melodia Pahati and Francisco Uyvico	A Generator 1-kilowatt Output Powered by Biogas
256	Vicente Z. Delante, Vrian Jay V. Ylaya, Robert R. Bacarro and Ryan Rhay P. Vicerra	Energy Potential of Macopa Irrigation Using Pico-hydro Power Plant Design Using Under-shot Type Waterwheel
Session: E10	November 30, 2021 - 1300-1400 Parallel Room 2	
Paper ID No.	Authors	Paper Title
262	Jonnel Alejandrino, Ronnie Concepcion II, Vincent Jan Almero, Maria Gemel Palconit, Ryan Rhay Vicerra, Argel Bandala, Leonardo Venancio Jr. and Elmer Dadios	State-of-charge Monitoring and Actuation System for Photovoltaic Solar Cell System
122	Diana Rose Rivera	Waste to Energy Generation: A Multi-Criteria Decision Analysis for Municipal Solid Waste Management in the City of Manila, Philippines
123	Vladimir Ibañez, Mark Christian Manuel and Jocelyn Villaverde	Design and Simulation of a Small-scale Power-generating Device by Carbon Sequestration
246	Via Dominique Balcita, Althea Tiffanie Bejar, Thomas Peter Goy, Elmer Dadios and Robert Kerwin Billones	Optimizing the Allocation of Renewable Energy Generation and Energy Consumption of Power Plants in the Philippines using Linear Programming

Nanotechnology, Manufacturing and Industrial Processes		
Session: F1	November 29, 2021 - 0900-1000 Parallel Room 6	
Paper ID No.	Authors	Paper Title
2	Jetron Adtoon, Edmund Bajenting, Reynaldo Jr. Palmero and Ralph Emerson Ompoc	Design of Motorcycle Speed Limiter through Global Positioning System
46	Earle Asher Dy, Deniel Edusada, Jossefe Lyrro Robles, Axel Triñona, Ivan Karl Camacho, Mary Grace Calilung and Florante Jr Poso	Construction Labor Productivity in Construction Sites During the COVID-19 Pandemic Using Relative Importance Index (RII)
47	Eugene Paula Arnold, Patricia Coleen Fernandez, Jaiea Julia Larcena, Mark Paolo Mission, Florante Jr Poso and Dean Carlo Lambino	Household Awareness and Participation on Waste Disposal; An Effective Solid Waste Management Amidst COVID-19 Pandemic
49	Janelle Kyra Sagum	Web-Based Document Management System for PEP Squad Events and Marketing Services
Session: F2	November 29, 2021 - 1015-1115 Parallel Room 6	
Paper ID No.	Authors	Paper Title
61	John Mark Cagurungan, Royvin Factuar, Jan Marynelle Reyes, Dayanara Torres, Mark Paolo Mission, Florante Jr Poso, Villamor Jr Abad and Jon Arnel Telan	Artificial Neural Network on Solid Waste Generation Based on Five (5) Categories Within Barangay Sagrada Familia in Hagonoy, Bulacan
69	Richard Andres, Jason James Robin, Jose Florenz Somigao, John Robert Tapada, Florante Jr Poso, Orlando Lopez and Bon Ryan Aniban	Waste-to-Energy Smale Scale Incinerator Designed With Air Filters For Municipal Rural Area
222	Jullian Dominic Ducut and Robert Kerwin Billones	Design and Development of Robotic Arm Movements and Body Frame for a Social Robot for Graduation Rites
137	Jesus Jr Martinez, Excel Kit Palmes and Vance Alden Castro	External Battery Charge Limiter for Consumer Electronic Devices
Session: F3	November 29, 2021 - 1300-1400 Parallel Room 6	
Paper ID No.	Authors	Paper Title
106	Melrose Lopez, Bruce Sevilla, Yvonne Simborio and Rolieven Cañizares	Reverse Vending Machine with Power Output
113	Catherine Rose Aquino, John Julius Gaudario, Mikaela Oliva, Dan Alvin Punongbayan, Paul Simon Terencio and Sarah Vanguardia	Study on Seedling Disc Pellets Made from Rice Straw and Cow Manure
187	Alezander Mikhail Galindo, Robert Kerwin Billones and Elmer Dadios	Cost Optimization for the Allocation, Production, and Distribution of a Plastic Manufacturing Company Using Integer Linear Programming
139	Jennifer Dela Cruz, Mark Christian Manuel, Paolo Rafael Meris, Roderick Tud, Gian Marko Gian Marko C. Agustin and Chris Dane B. Bernal Chris Dane B. Bernal	Wireless Semi-Autonomous Gas Contaminant Detection Robot
Session: F4	November 29, 2021 - 1415-1515 Parallel Room 6	
Paper ID No.	Authors	Paper Title
150	Willen Mark Manzanas, Jocelyn Villaverde and Mark Christian Manuel	Development of Piezoelectric Tiles That Utilizes Human Kinetic Energy from Walking to Provide 48 Watt-Hours of Energy for a 16 W Led Light Bulb
151	Vladimir Ibañez, Jocelyn Villaverde and Mark Christian Manuel	Development, Installation, and Testing of Solar Distillation System Integrated with Salt Gradient Solar Pond
167	Leif Oliver Coronado	Finite Element Modal Analysis and Harmonic Response Analysis of a 3D Printed Vibration Sensor Enclosure
78	Meo Vincent Caya, Drazen Khristofen Romero and Paul Castro	E-nose Based Classification of Drying Method Using Local Tea Leaves Gas Signature
Session: F5	November 29, 2021 - 1530-1630 Parallel Room 6	
Paper ID No.	Authors	Paper Title
166	Rodrigo Jr Pangantihon, Jocelyn Villaverde and Mark Christian Manuel	Design, Fabrication, and Testing of an Automated Pneumatic Braking Program with the Use of Ultrasonic Sensor
239	Kate Francisco, Ronnie Concepcion II, R-Jay Relano, Mike Louie Enriquez, Jonah Jahara Baun, Jason Espaniola, Ryan Rhay Vicerra, Argel Bandala and Elmer Dadios	Analytical Hierarchical Process-based Material Selection for Trailer Body Frame of an Underground Imaging System
196	Allan Punongbayan, Alvin Hemedez, April Jay Dueñas, Elino Jr Austria, Rhoniel Gerald Romero, Jesse Ian Lloyd Alcaraz and Sarah Vanguardia	Utilization of Banana Peel and Carton Waste in Manufacturing of Thermal Insulation Board
199	Jesse Ian Lloyd Alcaraz, Jack Armando, Garry Fiedacan, Patrick John Olmedo, Julius Caesar Sevilleno, Marcial Usaraga and Sarah Vanguardia	Eco-Friendly Concrete Roof Tiles Reinforced by Coconut Shell Powder and Coir
Session: F6	November 30, 2021 - 0900-1000 Parallel Room 6	
Paper ID No.	Authors	Paper Title
216	Susano Ampo II, Bessie Jane Glor, Desiree Fae Gimutao, Jochelle Guitierrez, Andrea Mae Gonzales, Sarah Vanguardia and Julian Robert Obamos	Innovation of Biodegradable Seeding Cup Made of Calamansi Peel: An Alternative Solution to Decrease Microplastic

267	Ana Antoniette Illahi, Elmer Dadios, Argel Bandala, Ryan Rhay Vicerra and Edwin Sybingco	Automatic Harmful Gas Detection Using Electronic Nose Technology
221	Justein Alagenio, Edriane James Jabanes and Cresencio Genobiagon	Hardware Development of a Humanoid Robot Head: "Gabot"
76	Meo Vincent Caya, Brian Mae Rabago and Tiffany Rodrigo	Development of a Portable Electrospinning Device with Tunable Voltage for Nanofiber Production
Session: F7		November 30, 2021 - 1015-1115 Parallel Room 6
Paper ID No.	Authors	Paper Title
223	Delan Bacus, Kenney Dave Ayawan, Abe Brent Saguiguit and Emmilou John Traya	Portable Desalination Equipment for Fishermen
229	Febus Reidj G. Cruz, Bryx William C. Garcia, Ryan Christopher M. Gania, Jared Christian R. Nob and Ma. Purie Angela H. Bongon	Solar-Assisted Electric Boat Power and Propulsion System Simulations
170	Rodrigo Jr Pangantihon, Jocelyn Villaverde and Mark Christian Manuel	Development of a Wireless Magnetic Climbing Robot for Visual Inspection of Galvanized Cooling Towers in a Commercial Building
250	Ana Antoniette Illahi, Elmer Dadios, Argel Bandala and Ryan Rhay Vicerra	Electronic Nose Technology and Application: A Review
Session: F8		November 30, 2021 - 1300-1400 Parallel Room 6
Paper ID No.	Authors	Paper Title
247	Alexander Paran and Robert Dizon	Modeling the Flow Dynamics of the Ostreavent II using Scilab
261	Miriam Bongo and Jose Edgar Mutuc	Six Sigma fiascos: a failure in the consensus of perspective
217	Jaezell Pesarit, Kesia Aldree Nabio, John Vincent Cuizon, Jesse James Javier, Jonaliza Balce and Julian Robert Obamos	Manufacturing of Biodegradable Cushion Packaging Material Using Compound Properties of Chicken Feather and Cornstarch as Alternative to Expanded Polystyrene Foam
273	Jeanette Pao, Charles Alver Banglos, Karl Martin Aldueso, Carl John Salaan and Jonathan Maglasang	Aerodynamic Analysis and Vibration Response of Spherical Shell with Meshed Net for Unmanned Aerial Vehicle Application

Plant, Agriculture, Farming and Food		
Session: G1	November 29, 2021 - 0900-1000 Parallel Room 7	
Paper ID No.	Authors	Paper Title
7	Manuel Garcia, Joel Mangaba and Celeste Tanchoco	Acceptability, Usability, and Quality of a Personalized Daily Meal Plan Recommender System: The Case of Virtual Dietitian
14	Mark Adrian Lunaria, Gorgonio Vallesteros, Ronan Cadmiel Castro and Riah Ann Fermin-Cayanan	Solar Powered Automated Drip Irrigation System using Particle Swarm Optimization
18	Dann Paulo Javierto, John Dannielle Martin and Jocelyn Villaverde	Robusta Coffee Leaf Detection based on YOLOv3-MobileNetV2 model
21	Ronnie Concepcion II, Bernardo Duarte, Argel Bandala, Joel Cuello, Ryan Rhay Vicerra and Elmer Dadios	Characterization of Potassium Chloride Stress on Philippine Vigna radiata Varieties in Temperature-stabilized Hydroponics Using Genetic Programming
Session: G2	November 29, 2021 - 1015-1115 Parallel Room 7	
Paper ID No.	Authors	Paper Title
20	Jazzlin Maye Bilang, Patricia Anne Alexis Balbuena and Jocelyn Villaverde	Cactaceae Detection Using MobileNet Architecture
32	Ramon Garcia, Milbert Shane Bicol and Amber Meazyle Cababat	A Raspberry Pi Microcontroller-based Insect Pests Detection, Counting and Logging System in Eggplants using SSD Lite MobileNetV2
97	Jay Navaluna, John Christian Herrera, Marla Redillas, Aaron Don Africa, Aristotle Ubando, Mark Christian Felipe Redillas and Alvin Culaba	An Optimization Algorithm Using Fuzzy Logic and Weibull Distribution for Bioretention Systems
125	Ronnie Concepcion II, Adrian Genevie Janairo, Maria Gemel Palconit, Joy Carpio, Argel Bandala, Ryan Rhay Vicerra, Joel Cuello and Elmer Dadios	Influence of Storage Periods and Temperatures on Postharvest Quality of Fresh-Marketed Lycopersicon esculentum Mill.
Session: G3	November 29, 2021 - 1300-1400 Parallel Room 7	
Paper ID No.	Authors	Paper Title
34	Ramon Garcia, Euro Mark Ebro and Rowen Carlo Balaba	Detection and Classification of Pathogens in Gram-Stained Dairy Cow Milk Using Otsu Method
71	Arnold Apdohan	Water Resource Potential Assessment for Pump Irrigation Systems for Open Source in Caraga Region, Philippines
174	Ronnie Concepcion II, Luigi Gennaro Izzo, Joel Cuello, Edwin Sybingco and Elmer Dadios	Stimulation of Static Electric Field and Exposure Time on Germination and Stem Tissues of Hybrid Philippine Zea mays Genotypes
202	Aaron Don Africa, Gabriel Antonio Borja and Gerard Ryan Ching	Arduino-based Digital Plant Control System
Session: G4	November 29, 2021 - 1415-1515 Parallel Room 7	
Paper ID No.	Authors	Paper Title
36	Ramon Garcia, Alejandro Ballado Jr., Jeremy Yumol and Charles Nicole David	Swarm Robotics Application for Gathering Soil Samples
42	Giorgette Louise Tuazon, Hazeline Duran and Jocelyn Villaverde	Portable Sigatoka Spot Disease Identifier on Banana Leaves Using Support Vector Machine
209	Heinrick Aquino, Ronnie Concepcion II, Argel Bandala, Christian Hail Mendigoria, Oliver John Alajas, Elmer Dadios and Joel Cuello	Fuzzy Logic Controlled Motor Speed in Rotating Aquaponics Based on Chlorosis and Necrosis Severity of Lettuce Leaf and Temperature
210	Ronnie Concepcion II, Bennyvic Joyce Esguerra, Christian Hail Mendigoria, Heinrick Aquino, Oliver John Alajas, Kate Francisco, John Joshua Montañez, Argel Bandala and Elmer Dadios	Intelligent Permaculture: A Sustainable and Profitable Practice for Tropical and Maritime Climate Urban and Peri-urban Agricultural Ecosystems
Session: G5	November 29, 2021 - 1530-1630 Parallel Room 7	
Paper ID No.	Authors	Paper Title
72	Midas Angelo M. Araneta, Daniel V. Asenjo, Carl Jeremiah L. Lamprea, Argilyn Mae L. Reyes and Oliver A. Medina	Controlled Environment for Spinach Cultured Plant with Health Analysis using Machine Learning
79	Meo Vincent Caya, Jennifer Dela Cruz, Anna Maria Estrella and Jonas Cyril Mendoza	Fuzzy Controlled LED Lighting Compensation for Aeroponics System
118	Glenn Magwili, Jhon Louise Ison, Justin Alfred San Pedro and Jemmar Ramizares	Precision Agriculture Detecting NPK Level Using Wireless Sensor Network with Mobile Sensor Nodes
226	Oliver John Alajas, Ronnie Concepcion II, Ryan Rhay Vicerra, Argel Bandala, Edwin Sybingco, Elmer Dadios, Joel Cuello and Vanessa Fonseca	Indirect Prediction of Aquaponic Water Nitrate Concentration Using Hybrid Genetic Algorithm and Recurrent Neural Network
Session: G6	November 30, 2021 - 0900-1000 Parallel Room 7	
Paper ID No.	Authors	Paper Title
96	Carlo Romero, Antipas Teologo Jr. and Arnel Nuesca	Arduino Rice Pest Trap Using Laser Sensors
127	Noel Linsangan and Lyndon Buenconsejo	Classification of Healthy and Unhealthy Abaca leaf using a Convolutional Neural Network (CNN)
227	Christan Hail Mendigoria, Ronnie Concepcion II, Argel Bandala, Oliver John Alajas, Heinrick Aquino and Elmer Dadios	OryzaNet: Leaf Quality Assessment of Oryza sativa Using Hybrid Machine Learning and Deep Neural Network

232	Maria Gemel Palconit, Ronnie Concepcion II, Rogelio Ruzcko Tobias, Jonnel Alejandrino, Vincent Jan Almero, Argel Bandala, Ryan Rhay Vicerra, Edwin Sybingco and Elmer Dadios	Development of IoT-based Fish Tank Monitoring System
Session: G7	November 30, 2021 - 1015-1115 Parallel Room 7	
Paper ID No.	Authors	Paper Title
110	Rex Paolo Gamara, Renann Baldovino and Pocholo James Loresco	Image-Based Shrimp Length Determination using OpenCV
138	Jennifer Dela Cruz, Mark Christian Manuel, Roderick Tud, John Edward Cruz, Ronnel Reyes and Mark Joseph Macapuno	Development of a One Way, Imaging Based Fish Fingerling Counter Using Raspberry Pi
238	Ronnie Concepcion II, Llewelyn Moron, Ira Valenzuela, Jonnel Alejandrino, Ryan Rhay Vicerra, Argel Bandala and Elmer Dadios	Towards the Integration of Computer Vision and Applied Artificial Intelligence in Postharvest Storage Systems: Non-invasive Harvested Crop Monitoring
269	Jo-Ann Magumbol, Maria Gemel Palconit, Lovelyn Garcia, Marife Rosales, Argel Bandala and Elmer Dadios	A Genetic Algorithm-based Approach for Temperature Optimization to Improve Lettuce Quality
Session: G8	November 30, 2021 - 1300-1400 Parallel Room 7	
Paper ID No.	Authors	Paper Title
126	Daniel Matheous Dungca, Paul Michael Mondoñedo, Hannah Faye Orence, Mark Dave Larioza, Oliver Medina and Anna-Liza Sigue	Innovating Green Wall: A Sustainable Way of Enhancing the Vertical Planting System
159	Jomarie Coruña, Zaira Gonzalvo, Mar Al Joe Gumban, Jenevieve Lorico, Ricky Umali, Mark Christian Manuel, Jennifer Dela Cruz and Marvin Verdadero	Development of a Controlled Hydroponic Growth Chamber for Solanum Lycopersicum "ROMA" Production
260	Ronnie Concepcion II, Maria Gemel Palconit, Christian Hail Mendigoria, Jonah Jahara Baun, Jonnel Alejandrino, Vanessa Fonseca, Andres Philip Mayol, Ryan Rhay Vicerra, Argel Bandala and Elmer Dadios	Analytical Hierarchy Processing for Sustainable Intensive Caged Tilapia and Milkfish Cultivation Site Selection in the Philippines
Session: G9	November 30, 2021 - 1300-1400 Parallel Room 4	
Paper ID No.	Authors	Paper Title
204	Glenn Magwili and Paul Andre Tapiceria	Hybrid Solar-Hydrokinetic Powered Automated Irrigation system
237	Mark Neil Caronan, Angelo Kharlo Celon, Mary Joyce Recto, John Matthew San Miguel, Mark Jerome San Pedro, Cristian Lazana, Ana Liza Publico and Argel Bandala	COCOBOT: Design and Implementation of a Robotic Arm to Ameliorate the Process of Stirring in the Coco Sugar Production in Alabat, Quezon
272	Aileen Villamonte, Patrick John Silva, Divina Gracia Ronquillo, Marife Rosales, Argel Bandala and Elmer Dadios	Python Based Defect Classification of Theobroma Cacao Bean using Fine-Tuned Visual Geometry Group16
270	Marife Rosales, Maria Gemel Palconit, Vincent Jan Almero, Edwin Sybingco, Argel Bandala, Elmer Dadios and Ronnie Concepcion II	Faster R-CNN based Fish Detector for Smart Aquaculture System

Sensor Networks, Signals, and Communication Technologies		
Session: H1	November 29, 2021 - 1415-1515 Parallel Room 2	
Paper ID No.	Authors	Paper Title
19	Rheeca Guion and Wilson Tan	Characterization of WiFi Signal Range and Bandwidth of the Philippines' "Free WiFi For All" Project
27	Glenn Magwili, Noel Linsangan, Jose Martin Marasigan and Carl Joseph Villanueva	Post Disaster Indoor Position Tracking Device with Pulse Detection in Wireless Sensor Networks
75	Aulivier Gilchrist Aquino, Alejandro Ballado and Azriell Bautista	Implementing a Wireless Sensor Network with Multiple Arduino-Based Farming Multi-Sensor Tool to Monitor a Small Farm Area Using ESP32 Microcontroller Board
10	Tun Tun Oo, Roy Francis Navea, Aaron Don M. Africa, Argel Bandala, Cesar Llorente, Ryan Rhay Vicerra and Kyawt Khin	Fuzzy Set the Data and Traffic Harmonize Algorithm for IP-Transit and Peer links of IXP
Session: H2	November 29, 2021 - 1530-1630 Parallel Room 2	
Paper ID No.	Authors	Paper Title
143	Gerard Ang, Maria Luisa Pernia and Roden Jay Rabe	Modeling and Simulation of D-STATCOM based on Phase Shift Control Applied in IEEE Bus 5 System: Mitigation of Voltage Sag, Swell and Harmonics Due to Fault Conditions
146	Febus Reidj Cruz, Alejandro Ballado Jr., Kim Legaspi and Mark Justine Prado	Development of Vessel Monitoring and Reporting Application of Automatic Identification System
186	Reggie Gustilo, Rommel Cortez, Gerald Arada and Elmer Magsino	Performance Improvement of the DWT-OFDM System Using Convolutional Coding
211	Matthew Joseph Dionela, Catherine Abigail Marino, Alexandra Denyse Oropesa, Louise Marwin Paran, Ronnie Concepcion II and Ryan Rhay Vicerra	ANCoustics: A Systematic Analysis in Acoustics with Active Noise-Cancellation Technology
Session: H3	November 30, 2021 - 0900-1000 Parallel Room 2	
Paper ID No.	Authors	Paper Title
200	Angel Flynn Egam, Keith Nicole Loma and Febus Reidj Cruz	A Handheld Global Positioning System with Compass and VHF Radio Transceiver
231	Jonnel Alejandrino, Ronnie Concepcion II, Maria Gemel Palconit, Elmer Dadios, Argel Bandala and Ryan Rhay Vicerra	Irescue: Tracking Device using RuBee – based Technology
248	Gideon Buniel and Monalee Dela Cerna	i-Detect: An Internet of Things Voice-Activated Home Automation with Smoke and Fire Detection and Mitigation System

WFH Session		
Session: WFH	November 30, 2021 - 1300-1515 Parallel Room 1	
Paper ID No.	Authors	Paper Title
73	Jack Armando, Garry Fiedacan, Patrick John Olmedo, Julius Caesar Sevilleno and Marcial Usaraga	Impacts of COVID-19 Pandemic on Mental Health Condition of PnC Engineering Students: A Basis for Development of Intervention Program Using DMADV
142	Paulo Jay De Jesus	Paper Analysis of "Motivational antecedents to high-tech R&D employees' innovative work behavior: Self-determined motivation, person-organization fit, organization support of creativity, and pay justice" during the Pandemic
172	Manuel Belino, Hans Felix Bosshard, Jaychris Georgette Onia and Diana Rose Rivera	Implementation of Online Education by the Mechanical Engineering Department at FEU Tech During the COVID-19 Pandemic

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1	Smart Electronic Assistive Device for Visually Impaired Individual with Image Processing	Session A1: Biomedical Robotics and Health Technologies 1	November 29, 2021 - 0900-1000 Parallel Room 1
2	Design of Motorcycle Speed Limiter through Global Positioning System	Session F1: Nanotechnology, Manufacturing and Industrial Processes 1	November 29, 2021 - 0900-1000 Parallel Room 6
3	Towards the Development of Pneumatically Actuated Soft Robotic Hand	Session A1: Biomedical Robotics and Health Technologies 1	November 29, 2021 - 0900-1000 Parallel Room 1
4	Development of Smart Waste Bin Segregation using Image Processing	Session C9: Computer Vision, Artificial Intelligence and Intelligent Systems 9	November 30, 2021 - 0900-1000 Parallel Room 1
6	An Online Examination System Applying Browser /Server Architecture for Online Class	Session D1: Education, Media, Knowledge, and Business Platforms 1	November 29, 2021 - 0900-1000 Parallel Room 4
7	Acceptability, Usability, and Quality of a Personalized Daily Meal Plan Recommender System: The Case of Virtual Dietitian	Session G1: Plant, Agriculture, Farming and Food 1	November 29, 2021 - 0900-1000 Parallel Room 7
10	Fuzzy Set the Data and Traffic Harmonize Algorithm for IP-Transit and Peer links of IXP	Session H1: Sensor Networks, Signals, and Communication Technologies 1	November 29, 2021 - 1415-1515 Parallel Room 2
13	iVital: Mobile Health Expert System with Wearable Vital Sign Analyzer	Session A5: Biomedical Robotics and Health Technologies 5	November 29, 2021 - 1530-1630 Parallel Room 1
14	Solar Powered Automated Drip Irrigation System using Particle Swarm Optimization	Session G1: Plant, Agriculture, Farming and Food 1	November 29, 2021 - 0900-1000 Parallel Room 7
15	Design the Climate Change Hybrid grid with Wind generator and PV module by using Fuzzy Logic	Session E1: Environment, Energy, Transportation, and Infrastructure 1	November 29, 2021 - 0900-1000 Parallel Room 5
16	Designing Human-Centered Learning Analytics Dashboard for Higher Education Using a Participatory Design Approach	Session D4: Education, Media, Knowledge, and Business Platforms 4	November 29, 2021 - 1415-1515 Parallel Room 4
17	Assessing the Role of Python Programming Gamified Course on Students' Knowledge, Skills Performance, Attitude, and Self-Efficacy	Session D2: Education, Media, Knowledge, and Business Platforms 2	November 29, 2021 - 1015-1115 Parallel Room 4
18	Robusta Coffee Leaf Detection based on YOLOv3-MobileNetv2 model	Session G1: Plant, Agriculture, Farming and Food 1	November 29, 2021 - 0900-1000 Parallel Room 7
19	Characterization of WiFi Signal Range and Bandwidth of the Philippines' "Free WiFi For All" Project	Session H1: Sensor Networks, Signals, and Communication Technologies 1	November 29, 2021 - 1415-1515 Parallel Room 2

20	Cactaceae Detection Using MobileNet Architecture	Session G2: Plant, Agriculture, Farming and Food 2	November 29, 2021 - 1015-1115 Parallel Room 7
21	Characterization of Potassium Chloride Stress on Philippine Vigna radiata Varieties in Temperature-stabilized Hydroponics Using Genetic Programming	Session G1: Plant, Agriculture, Farming and Food 1	November 29, 2021 - 0900-1000 Parallel Room 7
23	Recognition of Feline Epidermal Disease using Raspberry-Pi based Gray Level Co-occurrence Matrix and Support Vector Machine	Session C4: Computer Vision, Artificial Intelligence and Intelligent Systems 4	November 29, 2021 - 1415-1515 Parallel Room 3
25	Disinfectant Synthesizer using Electrolysis for Automatic Utilization of Sanitation Kiosk	Session C4: Computer Vision, Artificial Intelligence and Intelligent Systems 4	November 29, 2021 - 1415-1515 Parallel Room 3
27	Post Disaster Indoor Position Tracking Device with Pulse Detection in Wireless Sensor Networks	Session H1: Sensor Networks, Signals, and Communication Technologies 1	November 29, 2021 - 1415-1515 Parallel Room 2
28	Development of Earthquake Liquefaction Maps of Laguna, Philippines	Session E1: Environment, Energy, Transportation, and Infrastructure 1	November 29, 2021 - 0900-1000 Parallel Room 5
29	Coin Identification and Conversion System using Image Processing	Session C4: Computer Vision, Artificial Intelligence and Intelligent Systems 4	November 29, 2021 - 1415-1515 Parallel Room 3
32	A Raspberry Pi Microcontroller-based Insect Pests Detection, Counting and Logging System in Eggplants using SSD Lite MobileNetV2	Session G2: Plant, Agriculture, Farming and Food 2	November 29, 2021 - 1015-1115 Parallel Room 7
34	Detection and Classification of Pathogens in Gram-Stained Dairy Cow Milk Using Otsu Method	Session G3: Plant, Agriculture, Farming and Food 3	November 29, 2021 - 1300-1400 Parallel Room 7
36	Swarm Robotics Application for Gathering Soil Samples	Session G4: Plant, Agriculture, Farming and Food 4	November 29, 2021 - 1415-1515 Parallel Room 7
37	Determination of Unsound Concrete using Non-Destructive Testing in a Smooth Concrete through various Image Processing Techniques	Session E2: Environment, Energy, Transportation, and Infrastructure 2	November 29, 2021 - 1015-1115 Parallel Room 5
39	Applying Heatmaps for Health Hazard Indicators Living Near the Philippine National Railway (PNR) Trains in the National Capital Region (NCR)	Session E2: Environment, Energy, Transportation, and Infrastructure 2	November 29, 2021 - 1015-1115 Parallel Room 5
40	Prediction and Generation of Multiple Complex Drawing Figures From Partial Drawing Sequences	Session C7: Computer Vision, Artificial Intelligence and Intelligent Systems 7	November 30, 2021 - 1015-1115 Parallel Room 3
41	Using Unevenly Spaced Time Series Data Set in a Convolutional Reconstruction Autoencoder Algorithm	Session B1: Computer Science, Data Science, and Algorithms 1	November 29, 2021 - 0900-1000 Parallel Room 2
42	Portable Sigatoka Spot Disease Identifier on Banana Leaves Using Support Vector Machine	Session G4: Plant, Agriculture, Farming and Food 4	November 29, 2021 - 1415-1515 Parallel Room 7

44	Negative Air Pressure Isolation Room for COVID-19 Patients in the Philippines: A Simulation of the Proposed Design using SolidWorks	Session A2: Biomedical Robotics and Health Technologies 2	November 29, 2021 - 1015-1115 Parallel Room 1
45	Rainfall And Meteorological Drought Forecasting in Albay, Philippines Using Artificial Neural Network	Session E2: Environment, Energy, Transportation, and Infrastructure 2	November 29, 2021 - 1015-1115 Parallel Room 5
46	Construction Labor Productivity in Construction Sites During the COVID-19 Pandemic Using Relative Importance Index (RII)	Session F1: Nanotechnology, Manufacturing and Industrial Processes 1	November 29, 2021 - 0900-1000 Parallel Room 6
47	Household Awareness and Participation on Waste Disposal; An Effective Solid Waste Management Amidst COVID-19 Pandemic	Session F1: Nanotechnology, Manufacturing and Industrial Processes 1	November 29, 2021 - 0900-1000 Parallel Room 6
49	Web-Based Document Management System for PEP Squad Events and Marketing Services	Session F1: Nanotechnology, Manufacturing and Industrial Processes 1	November 29, 2021 - 0900-1000 Parallel Room 6
50	EC Health Medical Clinic and Diagnostic Center Appointment System	Session B1: Computer Science, Data Science, and Algorithms 1	November 29, 2021 - 0900-1000 Parallel Room 2
51	Twitter Sentiment Analysis towards Online Learning during COVID-19 in the Philippines	Session B3: Computer Science, Data Science, and Algorithms 3	November 29, 2021 - 1300-1400 Parallel Room 2
52	Design and development of a web GIS-based visualization and analytical platform for Farm-to-Market Road projects of the Philippines's Department of Agriculture	Session B2: Computer Science, Data Science, and Algorithms 2	November 29, 2021 - 1015-1115 Parallel Room 2
53	Two-Cell Contractions of a Filipino Braille Recognition Using Extreme Learning Machine	Session A2: Biomedical Robotics and Health Technologies 2	November 29, 2021 - 1015-1115 Parallel Room 1
54	Classification of Otitis Media Infections using Image Processing and Convolutional Neural Network	Session A2: Biomedical Robotics and Health Technologies 2	November 29, 2021 - 1015-1115 Parallel Room 1
57	Integration of RESTful API to Student Information System for Secured Data Sharing and Single Sign-on	Session D1: Education, Media, Knowledge, and Business Platforms 1	November 29, 2021 - 0900-1000 Parallel Room 4
58	Seepage Simulation Analysis for Isotropic Soils of Homogeneous Embankment Dams	Session E3: Environment, Energy, Transportation, and Infrastructure 3	November 29, 2021 - 1300-1400 Parallel Room 5
60	Gender Classification Hand Recognition System Using Key-Point Detection with Deep Neural Network	Session C3: Computer Vision, Artificial Intelligence and Intelligent Systems 3	November 29, 2021 - 1300-1400 Parallel Room 3
61	Artificial Neural Network on Solid Waste Generation Based on Five (5) Categories Within Barangay Sagrada Familia in Hagonoy, Bulacan	Session F2: Nanotechnology, Manufacturing and Industrial Processes 2	November 29, 2021 - 1015-1115 Parallel Room 6
62	Classification of Fire Related Tweets on Twitter Using Bidirectional Encoder Representations from Transformers (BERT)	Session B1: Computer Science, Data Science, and Algorithms 1	November 29, 2021 - 0900-1000 Parallel Room 2
64	Smart Stick for the Visually Impaired Person	Session A3: Biomedical Robotics and Health Technologies 3	November 29, 2021 - 1300-1400 Parallel Room 1

66	AlertQC: A Web and Mobile Disaster Utility and Incident Report Management System for Quezon City Disaster Risk Reduction and Management Office	Session D3: Education, Media, Knowledge, and Business Platforms 3	November 29, 2021 - 1300-1400 Parallel Room 4
67	E-Commerce System for Anywhere Fitness PH With Sentiment Analysis	Session D5: Education, Media, Knowledge, and Business Platforms 5	November 29, 2021 - 1530-1630 Parallel Room 4
68	VIP-Guide: Development of Pedestrian Crossing Guide for the Visually Impaired People	Session A3: Biomedical Robotics and Health Technologies 3	November 29, 2021 - 1300-1400 Parallel Room 1
69	Waste-to-Energy Smale Scale Incinerator Designed With Air Filters For Municipal Rural Area	Session F2: Nanotechnology, Manufacturing and Industrial Processes 2	November 29, 2021 - 1015-1115 Parallel Room 6
71	Water Resource Potential Assessment for Pump Irrigation Systems for Open Source in Caraga Region, Philippines	Session G3: Plant, Agriculture, Farming and Food 3	November 29, 2021 - 1300-1400 Parallel Room 7
72	Controlled Environment for Spinach Cultured Plant with Health Analysis using Machine Learning	Session G5: Plant, Agriculture, Farming and Food 5	November 29, 2021 - 1530-1630 Parallel Room 7
73	Impacts of COVID-19 Pandemic on Mental Health Condition of PnC Engineering Students: A Basis for Development of Intervention Program Using DMADV	Session: WFH Session	November 30, 2021 - 1300-1515 Parallel Room 1
74	Tracelet: Contact Tracing and Physical Distancing Device with Blockchain Technology for Pamantasan ng Cabuyao	Session B2: Computer Science, Data Science, and Algorithms 2	November 29, 2021 - 1015-1115 Parallel Room 2
75	Implementing a Wireless Sensor Network with Multiple Arduino-Based Farming Multi-Sensor Tool to Monitor a Small Farm Area Using ESP32 Microcontroller Board	Session H1: Sensor Networks, Signals, and Communication Technologies 1	November 29, 2021 - 1415-1515 Parallel Room 2
76	Development of a Portable Electrospinning Device with Tunable Voltage for Nanofiber Production	Session F6: Nanotechnology, Manufacturing and Industrial Processes 6	November 30, 2021 - 0900-1000 Parallel Room 6
77	Dog Identification System Using Nose Print Biometrics	Session C1: Computer Vision, Artificial Intelligence and Intelligent Systems 1	November 29, 2021 - 0900-1000 Parallel Room 3
78	E-nose Based Classification of Drying Method Using Local Tea Leaves Gas Signature	Session F4: Nanotechnology, Manufacturing and Industrial Processes 4	November 29, 2021 - 1415-1515 Parallel Room 6
79	Fuzzy Controlled LED Lighting Compensation for Aeroponics System	Session G5: Plant, Agriculture, Farming and Food 5	November 29, 2021 - 1530-1630 Parallel Room 7
81	Development of Load Moment Control and Monitoring System for 2nd-Hand Mobile Heavy Load Cranes	Session E4: Environment, Energy, Transportation, and Infrastructure 4	November 29, 2021 - 1415-1515 Parallel Room 5
82	Gender Identification Using Keras Model Through Detection of Face	Session C5: Computer Vision, Artificial Intelligence and Intelligent Systems 5	November 29, 2021 - 1530-1630 Parallel Room 3

83	Tongue Biometrics Extraction Based on YOLO Algorithm and CNN Inception	Session C3: Computer Vision, Artificial Intelligence and Intelligent Systems 3	November 29, 2021 - 1300-1400 Parallel Room 3
86	IoTFisher: A Fish Feeder Mechanism with Timer/ GSM based	Session C2: Computer Vision, Artificial Intelligence and Intelligent Systems 2	November 29, 2021 - 1015-1115 Parallel Room 3
88	Complete Blood Count (CBC) Analysis Mobile Application	Session C1: Computer Vision, Artificial Intelligence and Intelligent Systems 1	November 29, 2021 - 0900-1000 Parallel Room 3
89	Car Damage Detector: A Comparative Study of Haar Cascade Classifier Algorithm and Convolutional Neural Networks	Session C5: Computer Vision, Artificial Intelligence and Intelligent Systems 5	November 29, 2021 - 1530-1630 Parallel Room 3
91	PUPRBLMS: Development And Acceptability of a Proposed Library Management System	Session D3: Education, Media, Knowledge, and Business Platforms 3	November 29, 2021 - 1300-1400 Parallel Room 4
92	Volume Approximation Using Kinect Sensor	Session C8: Computer Vision, Artificial Intelligence and Intelligent Systems 8	November 30, 2021 - 1300-1400 Parallel Room 3
93	Development And Acceptability of a Student Daily Attendance Monitoring System	Session D4: Education, Media, Knowledge, and Business Platforms 4	November 29, 2021 - 1415-1515 Parallel Room 4
95	Strengthening Module Development to Full Online Modality: Faculty and Student Adaptation in the Pandemic Era	Session D5: Education, Media, Knowledge, and Business Platforms 5	November 29, 2021 - 1530-1630 Parallel Room 4
96	Arduino Rice Pest Trap Using Laser Sensors	Session G6: Plant, Agriculture, Farming and Food 6	November 30, 2021 - 0900-1000 Parallel Room 7
97	An Optimization Algorithm Using Fuzzy Logic and Weibull Distribution for Bioretention Systems	Session G2: Plant, Agriculture, Farming and Food 2	November 29, 2021 - 1015-1115 Parallel Room 7
98	Automated RBC Morphology Counting and Grading Using Image Processing and Support Vector Machine	Session A3: Biomedical Robotics and Health Technologies 3	November 29, 2021 - 1300-1400 Parallel Room 1
103	Deriving Heart Rate and Respiratory Rate from Pulse Oximetry Using Neural Networks	Session A3: Biomedical Robotics and Health Technologies 3	November 29, 2021 - 1300-1400 Parallel Room 1
104	Classification of Filipino Braille Codes with Contractions Using Machine Vision	Session A4: Biomedical Robotics and Health Technologies 4	November 29, 2021 - 1415-1515 Parallel Room 1
105	Behavior-Based Early Cervical Cancer Risk Detection Using Artificial Neural Networks	Session A1: Biomedical Robotics and Health Technologies 1	November 29, 2021 - 0900-1000 Parallel Room 1
106	Reverse Vending Machine with Power Output	Session F3: Nanotechnology, Manufacturing and Industrial Processes 3	November 29, 2021 - 1300-1400 Parallel Room 6
107	Android-Based Mobile Grade Viewer Application Using PHP	Session D6: Education, Media, Knowledge, and Business Platforms 6	November 30, 2021 - 0900-1000 Parallel Room 4
110	Image-Based Shrimp Length Determination using OpenCV	Session G7: Plant, Agriculture, Farming and Food 7	November 30, 2021 - 1015-1115 Parallel Room 7

113	Study on Seedling Disc Pellets Made from Rice Straw and Cow Manure	Session F3: Nanotechnology, Manufacturing and Industrial Processes 3	November 29, 2021 - 1300-1400 Parallel Room 6
117	Development and Characterization of Energy Harvester using Electromagnetic Linear Generators in Bicycle Shock Absorbers	Session E3: Environment, Energy, Transportation, and Infrastructure 3	November 29, 2021 - 1300-1400 Parallel Room 5
118	Precision Agriculture Detecting NPK Level Using Wireless Sensor Network with Mobile Sensor Nodes	Session G5: Plant, Agriculture, Farming and Food 5	November 29, 2021 - 1530-1630 Parallel Room 7
119	Implementation of a Hybrid Plant-Shaped Energy Harvester Using Flexible Polyvinylidene Fluoride (PVDF) Piezoelectric and Solar Film	Session E1: Environment, Energy, Transportation, and Infrastructure 1	November 29, 2021 - 0900-1000 Parallel Room 5
121	Steady State Estimation of Power Distribution Networks with Distributed Generation using Integrated DC Load Flow and Weighted Least-Square Algorithm	Session E5: Environment, Energy, Transportation, and Infrastructure 5	November 29, 2021 - 1530-1630 Parallel Room 5
122	Waste to Energy Generation: A Multi-Criteria Decision Analysis for Municipal Solid Waste Management in the City of Manila, Philippines	Session E10: Environment, Energy, Transportation, and Infrastructure 10	November 30, 2021 - 1300-1400 Parallel Room 2
123	Design and Simulation of a Small-scale Power-generating Device by Carbon Sequestration	Session E10: Environment, Energy, Transportation, and Infrastructure 10	November 30, 2021 - 1300-1400 Parallel Room 2
124	e-hAC: Interactive Health Access Card Dispenser Kiosk to aid Outpatient Queuing in Jose Reyes Memorial Medical Center	Session D6: Education, Media, Knowledge, and Business Platforms 6	November 30, 2021 - 0900-1000 Parallel Room 4
125	Influence of Storage Periods and Temperatures on Postharvest Quality of Fresh-Marketed Lycopersicon esculentum Mill.	Session G2: Plant, Agriculture, Farming and Food 2	November 29, 2021 - 1015-1115 Parallel Room 7
126	Innovating Green Wall: A Sustainable Way of Enhancing the Vertical Planting System	Session G8: Plant, Agriculture, Farming and Food 8	November 30, 2021 - 1300-1400 Parallel Room 7
127	Classification of Healthy and Unhealthy Abaca leaf using a Convolutional Neural Network (CNN)	Session G6: Plant, Agriculture, Farming and Food 6	November 30, 2021 - 0900-1000 Parallel Room 7
128	Impacts of COVID-19 Pandemic Crisis in the Transportation Sector: A Classification Analysis in Regard with Preferred Modes of Transportation Using Random Forest Algorithm	Session E5: Environment, Energy, Transportation, and Infrastructure 5	November 29, 2021 - 1530-1630 Parallel Room 5
129	Seasonal Mapping and Air Quality Evaluation of Total Suspended Particulate Concentration Using ArcGIS-Based Spatial Analysis in Metro Manila, Philippines	Session E7: Environment, Energy, Transportation, and Infrastructure 7	November 30, 2021 - 1015-1115 Parallel Room 5
131	Phasor Measurement Unit (PMU) based Power System State Estimation with Distributed Generation (DG) using Integrated Alternating Current (AC) Load Flow with Weighted Least Square Algorithm	Session E6: Environment, Energy, Transportation, and Infrastructure 6	November 30, 2021 - 0900-1000 Parallel Room 5

133	Generation of Flood Hazard Maps in Marikina City Using GIS-MCDA Interval Rough AHP (IR'AHP)	Session E8: Environment, Energy, Transportation, and Infrastructure 8	November 30, 2021 - 1300-1400 Parallel Room 5
135	Design and Fabrication of an Arduino-based Self-balancing Walking Robot's Lower Limb	Session A4: Biomedical Robotics and Health Technologies 4	November 29, 2021 - 1415-1515 Parallel Room 1
136	Face Mask and Face Shield Detection Using Image Processing with Deep Learning and Thermal Scanning for Logging System	Session C2: Computer Vision, Artificial Intelligence and Intelligent Systems 2	November 29, 2021 - 1015-1115 Parallel Room 3
137	External Battery Charge Limiter for Consumer Electronic Devices	Session F2: Nanotechnology, Manufacturing and Industrial Processes 2	November 29, 2021 - 1015-1115 Parallel Room 6
138	Development of a One Way, Imaging Based Fish Fingerling Counter Using Raspberry Pi	Session G7: Plant, Agriculture, Farming and Food 7	November 30, 2021 - 1015-1115 Parallel Room 7
139	Wireless Semi-Autonomous Gas Contaminant Detection Robot	Session F3: Nanotechnology, Manufacturing and Industrial Processes 3	November 29, 2021 - 1300-1400 Parallel Room 6
142	Paper Analysis of "Motivational antecedents to high-tech R&D employees' innovative work behavior: Self-determined motivation, person-organization fit, organization support of creativity, and pay justice" during the Pandemic	Session: WFH Session	November 30, 2021 - 1300-1515 Parallel Room 1
143	Modeling and Simulation of D-STATCOM based on Phase Shift Control Applied in IEEE Bus 5 System: Mitigation of Voltage Sag, Swell and Harmonics Due to Fault Conditions	Session H2: Sensor Networks, Signals, and Communication Technologies 2	November 29, 2021 - 1530-1630 Parallel Room 2
144	Hybrid Renewable Energy Resources Utilizing Hybrid PSO and Cuckoo Search Algorithm	Session E7: Environment, Energy, Transportation, and Infrastructure 7	November 30, 2021 - 1015-1115 Parallel Room 5
146	Development of Vessel Monitoring and Reporting Application of Automatic Identification System	Session H2: Sensor Networks, Signals, and Communication Technologies 2	November 29, 2021 - 1530-1630 Parallel Room 2
148	Dog Skin Disease Recognition Using Image Segmentation and Gpu Enhanced Convolutional Neural Network	Session C3: Computer Vision, Artificial Intelligence and Intelligent Systems 3	November 29, 2021 - 1300-1400 Parallel Room 3
149	Energy Harvesting on Playground Slide with Implementation of Lead Zirconate Titrate (PZT) Cantilever and Gear System with IoT Monitoring	Session E8: Environment, Energy, Transportation, and Infrastructure 8	November 30, 2021 - 1300-1400 Parallel Room 5
150	Development of Piezoelectric Tiles That Utilizes Human Kinetic Energy from Walking to Provide 48 Watt-Hours of Energy for a 16 W Led Light Bulb	Session F4: Nanotechnology, Manufacturing and Industrial Processes 4	November 29, 2021 - 1415-1515 Parallel Room 6
151	Development, Installation, and Testing of Solar Distillation System Integrated with Salt Gradient Solar Pond	Session F4: Nanotechnology, Manufacturing and Industrial Processes 4	November 29, 2021 - 1415-1515 Parallel Room 6

153	Design And Control Of A Wireless Six Degree Freedom Robotic Arm	Session C6: Computer Vision, Artificial Intelligence and Intelligent Systems 6	November 30, 2021 - 0900-1000 Parallel Room 3
154	Development and Application of an Omni-Directional Robot for the Detection of Combustible and Toxic Gases	Session C1: Computer Vision, Artificial Intelligence and Intelligent Systems 1	November 29, 2021 - 0900-1000 Parallel Room 3
156	Detection of Outer Throat Infection using Deep Convolutional Neural Network	Session A4: Biomedical Robotics and Health Technologies 4	November 29, 2021 - 1415-1515 Parallel Room 1
158	Water Quality Assessment Using Microcontroller-based Robot in Aquaculture Consideration in Samal River	Session E8: Environment, Energy, Transportation, and Infrastructure 8	November 30, 2021 - 1300-1400 Parallel Room 5
159	Development of a Controlled Hydroponic Growth Chamber for Solanum Lycopersicum "ROMA" Production	Session G8: Plant, Agriculture, Farming and Food 8	November 30, 2021 - 1300-1400 Parallel Room 7
161	Fuzzy-Controlled Based Methane and Electricity Measurement on Anaerobic Digestion of Musa Subspecies' Peels	Session E7: Environment, Energy, Transportation, and Infrastructure 7	November 30, 2021 - 1015-1115 Parallel Room 5
163	Water Level Monitoring and Flood Warning System using Light Detection and Ranging (LiDAR) Sensor with Hybrid Renewable Solar-Wind Power	Session E9: Environment, Energy, Transportation, and Infrastructure 9	November 30, 2021 - 1015-1115 Parallel Room 2
164	PWM Speed Control of Brushless DC Motor for Inrush Current Regulation of Solar Water Pumping System	Session E8: Environment, Energy, Transportation, and Infrastructure 8	November 30, 2021 - 1300-1400 Parallel Room 5
165	Bearing Fault Detection of a Single-phase Induction Motor Using Acoustic and Vibration Analysis Through Hilbert-Huang Transform	Session C6: Computer Vision, Artificial Intelligence and Intelligent Systems 6	November 30, 2021 - 0900-1000 Parallel Room 3
166	Design, Fabrication, and Testing of an Automated Pneumatic Braking Program with the Use of Ultrasonic Sensor	Session F5: Nanotechnology, Manufacturing and Industrial Processes 5	November 29, 2021 - 1530-1630 Parallel Room 6
167	Finite Element Modal Analysis and Harmonic Response Analysis of a 3D Printed Vibration Sensor Enclosure	Session F4: Nanotechnology, Manufacturing and Industrial Processes 4	November 29, 2021 - 1415-1515 Parallel Room 6
169	Swarm Collision Avoidance using Moving Particle Semi-Implicit Method	Session C4: Computer Vision, Artificial Intelligence and Intelligent Systems 4	November 29, 2021 - 1415-1515 Parallel Room 3
170	Development of a Wireless Magnetic Climbing Robot for Visual Inspection of Galvanized Cooling Towers in a Commercial Building	Session F7: Nanotechnology, Manufacturing and Industrial Processes 7	November 30, 2021 - 1015-1115 Parallel Room 6
172	Implementation of Online Education by the Mechanical Engineering Department at FEU Tech During the COVID-19 Pandemic	Session: WFH Session	November 30, 2021 - 1300-1515 Parallel Room 1
173	A Generator 1-kilowatt Output Powered by Biogas	Session E9: Environment, Energy, Transportation, and Infrastructure 9	November 30, 2021 - 1015-1115 Parallel Room 2

174	Stimulation of Static Electric Field and Exposure Time on Germination and Stem Tissues of Hybrid Philippine Zea mays Genotypes	Session G3: Plant, Agriculture, Farming and Food 3	November 29, 2021 - 1300-1400 Parallel Room 7
175	Mga Kwento ni Lola Basyang: An Augmented Reality on Selected Philippine Folklore	Session D7: Education, Media, Knowledge, and Business Platforms 7	November 30, 2021 - 1015-1115 Parallel Room 4
176	Application of Associative Classifier for Data Sparsity in Predictive Analysis Recommendation	Session B3: Computer Science, Data Science, and Algorithms 3	November 29, 2021 - 1300-1400 Parallel Room 2
177	Tagalog Text Normalization with Slang Word Detection and Classification of Type of Slang Word Using Support Vector Machine	Session D7: Education, Media, Knowledge, and Business Platforms 7	November 30, 2021 - 1015-1115 Parallel Room 4
180	Neuro-Fuzzy based Safe Landing Control System for UAVs	Session C8: Computer Vision, Artificial Intelligence and Intelligent Systems 8	November 30, 2021 - 1300-1400 Parallel Room 3
181	AMBUAPP: Ambulance Response Application	Session D5: Education, Media, Knowledge, and Business Platforms 5	November 29, 2021 - 1530-1630 Parallel Room 4
182	ACMS: An Android-Based Class Management System	Session D6: Education, Media, Knowledge, and Business Platforms 6	November 30, 2021 - 0900-1000 Parallel Room 4
185	Performance Analysis of Machine Learning Algorithms in Generating Urban Land Cover Map of Quezon City, Philippines Using Sentinel-2 Satellite Imagery	Session E1: Environment, Energy, Transportation, and Infrastructure 1	November 29, 2021 - 0900-1000 Parallel Room 5
186	Performance Improvement of the DWT-OFDM System Using Convolutional Coding	Session H2: Sensor Networks, Signals, and Communication Technologies 2	November 29, 2021 - 1530-1630 Parallel Room 2
187	Cost Optimization for the Allocation, Production, and Distribution of a Plastic Manufacturing Company Using Integer Linear Programming	Session F3: Nanotechnology, Manufacturing and Industrial Processes 3	November 29, 2021 - 1300-1400 Parallel Room 6
191	Under Voltage Load Shedding Algorithm using Fast Voltage Stability Index (FVSI) and Line Stability Index (LSI)	Session C7: Computer Vision, Artificial Intelligence and Intelligent Systems 7	November 30, 2021 - 1015-1115 Parallel Room 3
192	Developing a Record Archiving System in Eastern Visayas State University	Session D4: Education, Media, Knowledge, and Business Platforms 4	November 29, 2021 - 1415-1515 Parallel Room 4
193	Modelling New Cases of Covid-19 in the Philippines using Polynomial and MLP Regression	Session B2: Computer Science, Data Science, and Algorithms 2	November 29, 2021 - 1015-1115 Parallel Room 2
195	Application of Neuro-Fuzzy Logic on the NewsVendor Inventory Model	Session D7: Education, Media, Knowledge, and Business Platforms 7	November 30, 2021 - 1015-1115 Parallel Room 4
196	Utilization of Banana Peel and Carton Waste in Manufacturing of Thermal Insulation Board	Session F5: Nanotechnology, Manufacturing and Industrial Processes 5	November 29, 2021 - 1530-1630 Parallel Room 6
198	A Systematic Analysis on the Trends and Challenges in Autonomous Vehicles and the Proposed Solutions for Level 5 Automation	Session E2: Environment, Energy, Transportation, and Infrastructure 2	November 29, 2021 - 1015-1115 Parallel Room 5

199	Eco-Friendly Concrete Roof Tiles Reinforced by Coconut Shell Powder and Coir	Session F5: Nanotechnology, Manufacturing and Industrial Processes 5	November 29, 2021 - 1530-1630 Parallel Room 6
200	A Handheld Global Positioning System with Compass and VHF Radio Transceiver	Session H3: Sensor Networks, Signals, and Communication Technologies 3	November 30, 2021 - 0900-1000 Parallel Room 2
202	Arduino-based Digital Plant Control System	Session G3: Plant, Agriculture, Farming and Food 3	November 29, 2021 - 1300-1400 Parallel Room 7
204	Hybrid Solar-Hydrokinetic Powered Automated Irrigation system	Session G9: Plant, Agriculture, Farming and Food 9	November 30, 2021 - 1300-1400 Parallel Room 4
205	TPACK: Technology, Pedagogy, and Content Knowledge for Paraeducator in the Context of Sustainable Development Goal 4	Session D1: Education, Media, Knowledge, and Business Platforms 1	November 29, 2021 - 0900-1000 Parallel Room 4
206	Light Emitting Diode Systems for Artificial Photobioreactors Used in Algal Biofuel Production: A Systematic and Trend Analysis	Session E3: Environment, Energy, Transportation, and Infrastructure 3	November 29, 2021 - 1300-1400 Parallel Room 5
208	Prediction of Moisture Content of Chlorella vulgaris Microalgae Using Hybrid Evolutionary Computing and Neural Network Variants for Biofuel Production	Session E3: Environment, Energy, Transportation, and Infrastructure 3	November 29, 2021 - 1300-1400 Parallel Room 5
209	Fuzzy Logic Controlled Motor Speed in Rotating Aquaponics Based on Chlorosis and Necrosis Severity of Lettuce Leaf and Temperature	Session G4: Plant, Agriculture, Farming and Food 4	November 29, 2021 - 1415-1515 Parallel Room 7
210	Intelligent Permaculture: A Sustainable and Profitable Practice for Tropical and Maritime Climate Urban and Peri-urban Agricultural Ecosystems	Session G4: Plant, Agriculture, Farming and Food 4	November 29, 2021 - 1415-1515 Parallel Room 7
211	ANcoustics: A Systematic Analysis in Acoustics with Active Noise-Cancellation Technology	Session H2: Sensor Networks, Signals, and Communication Technologies 2	November 29, 2021 - 1530-1630 Parallel Room 2
215	Body Pain Assessment on Sitting Time of Fifth Year Engineering Students of Pamantasan ng Cabuyao During E-Learning Setup	Session D3: Education, Media, Knowledge, and Business Platforms 3	November 29, 2021 - 1300-1400 Parallel Room 4
216	Innovation of Biodegradable Seeding Cup Made of Calamansi Peel: An Alternative Solution to Decrease Microplastic	Session F6: Nanotechnology, Manufacturing and Industrial Processes 6	November 30, 2021 - 0900-1000 Parallel Room 6
217	Manufacturing of Biodegradable Cushion Packaging Material Using Compound Properties of Chicken Feather and Cornstarch as Alternative to Expanded Polystyrene Foam	Session F8: Nanotechnology, Manufacturing and Industrial Processes 8	November 30, 2021 - 1300-1400 Parallel Room 6
218	Systematic Analysis of the Implementation of Sustainable Development Goals on Energy, Industrialization, Infrastructure, and Innovation: A Multifaceted Philippines	Session E4: Environment, Energy, Transportation, and Infrastructure 4	November 29, 2021 - 1415-1515 Parallel Room 5

219	A Bibliometric and Trend Analysis of Applied Technologies in Bioengineering for Additive Manufacturing of Human Organs	Session A5: Biomedical Robotics and Health Technologies 5	November 29, 2021 - 1530-1630 Parallel Room 1
221	Hardware Development of a Humanoid Robot Head: "Gabot"	Session F6: Nanotechnology, Manufacturing and Industrial Processes 6	November 30, 2021 - 0900-1000 Parallel Room 6
222	Design and Development of Robotic Arm Movements and Body Frame for a Social Robot for Graduation Rites	Session F2: Nanotechnology, Manufacturing and Industrial Processes 2	November 29, 2021 - 1015-1115 Parallel Room 6
223	Portable Desalination Equipment for Fishermen	Session F7: Nanotechnology, Manufacturing and Industrial Processes 7	November 30, 2021 - 1015-1115 Parallel Room 6
226	Indirect Prediction of Aquaponic Water Nitrate Concentration Using Hybrid Genetic Algorithm and Recurrent Neural Network	Session G5: Plant, Agriculture, Farming and Food 5	November 29, 2021 - 1530-1630 Parallel Room 7
227	OryzaNet: Leaf Quality Assessment of Oryza sativa Using Hybrid Machine Learning and Deep Neural Network	Session G6: Plant, Agriculture, Farming and Food 6	November 30, 2021 - 0900-1000 Parallel Room 7
228	Optimization of Vacuum Drying Properties for Chlorococcum infusionum Microalgae Moisture Content Using Hybrid Genetic Programming and Genetic Algorithm	Session E4: Environment, Energy, Transportation, and Infrastructure 4	November 29, 2021 - 1415-1515 Parallel Room 5
229	Solar-Assisted Electric Boat Power and Propulsion System Simulations	Session F7: Nanotechnology, Manufacturing and Industrial Processes 7	November 30, 2021 - 1015-1115 Parallel Room 6
230	Chemical Reaction Optimization (CRO) of Deep Neural Network (DNN) Model for Characterization of Algae Drying Kinetics	Session E6: Environment, Energy, Transportation, and Infrastructure 6	November 30, 2021 - 0900-1000 Parallel Room 5
231	Irescue: Tracking Device using RuBee – based Technology	Session H3: Sensor Networks, Signals, and Communication Technologies 3	November 30, 2021 - 0900-1000 Parallel Room 2
232	Development of IoT-based Fish Tank Monitoring System	Session G6: Plant, Agriculture, Farming and Food 6	November 30, 2021 - 0900-1000 Parallel Room 7
233	Clustering and Predicting of Smartphones Features using Gaussian Mixture Model Algorithm	Session B3: Computer Science, Data Science, and Algorithms 3	November 29, 2021 - 1300-1400 Parallel Room 2
236	Development of Predictive Machine Learning Model using Neural Network for Threshold Value Determination of Buildings	Session C8: Computer Vision, Artificial Intelligence and Intelligent Systems 8	November 30, 2021 - 1300-1400 Parallel Room 3
237	COCOBOT: Design and Implementation of a Robotic Arm to Ameliorate the Process of Stirring in the Coco Sugar Production in Alabat, Quezon	Session G9: Plant, Agriculture, Farming and Food 9	November 30, 2021 - 1300-1400 Parallel Room 4

238	Towards the Integration of Computer Vision and Applied Artificial Intelligence in Postharvest Storage Systems: Non-invasive Harvested Crop Monitoring	Session G7: Plant, Agriculture, Farming and Food 7	November 30, 2021 - 1015-1115 Parallel Room 7
239	Analytical Hierarchical Process-based Material Selection for Trailer Body Frame of an Underground Imaging System	Session F5: Nanotechnology, Manufacturing and Industrial Processes 5	November 29, 2021 - 1530-1630 Parallel Room 6
240	A Maximization Model for Food Aid Distribution using Integer Linear Programming	Session B2: Computer Science, Data Science, and Algorithms 2	November 29, 2021 - 1015-1115 Parallel Room 2
241	AI To Predict Price Movements in the Stock Market	Session B1: Computer Science, Data Science, and Algorithms 1	November 29, 2021 - 0900-1000 Parallel Room 2
242	Damage Identification of Selected Car Parts Using Image Classification and Deep Learning	Session C1: Computer Vision, Artificial Intelligence and Intelligent Systems 1	November 29, 2021 - 0900-1000 Parallel Room 3
243	Strawberry Quality Classification Utilizing Convolutional Neural Network	Session C2: Computer Vision, Artificial Intelligence and Intelligent Systems 2	November 29, 2021 - 1015-1115 Parallel Room 3
244	Automated Tungsten Inert Gas Welding Process using Fuzzy Logic Operation	Session C6: Computer Vision, Artificial Intelligence and Intelligent Systems 6	November 30, 2021 - 0900-1000 Parallel Room 3
245	A Case Study on Waiting Line Management for the Land Transportation Office of the Philippines	Session E7: Environment, Energy, Transportation, and Infrastructure 7	November 30, 2021 - 1015-1115 Parallel Room 5
246	Optimizing the Allocation of Renewable Energy Generation and Energy Consumption of Power Plants in the Philippines using Linear Programming	Session E10: Environment, Energy, Transportation, and Infrastructure 10	November 30, 2021 - 1300-1400 Parallel Room 2
247	Modeling the Flow Dynamics of the Ostreavent II using Scilab	Session F8: Nanotechnology, Manufacturing and Industrial Processes 8	November 30, 2021 - 1300-1400 Parallel Room 6
248	i-Detect: An Internet of Things Voice-Activated Home Automation with Smoke and Fire Detection and Mitigation System	Session H3: Sensor Networks, Signals, and Communication Technologies 3	November 30, 2021 - 0900-1000 Parallel Room 2
249	Implementation of Project Study Courses at the Mechanical Engineering Program of FEU Tech During the COVID-19 Pandemic	Session D2: Education, Media, Knowledge, and Business Platforms 2	November 29, 2021 - 1015-1115 Parallel Room 4
250	Electronic Nose Technology and Application: A Review	Session F7: Nanotechnology, Manufacturing and Industrial Processes 7	November 30, 2021 - 1015-1115 Parallel Room 6
251	Coral Health Identification using Image Classification and Convolutional Neural Networks	Session C3: Computer Vision, Artificial Intelligence and Intelligent Systems 3	November 29, 2021 - 1300-1400 Parallel Room 3

252	A Comparative Study on the Use of Raw and Filtered Images for Multi-class Image Classification	Session C2: Computer Vision, Artificial Intelligence and Intelligent Systems 2	November 29, 2021 - 1015-1115 Parallel Room 3
253	SIMD Implementation of Modified Zhang's Three-Frame Alignment Algorithm	Session B3: Computer Science, Data Science, and Algorithms 3	November 29, 2021 - 1300-1400 Parallel Room 2
254	Development and Analysis of Footstep Power Harvester – A Case Study for the Viability Of the Device in Surigao City	Session E5: Environment, Energy, Transportation, and Infrastructure 5	November 29, 2021 - 1530-1630 Parallel Room 5
255	Analysis of Water Leaking Pipes Using Impulse Radar: A Case Study in Surigao City, SDN Philippines	Session E6: Environment, Energy, Transportation, and Infrastructure 6	November 30, 2021 - 0900-1000 Parallel Room 5
256	Energy Potential of Macopa Irrigation Using Pico-hydro Power Plant Design Using Under-shot Type Waterwheel	Session E9: Environment, Energy, Transportation, and Infrastructure 9	November 30, 2021 - 1015-1115 Parallel Room 2
257	Analysis of Wind Power Potential Using the Developed Windmill with Data Logger	Session E6: Environment, Energy, Transportation, and Infrastructure 6	November 30, 2021 - 0900-1000 Parallel Room 5
258	Development of a Raspberry Pi-based Underwater Camera System for Inland Freshwater Aquaculture	Session C9: Computer Vision, Artificial Intelligence and Intelligent Systems 9	November 30, 2021 - 0900-1000 Parallel Room 1
259	Prediction of Weld Current Using Deep Transfer Image Networks Based on Weld Signatures for Quality Control	Session C5: Computer Vision, Artificial Intelligence and Intelligent Systems 5	November 29, 2021 - 1530-1630 Parallel Room 3
260	Analytical Hierarchy Processing for Sustainable Intensive Caged Tilapia and Milkfish Cultivation Site Selection in the Philippines	Session G8: Plant, Agriculture, Farming and Food 8	November 30, 2021 - 1300-1400 Parallel Room 7
261	Six Sigma fiascos: a failure in the consensus of perspective	Session F8: Nanotechnology, Manufacturing and Industrial Processes 8	November 30, 2021 - 1300-1400 Parallel Room 6
262	State-of-charge Monitoring and Actuation System for Photovoltaic Solar Cell System	Session E10: Environment, Energy, Transportation, and Infrastructure 10	November 30, 2021 - 1300-1400 Parallel Room 2
263	Fish Centroid Matching using Modified k-Dimensional Tree Nearest Neighbor Search in Stereo Images	Session C7: Computer Vision, Artificial Intelligence and Intelligent Systems 7	November 30, 2021 - 1015-1115 Parallel Room 3
264	BahurApp: Development and Implementation of Coral Bleaching Monitoring Application Using Convolutional Neural network	Session C6: Computer Vision, Artificial Intelligence and Intelligent Systems 6	November 30, 2021 - 0900-1000 Parallel Room 3
266	Impact of COVID-19 on Air Quality in Hanoi and Ho Chi Minh City, Vietnam	Session E5: Environment, Energy, Transportation, and Infrastructure 5	November 29, 2021 - 1530-1630 Parallel Room 5
267	Automatic Harmful Gas Detection Using Electronic Nose Technology	Session F6: Nanotechnology, Manufacturing and Industrial Processes 6	November 30, 2021 - 0900-1000 Parallel Room 6
268	Development of a Sign Language Glove Translator Using Microcontroller and Android Technology for Deaf-Mute	Session A2: Biomedical Robotics and Health Technologies 2	November 29, 2021 - 1015-1115 Parallel Room 1

269	A Genetic Algorithm-based Approach for Temperature Optimization to Improve Lettuce Quality	Session G7: Plant, Agriculture, Farming and Food 7	November 30, 2021 - 1015-1115 Parallel Room 7
270	Faster R-CNN based Fish Detector for Smart Aquaculture System	Session G9: Plant, Agriculture, Farming and Food 9	November 30, 2021 - 1300-1400 Parallel Room 4
271	Vital Signs Evaluator and Blood Type Identification using Deep Learning for Blood Donation	Session A4: Biomedical Robotics and Health Technologies 4	November 29, 2021 - 1415-1515 Parallel Room 1
272	Python Based Defect Classification of Theobroma Cacao Bean using Fine-Tuned Visual Geometry Group16	Session G9: Plant, Agriculture, Farming and Food 9	November 30, 2021 - 1300-1400 Parallel Room 4
273	Aerodynamic Analysis and Vibration Response of Spherical Shell with Meshed Net for Unmanned Aerial Vehicle Application	Session F8: Nanotechnology, Manufacturing and Industrial Processes 8	November 30, 2021 - 1300-1400 Parallel Room 6
274	You Only Look Once on Power Line Components: A Multi-Class Detection Using Unmanned Aerial Vehicle	Session C8: Computer Vision, Artificial Intelligence and Intelligent Systems 8	November 30, 2021 - 1300-1400 Parallel Room 3
275	Semantic Segmentation Models for Crack Detection: Using Shelled Unmanned Aerial Vehicle Imagery	Session C9: Computer Vision, Artificial Intelligence and Intelligent Systems 9	November 30, 2021 - 0900-1000 Parallel Room 1
276	Object Detection as a Technological Adjunct to the Manual Counting Protocol during Surgery	Session A5: Biomedical Robotics and Health Technologies 5	November 29, 2021 - 1530-1630 Parallel Room 1
278	Vision Based Hand Tracking System Development for Non-Face-to-Face Interaction	Session C5: Computer Vision, Artificial Intelligence and Intelligent Systems 5	November 29, 2021 - 1530-1630 Parallel Room 3
279	A Framework on the Development of an IoT Based Eye Tracking Device: A review study	Session C7: Computer Vision, Artificial Intelligence and Intelligent Systems 7	November 30, 2021 - 1015-1115 Parallel Room 3
280	The Development of a Visual Novel Role-Playing Game [VN RPG] as an Open Educational Resource [OER] for Philippine Literature Educators Administering the "Noli Me Tangere" Module	Session D2: Education, Media, Knowledge, and Business Platforms 2	November 29, 2021 - 1015-1115 Parallel Room 4
281	Development of a Multi-Object Detection and Human Tracking System from Cooperative Dual Cameras in an Unmanned Aerial Vehicle	Session C9: Computer Vision, Artificial Intelligence and Intelligent Systems 9	November 30, 2021 - 0900-1000 Parallel Room 1

Paper # 1

Smart Electronic Assistive Device for Visually Impaired Individual with Image Processing

Abstract - According to World Health Organization, it is assessed that around 1.3 billion individuals live with some distance or near vision impairment. People with visual impairment encounter different issues in their everyday life as advanced assistive devices are frequently not meeting the consumer prerequisites in terms of price and level of assistance. The primary goal of the paper is to build up a low cost, reliable, portable, user-friendly, and low power device for smooth navigation. The study consists of two devices, which are the glasses and the smart cane. The glasses are the ones responsible for the text detection and recognition, which falls under the category of image processing, while the smart cane is the one responsible for the obstacle detection using combination sensors known as VL53L0X and Ultrasonic. This study found that the smart cane and smart glass functions well as intended, in alerting users through a voice alert about the obstacles around and navigation, and in reading the text captured by the camera. The smart cane's obstacle detection overall accuracy is 100% while the smart glasses' overall accuracy is 98.13% for document text and 91.33% for natural scene text.

Paper # 2

Design of Motorcycle Speed Limiter through Global Positioning System

Abstract - This study focused on designing a motorcycle speed limiter using GPS with throttle modification. The study was brought about the increase in road accidents involving motorcycle vehicles tagged to be over speeding and some not wearing helmet. The designed system focused on controlling the throttle of the motorcycle through a microcontroller and a GPS. Also, communication from the helmet to the motorcycle was established to complete the system functionality. The system does not allow the use of the said motorcycle once the rider does not wear the helmet prescribed for the said motorcycle. Speed control of the designed system relies solely upon the GPS, making it different from typical sensory for speed and PID algorithm applied in servo motor to control the throttle acceleration. Selected road stretch was assigned 30 kph, 40 kph, and 60 kph, respectively. Initial tests showed a responsive rate of all parameters of the helmet and LCD design.

Paper # 3

Towards the Development of Pneumatically Actuated Soft Robotic Hand

Abstract - Several models have been developed for rehabilitation and mimicking of human hands for prosthesis. There are different designs and structures that have been modeled and implemented. Soft robotics has taken its toll on many applications in the biomedical field. However, there is still ongoing research in modeling anthropomorphic designs. This paper presents a preliminary work on a method of modeling a pneumatically actuated soft robotic hand which uses finite element analysis with simplicity of homogenous silicone material. The model presented has been fabricated and characterized in order to obtain a response that could mimic the bending of the human hand. A simple PID controller was used to control the air pressure applied in each joint for the evaluation. A vision system was set up to track the node coordinates of the soft pneumatic bending actuator (sPBA) finger. The kinematic equations of a hyper-redundant structure were used to estimate the bending angle of each joint. The results show that comparing the bending angle characteristic of the actual prototype and the FEM has an average error performance of 28.90 or 32.67% at joint 2 and 29.90 or 23.64% at joint 3. In terms of air pressure difference, 47 kPa or 34.07% is achieved in joint 2, and 33 kPa or 24% at joint 3 were achieved. Although these differences exist, the model was still able to achieve bending approximately 90° at each joint which can be useful for the development of a soft robotic hand.

Paper # 4

Development of Smart Waste Bin Segregation using Image Processing

Abstract - In the Philippines, solid waste management is still a significant problem. Improper waste disposal causes serious health problems and environmental risks such as contamination of the water systems, floods, ground and air pollution, and diseases. Unfortunately, most people mistakenly believe that not segregating waste is acceptable. This study aims to develop and design a Smart Waste Bin Segregation using Image Processing and assist waste segregation through waste identification and segregation built on machine learning capable of navigating the one-time path set by the user. In particular, create an intelligent waste bin segregation prototype using image processing with three classifications. These classifications are the biodegradable, non-bio-degradable, and unknown intended to segregate solid waste into its respective bins and conduct accuracy tests using appropriate statistical tools. This device is designed for school use and may also be used in other establishments if more waste is trained, alleviate the waste segregation problem and help build an eco-friendlier society without compromising health and hygiene. The proponents successfully materialized the device,

Paper # 6

An Online Examination System Applying Browser /Server Architecture for Online Class

Abstract - One of the most crucial parts of online learning is online testing. It is advantageous to users to save material resources while conducting an effective, quick, and secure inspection. The researchers created and built a web-based assessment system. This article discusses the system's primary operations, objectives, and principles, as well as auto-generating test papers and questionnaires utilizing algorithmic analyses and presenting the system's security.

Paper # 7

*Acceptability, Usability, and Quality of a Personalized Daily Meal Plan Recommender System:
The Case of Virtual Dietitian*

Abstract - Nutrition research is now entering the subfield of personalized nutrition, where dietetics professionals are using it as an approach to support individuals in formulating unique dietary interventions and guidelines. Despite a large number of meal recommender systems that endeavors to incorporate the concept of personalized nutrition, the existing artifacts remain preliminary in the nutritional health context largely due to lack of integrated nutrition knowledge. Hence, a nutrition system called Virtual Dietitian (VD) was developed and grounded on the Nutrition Care Process and Model. Unfortunately, the beta evaluation (Phase 1) revealed some vital modifications that are needed to accomplish as per the feedback from experts. Hence, another sprint of development was achieved to comply with the requirements set forth by experts. This study reports the alpha evaluation (Phase 2) of 397 non-expert users on the revised VD on three factors: acceptability, usability, and quality. Using the scores from these factors, statistical analyses were performed to determine if there were significant differences between these scores and variables linked to users' profile. Results show that VD passed on all factors, and there were significant differences between the scores and users' profile (living condition, current physical activity, nutritional status, monthly household income, and average daily meals). Several recommendations were still offered on how to move beyond the existing features of VD and with considerations to relevant modern technologies.

Paper # 10

Fuzzy Set the Data and Traffic Harmonize Algorithm for IP-Transit and Peer links of IXP

Abstract - Much depends on how well the IXP or gateway maintains the Internet connection for the convenience and efficiency of the LSP (local service provider) users. As for usage increases, traffic and bandwidths increase dramatically across lines. IXP is responsible for the timely improvement of backbone links and, in other words, the backbone link downtime. In most countries, IXPs are manually configuring the backbone links, transit links, and peer links provided. This article is designed primarily for automation using membership functions with a fuzzy set to align lines and harmonize lines. The function of the semantic rule is to associate the input parameters accompanying an output function of the fuzzy system, which in case we combined link rhythming and automation. The Input memberships are three membership functions that are used LOW, Medium, and HIGH.[1] The output membership functions are applied Open, Close of the links. In this paper, the fuzzy logic is used the MIMO fuzzy logic function, eight inputs, and four output functions, and a load harmonic method.

Paper # 13

iVital: Mobile Health Expert System with Wearable Vital Sign Analyzer

Abstract - Several equipment and measurement devices were used to monitor human vital signs. Critical signs are vital for medical discipline, especially diagnostics, which requires that vital signs be monitored and interpreted. Patients' mobile technologies will be used to track medical personnel. Using mobile technology, the patient's state can be tracked and monitored, and when critical changes occur, recommendations on the patient's condition will be made. The objective of the study is to continuously monitor and analyze patient health advancements and to provide top-notch, efficient, and effective health care. The system features modules designed to monitor the state of patient health, including the use of checklists to receive vital sign data from a wearable device, the use of control structures to oversee data gathering, and notifications to the doctor.

Paper # 14

Solar Powered Automated Drip Irrigation System using Particle Swarm Optimization

Abstract - There is a significant imbalance between energy demand and supply due to dwindling conventional energy resources and ever-increasing energy consumption. Researchers are now developing more ways to utilize green energy production, mainly renewable energy such as Solar PV and Wind energy. To increase the efficient use of water resources and decrease the dependency on conventional energy sources, researchers are finding ways to integrate renewable energy sources with irrigation systems to help the agricultural sector ease the cost of irrigation. The author used Particle Swarm Optimization in their research to determine the optimal soil depth to be maintained at field capacity to minimize the cost of irrigation. A solar-powered drip irrigation system is then implemented to test and prove that drip irrigation systems are more efficient than traditional irrigation methods. This study also utilizes Internet-of-Things technology to provide remote monitoring of the system. At the end of the study, it is found that the output solar-powered automated drip irrigation system is comparable to that of a traditional irrigation system while using significantly less water.

Paper # 15

Design the Climate Change Hybrid grid with Wind generator and PV module by using Fuzzy Logic

Abstract - This paper is designed for the hybrid system of the PV module and Wind generator by using Matlab software that has Simulink software. Hybrid renewable energy is very popular nowadays because it is a very cheaper production cost than other electricity generation. The author's design accentuated the hybrid systems which combine solar modules and wind generators by using fuzzy logic by conforming the climate change in Eastern Shan State, Myanmar. According to design like hybrid systems, the battery bank of the hybrid system will protect a long time charging and backward electricity flow and higher voltage passing through it. Therefore, this system is more secure than other manual designs which are called the smart grid system. the Smart grid is more popular from the new technology era. As a result, the Smart grid system will be powerful, be utilization by using the Internet of Thing (IoT) system, and another applicant eternal.

Paper # 16

Designing Human-Centered Learning Analytics Dashboard for Higher Education Using a Participatory Design Approach

Abstract - Higher education institutions (HEIs) are looking for new methods to assess and monitor student learning outcomes, as well as objectively determine the circumstances that contribute to their growth, especially in IT courses. Advances in new analytics tools that put visualizations and dashboards on top of live student data are making learning analytics more powerful than ever. The researchers utilize a participatory design (PD) method to design, which involves including all stakeholders into the design process, including workers, married people, and others, in order to better understand, fulfill, and occasionally anticipate their requirements. The researchers believe that the system should be designed for the students, rather than the students having to accommodate the system. Informing the creation and end-use of analytical learning dashboards is more successful using the PD method.

Paper # 17

Assessing the Role of Python Programming Gamified Course on Students' Knowledge, Skills Performance, Attitude, and Self-Efficacy

Abstract - Coding is widely regarded as a fundamental skill of the 21st century. Yet, there is still a shortage of programmers worldwide which disproportionately affect the innovation goals of many sectors. In this study, we evaluated the installment of a Python programming gamified course in higher education, and measure its effect on students' knowledge, attitude, self-efficacy, and skills performance. Two sections with 50 students each were randomly assigned to experimental or control groups. After one semester, the experimental group exhibited significantly higher scores in laboratory activities (skills performance) compared to the control group. Furthermore, they demonstrated a significant improvement with reference to attitude and self-efficacy before and after intervention. Therefore, we concluded that the use of a Python programming gamified course was an effective method for students to learn coding and programming concepts. The use and installation of a gamified course in learning other computer programming languages is highly recommended.

Paper # 18

Robusta Coffee Leaf Detection based on YOLOv3-MobileNetv2 model

Abstract - Coffee is one of the Philippines' main crops. Agriculture remains to be the primary source of Philippines market value. Given its thirty million hectares, with forty-seven percent agricultural land, investing in agri-research institutions is crucial. Robusta coffee is the most produced type, which contributed 59% to the total built-in 2019. Hence, the main objective of this study is to design a device that will recognize the visual characteristics of Robusta leaves and classify whether the leaf input is a Robusta leaf or not through the application of the YOLOv3-MobileNetv2 model. You Only Look Once object detection provides a network that understands generalized object representation through training the network with real-world images to produce an accurate prediction. YOLOv3 paired with MobileNetv2 offers a broader range of possibilities as its intermediate expansion layer uses lightweight depth-wise convolutions to filter source features of non-linearity. This model will make image processing work well even with low graphics processing units (GPU). The accuracy for the model's prediction was verified using a confusion matrix, and it resulted in a 90% accuracy. Increasing the training data involving leaves with deformities and diseases to extract more features from leaves with different conditions can further improve the accuracy.

Paper # 19

Characterization of WiFi Signal Range and Bandwidth of the Philippines' "Free WiFi For All" Project

Abstract - Internet access has become a necessity in the modern age, its relevance only becoming more evident as the recent global pandemic led to the shift to online education and work. In the Philippines however, access to the internet continues to be difficult for many. The country's Department of Information and Communications Technology created the Free WiFi For All (FW4A) project to provide free WiFi to the public at thousands of sites across the country. This paper aims to evaluate five of these sites—health centers located in Nangka, Tumana, Parang, Marikina Heights and Sto. Niño in Marikina City—by evaluating the performance of the WiFi network from the perspective of the end users. A mobile application was developed which users may use to collect received signal strength indicator (RSSI) measurements and bandwidth tests when they are connected to FW4A sites. The RSSI data collected was used to visualize the signal strength and coverage of the WiFi network on a map, which is viewable on a web app. The bandwidth tests were used to determine whether the sites reached the minimum download speed requirement for FW4A sites. Based on the results recorded by the mobile application, the average range of the signal for the five sites is approximately a 55.2 m by 29.2 m area. Based on the results of the bandwidth measurement tool used, three of the sites, specifically the Nangka, Tumana and Marikina Heights sites, were able to fulfill the 2 Mb/s requirement for Free WiFi For All sites. Meanwhile, the remaining two sites, which were at Parang and Sto. Niño, were unable to fulfill the requirement.

Paper # 20

Cactaceae Detection Using MobileNet Architecture

Abstract - Convolutional Neural Networks and image processing work well together. Image processing nowadays is a big topic in the world of technology because of its wide applications. The CNN algorithm has a lot of advantages dealing with image processing like efficiency and accuracy. Using CNN and MobileNet Architecture for this research, the output will be relative and effective and can be used for future studies. CNN uses layers, such as a convolutional, pooling, activation, and fully connected that filter the images for more accurate outputs. This research will produce an output in identifying a plant to further discuss the process and methods of using CNN and MobileNet Architecture in image processing.

Paper # 21

Characterization of Potassium Chloride Stress on Philippine Vigna radiata Varieties in Temperature-stabilized Hydroponics Using Genetic Programming

Abstract - Chloride is an important micronutrient for crop plant life. Excess chloride dehydrates the plant system and accumulates salt-like residue in leaves causing them to undergo chlorosis and necrosis. Micronutrient stress through potassium chloride that is used as fertilizers to common and industrial farms was not yet comprehensively explored concerning mung beans. This study aims to characterize the effects of potassium chloride (KCl) fertilization on stems and roots of two Philippine mung bean (*Vigna radiata* L.) varieties which are the yellow and green mongo. A temperature-stabilized hydroponics setup was developed based on Peltier technology. Three KCl treatments were employed: 50 μM (control), 10 μM (deficient), and 100 μM (toxic or excess). Morphological assay confirmed that KCl deficient mung beans have longer root and shoot systems and higher number of spanning leaves. Lowering KCl concentration to 10 μM also increases the germination rate by 111.536% than the control. Light microscopy was performed and confirmed that there is thicker cortex, denser vascular cambium, broader xylem and phloem vessels, and larger parenchyma cells in KCl deficient seedlings. Only the green mung bean seedling variety exposed in excess KCl have formed trichomes within 14 days. Multigene genetic programming was applied to generate mathematical models of seedling architectural traits as functions of KCl concentration and cultivation period. It was found out that less than 0.05 mM, 0.9 mM 0.7 mM, 4 mM of KCl promotes root growth, shoot length, leaf expansion, and the number of spanning leaves, respectively. Overall, chloride deficiency improves mung bean growth.

Paper # 23

Recognition of Feline Epidermal Disease using Raspberry-Pi based Gray Level Co-occurrence Matrix and Support Vector Machine

Abstract - As of 2018, with over 373 million population of cats worldwide, cases of feline skin diseases have drastically increased as well, with 6-15% of feline patients who have experienced at least one form of dermatopathy in their lifetimes. Research on detecting feline skin diseases has been focused on using different diagnostic methods in the past. Examples of these methods include the Fur Pluck Method, which uses microscopic hair evaluation to detect parasites. Another study uses Wood's Lamp method that uses a UV light source to detect dermatophytosis. In this study, the image processing technique in diagnosing two types of skin diseases, Dermatophytosis and Ectoparasitic Skin Disease, was identified using GLCM and SVM to extract the features and classify the images, respectively. The system trained 270 images with 90 photos each on Dermatophytosis, Ectoparasitic, and unknown skin diseases and tested 45 skin disease images. These feline skin disease images used are primarily from domestic short-haired cats. Confusion Matrix was used in determining the accuracy of the system. The accuracy of the system reached 86.776% with 80% on Dermatophytosis Skin Diseases, 93.33% for Ectoparasitic Skin Diseases, and 87% for the Unknown Parameter with 13.224% Error of Commission.

Paper # 25

Disinfectant Synthesizer using Electrolysis for Automatic Utilization of Sanitation Kiosk

Abstract - Wearing facemask, face shield and social distancing are some of health protocols that are being imposed to lessen the risk of viral transmission specifically COVID 19. All the establishments here in the Philippines build their own sanitation booths to ensure virus prevention. This study aims to address the issues regarding the use of chemical disinfectants and manually placing them in sanitation booths, and the ineffective manual ways of sanitizing individuals. This study is a design project adopting the developmental type of research method. Hypochlorous acid (HOCL) has a lot of potential as a disinfectant. In an electrolysis chamber with dilute salt and distilled water, HOCL can be made. The researchers design a device to automate the manufacturing of HOCL, which will be used as disinfectant, and automatically sanitize individuals with a safer and non-toxic disinfectant. The researchers prepared questionnaires to assess the acceptability of the device. The statistical tool used in the interpretation of data is weighted arithmetic mean. The major finding of this study is the device were able to convert distilled water and salt into disinfectant solution with the electrolysis process utilized, the duration of the process that will optimally convert it is 40 minutes, with accurate reading of analog pH sensor and lessen the exposure to each individual through the automation of the sanitation booth. For that reason, the researchers conclude that this design project provides a way to ensure virus prevention using automatic sanitation booth with disinfectant (HOCL) solution that offers more benefits over traditional sanitation methods. The overall acceptability rating of the design project is 4.46, interpreted as Very Good which shows that the device has high satisfaction.

Paper # 27

Post Disaster Indoor Position Tracking Device with Pulse Detection in Wireless Sensor Networks

Abstract - Wireless sensor networks have a lot of applications and can apply in post-disaster management. The study's main objective is to develop post-disaster indoor position tracking in wireless sensor networks. It also aims to determine the estimated indoor position of the wrist strap wearer using the distance measuring technique. NodeMCU ESP8266 was used to pass along the RSSI values and send them to the sink node located outside the establishment, and viewing the GUI from the sink node. The researchers tested the calculated distance at various distances by getting RSSI values from the fixed node to determine the distance measurement formula. The researchers did the same testing in different scenarios: no obstructions, large obstructions. At one meter, the average calculated distance at fixed node 1 was 1.2598m for no obstructions and 2.1061m for large obstructions. This meant that the RSSI generated with large obstructions was becoming smaller. The sample standard deviation also suggested that the distance also affected how spread the RSSI values at longer distances.

Paper # 28

Development of Earthquake Liquefaction Maps of Laguna, Philippines

Abstract - Structures built on high seismic areas are likely to experience earthquake liquefaction. This in turn will compromise the integrity of the structures and thus, assessment of the susceptibility to liquefaction is essential. To evaluate the likelihood and severity of earthquake induced liquefaction particularly in the 2nd district of Laguna, 74 geotechnical reports from various locations were collected. Using deterministic approach, safety factors and liquefaction severity index were calculated at different locations to generate liquefaction probability and severity maps. Results showed that there is a wide range of liquefaction severity levels from very low severity of 3.8% of the areas to high severity of 5.06% of the areas. The probability map further showed that an average of 90.49% of the areas are susceptible to liquefaction when an 8.0 earthquake magnitude occurs. The developed maps can be used by site planners and engineers to identify the severity of liquefaction at specific locations and appropriately apply remedial measures in the design of structures.

Paper # 29

Coin Identification and Conversion System using Image Processing

Abstract - Different features and template designs of currencies give travellers a hard time identifying and recognize a coin; that's why a device to locate and recognize a coin is a must. Four currencies were used in the study, and researchers applied the YOLOv3 and CNN to create the system. It is hard for machine learning to easily identify and recognize the coin because of its many rotations and widely changing patterns. With this, the researchers obtain the optimal distance of the camera to the coin and test different angles of rotation and find out that a 6 cm distance from the camera to the coin is the best to identify the coin easily. Thus, the angle of 0, 90, 180, and 270 degrees yields the researchers an accuracy result of 98.15%, 98.15%, 97.22%, and 96.30%, respectively.

Paper # 32

A Raspberry Pi Microcontroller-based Insect Pests Detection, Counting and Logging System in Eggplants using SSD Lite MobileNetV2

Abstract - Scouting is a good practice for monitoring the crop's performance and the management of the insect pests present on the crop. The need to identify and control the risks of pest infestations and diseases are vital such that it affects the quality and compromises the sustainability of the crop. Hence, it is essential to keep a well-defined record for insect pest management, which includes the detection and the number of the insect pests present. To lessen the labor and provide a healthy and well-grown eggplant for the farmers, a Microcontroller system can be used to supervise the crops and the insect pests present, which will greatly benefit not only the eggplant farmers, but also all the farmers associated in the agricultural field. The inputs are captured from the device that is placed specifically in the leaves of the eggplant. The output is then logged to the system which shows the insect count. The system provides a 100% detection rate for moths (fully grown EFSB), 83.33% for aphids and 85.7% for whiteflies as per calibration. As for the gathered data, the system obtain a 90.48% detection rate. Moreover, the device is greatly suitable for insect pests monitoring especially for home set-up crops.

Paper # 34

Detection and Classification of Pathogens in Gram-Stained Dairy Cow Milk Using Otsu Method

Abstract - Milk is one of the main ingredients used in dairy products. It is important to determine the quality of milk before distributing them to prevent consumers from catching illnesses such as vomiting and diarrhea. This research paper aims to create an automated microscope with an auto-focus and stitching feature, which will be used for capturing images; and to detect and classify whether pathogens, specifically Escherichia Coli (E. Coli), are present in the gram-stained milk sample. The researchers have automated the microscope stage slider and implemented the Variance of Laplacian method for the auto-focusing and Scale Invariant Feature Transform (SIFT) for the stitching. The image captured will then undergo Otsu thresholding and find Contour which scans and analyze whether there is Escherichia Coli present in the gram-stained sample. After the images are analyzed, the result can be viewed using the GUI of the system and the data gathered during the experimentation process are tabulated in a confusion matrix to determine the false rejection rate and accuracy. After computing, the resulting false rejection rate is 11.6667 percent, and the resulting accuracy of the system is 88.3333 percent.

Paper # 36

Swarm Robotics Application for Gathering Soil Samples

Abstract - In this work, researchers were able to create two ground robot that can be easily deployed and collect soil sample. These devices can be accessibly use by anyone, especially farmers. The system is tested in an open space-controlled environment with different scenarios which can allow the GPS location of each robot to be detected by the central unit. The user set the waypoints of each robot then the system logs date/time, target waypoint, reached waypoint, the difference between the target and reached, and the amount of soil gathered.

Paper # 37

Determination of Unsound Concrete using Non-Destructive Testing in a Smooth Concrete through various Image Processing Techniques

Abstract - Traditional inspection requires the tampering or handling of the concrete in a destructive manner. The researchers have developed a device that utilizes different image processing techniques that include Grayscale, Gaussian blur, Binary thresholding, Morphology, Contour, and Flood fill to determine a crack or spall width area. The Image capturing device that the researchers created also classifies if the said crack or spall can still be tolerable or needs structural consultation based on the thresholds set. The device has a graphical user interface that captures the images of crack or spall, measuring its width and area and classification if tolerable or needs structural consultation.

Paper # 39

Applying Heatmaps for Health Hazard Indicators Living Near the Philippine National Railway (PNR) Trains in the National Capital Region (NCR)

Abstract - Noise pollution from public trains in the metro impacts both children and adults daily, posing a challenge in their daily lives. Noise has an impact on the community's psychological and physical well-being. The Philippine National Railways trains are an integral component of the daily lives of the city's passengers. Trains are a popular means of transportation for commuters, as it is the best and only option to travel quickly and get to your destination. Because of the severe traffic circumstances and conditions of land transportation such as jeepneys, private vehicles, and others, Filipino commuters are significant respondents to the study.

Paper # 40

Prediction and Generation of Multiple Complex Drawing Figures From Partial Drawing Sequences

Abstract - The goal of this study is to construct a model that predicts and generates the entire drawing sequence from a partial drawing sequence. In the proposed method, a recurrent neural network, namely Multiple Timescale Recurrent Neural Network (MTRNN), was used as the learning model. MTRNN has been modified to accommodate pen lifting. The experiment was performed using three functions of MTRNN (Learning, Recognition, Generation) and a drawing sequence consisting of the pen coordinates and the pen state. First, MTRNN training the drawing sequence and self-organizes the drawing dynamics. A partial drawing sequence is input to the trained MTRNN, and the recognition function calculates and predicts a vector that represents the entire drawing sequence. The entire drawing sequence is generated by inputting the calculated vector into the model. The results of the experiment were evaluated qualitatively, confirming the effectiveness of the proposed method.

Paper # 41

Using Unevenly Spaced Time Series Data Set in a Convolutional Reconstruction Autoencoder Algorithm

Abstract - Time series has been utilized for years, especially in the financial and economic sectors. These data are usually measured over a specific period at evenly spaced intervals, and only a few have analyzed time series on unevenly spaced time series intervals. Such uneven time series are natural phenomena like storms, earthquakes, and tsunamis. The researchers used five randomly generated, unevenly spaced time series datasets with five different data averages as an input to a convolutional reconstruction autoencoder algorithm to determine its reconstruction performance using such type of time series. At the end of the study, the algorithm yielded an average mean absolute error of 0.216 with 0.16 as the lowest mean absolute error and 0.26 as the highest mean absolute error value. Therefore, the researchers can conclude that a convolutional reconstruction autoencoder algorithm can be used with unevenly spaced time series data. However, it is not without drawbacks, as the algorithm could not properly reconstruct the later parts of the dataset. Furthermore, the algorithm's performance can be improved by extending its training period through more dataset entries.

Paper # 42

Portable Sigatoka Spot Disease Identifier on Banana Leaves Using Support Vector Machine

Abstract - Banana plant diseases serve as a threat to farmers which can affect the quality and quantity of banana production. Black Sigatoka Spot is considered as the most economically important banana leaf disease as it affects banana plantains worldwide, causing yield losses of up to 50%. It is caused by a fungi called *Mycosphaerella fijensis*. Sigatoka spots are small reddish-brown flecks that are seen on the leaf and over time develop into pale yellow, brown streaks surrounded by a yellow halo. The goal of this study is to develop a portable system that will be able to identify the Sigatoka spot disease on a banana leaf to help farmers prevent agricultural loss on banana plants. The researchers used a USB Camera to capture banana leaf images and were processed by stitching, equalization, segmentation, feature extraction and classification by Support Vector Machine. Overall, the proposed system obtained a 90% accuracy in classifying healthy and Sigatoka infected banana leaves.

Paper # 44

Negative Air Pressure Isolation Room for COVID-19 Patients in the Philippines: A Simulation of the Proposed Design using SolidWorks

Abstract - Since the start of the COVID-19 pandemic in 2019, medical staff and non-medical staff are fighting on the front line in all hospitals worldwide. However, the possibility of healthcare workers' scarcity due to the increasing medical infection rate is ignored in many recent studies. To prevent such things to happen, installation of negative air pressure isolation room is proposed to Norzagaray Municipal Hospital. Primary parameters such as filtration, pressure management, and dilution ventilation were investigated in SOLIDWORKS simulation software by removing one parameter per simulation. Two existing schemes were simulated, and the primary parameters present were evaluated. Three ventilation design set-ups were designed and the effects of the varying placements of the primary parameters to the air flow pattern in a negative air pressure isolation room were determined. Cost-benefit analysis was conducted to determine if the cost of installing the negative air pressure room outweighs its benefit. The set-up where the HEPA machine is inside the room is proposed to NMH as this abides by the DOH memorandum and standards on AIIRs and is the most effective of three set-ups. Results shows that filtration filters the infectious particles, pressure management manages the proper air flow direction, and dilution ventilation makes sure there is enough air changes per hour to filter a percentage of infectious particles. In the existing schemes, all the primary parameters were used to contain the infectious particles in the room, however, the effectiveness of the filtration also depends on the location of the patient, supply, and exhaust. The most significant effect of the varying placements of the primary parameters can be seen in filtration as only the set-up where the HEPA machine is inside the room were able to filter 100% of the infectious particles. It is also the most profitable ventilation design set-up with 2.08 CBA ratio and has the least payback period of 5.8 months.

Paper # 45

Rainfall And Meteorological Drought Forecasting in Albay, Philippines Using Artificial Neural Network

Abstract - Agriculture relies heavily on weather forecasts and a reliable weather forecasting system can help mitigate the calamities which can affect this industry. Rainfall and meteorological drought duration forecasting are some of the most important yet challenging tasks. This paper presents the creation of feedforward backpropagation artificial neural networks for daily rainfall forecasting and monthly meteorological drought forecasting. Artificial Neural Networks have the ability to capture the variability of these phenomena. Rainfall data from nine stations all over the province of Albay, Philippines spanning from 1967 to 2000 were used to create the models. The input parameters used for developing the models for daily rainfall forecasting were 14-day antecedent rainfall, current-day rainfall, relative humidity, mean temperature, and sunshine duration. The parameters utilized for monthly meteorological drought forecasting were 1-month SPI, current-month rainfall, relative humidity, mean temperature, and sunshine duration. Having the results presented in this paper, the performance of the ANN Models of the stations were compared based on R and RMSE. The rainfall forecasting models and meteorological drought forecasting models have provided satisfactory performance. A satisfactory performance for forecasting has an R value ranging from 0.2 to 0.5. Sensitivity analysis indicated that the most significant parameter for rainfall forecast is the relative humidity and mean temperature for drought forecast.

Paper # 46

Construction Labor Productivity in Construction Sites During the COVID-19 Pandemic Using Relative Importance Index (RII)

Abstract - The construction industry is heavily reliant on the production of the laborers. Construction labor costs shares a big part on the total cost of the projects. Due to the emergence of the COVID-19, the construction industry has been experiencing restrictions and limitations in their project sites, therefore affecting labor productivity. The goal of this paper is to determine which factors are critical in influencing Construction Labor Productivity in the National Capital Region (NCR) in the Philippines during the COVID-19 pandemic by obtaining each of the critical factors' respective relative importance index. In order to achieve the study's objective, the researchers asked experts under the category AAAA companies who have site and managerial experience during the pandemic to participate in an online questionnaire survey. 34 factors were considered for this study and categorized into four groups: (1) Human/labor; (2) Management; (3) Technological; and (4) COVID-19. The findings of the study were able to identify the 10 significant factors affecting labor productivity during the pandemic: (1) Laborer's Experience and Skill; (2) Availability of Materials; (3) Clarity of Instructions and Daily Task Assignments; (4) Coordination among Level Design Disciplines; (5) Shortage of Laborers, Construction Method; (6) Prolonged Delivery Period, Limited Number of Work Personnel Per Zone, Leadership of Construction Management; (7) Clarity of the Drawings and Specifications; (8) Communication among Laborers, Rework; (9) Social Distancing, Laborer's Absenteeism; and (10) Availability of Personal Protective Equipment. The study can serve as a guide for construction firms for efficient management of laborers during a pandemic to improve the construction labor productivity and accomplish a cost-effective project.

Paper # 47

Household Awareness and Participation on Waste Disposal; An Effective Solid Waste Management Amidst COVID-19 Pandemic

Abstract - The aim of this research is to determine the demographics that affects the solid waste management behavior in San Martin Subdivision in Angono, Rizal, conducted during the time of pandemic. This aims to improve sustainability and help create programs that will improve the participation of the households towards positive waste management. Currently, there are limited studies involving waste management especially in developing countries like the Philippines where problems regarding waste management are more prevalent, adding more solid wastes during the pandemic period. This will help developing countries improve their waste management system as it will open areas for research and development. The researchers seek through the study of the demographics that affects the attitude, knowledge, and practices of the households to create a more targeted solution for the area. Online questionnaires were distributed to the respondents and were analyzed using the Kruskal-Wallis test. The findings revealed the relevant demographics in the target area and created a conceptual framework that the administrators can adopt. For the knowledge, attitude, and practice of the households, the income of the family showed significance. The other significant demographics were the household size for the attitude section; educational attainment for the knowledge section; and all the demographics for the practice section. Knowing this relevance, the community can create policies that are catered more to the effective group equating to greater chance of success in the implementation. The significance of the study is that the household wastes comprise of more than half of the waste generation of the Philippines hence, targeting this sector of the society will greatly impact the solid waste problem in the country.

Paper # 49

Web-Based Document Management System for PEP Squad Events and Marketing Services

Abstract - A Document Management Systems (DMS) plays an important role in different organizations today. It allows users to store, manage, retrieve and keep track of digital documents. It enables its users to create document or capture a hard copy in electronic form as input. It also allows editing, publishing, and distributing documents to other users in a certain format as process. This paper presents an application of DMS in Pep Squad Events and Marketing Services.

Paper # 50

EC Health Medical Clinic and Diagnostic Center Appointment System

Abstract - Online appointment systems are prevalent currently either online or using traditional queuing systems. Several businesses like hospitals use different online appointment systems for their patients which make appointments process more efficient, thereby minimizing patient's waiting time and maximizing the total number of patients served. This paper presents the application of online patient appointment system that allows patient, staffs and physician to simply gain access to the system by connecting to the internet. All out enumeration of the respondents was subject for the assessment of the prototype using the ISO 9126. The data were assembled and classified to demonstrate the means that was used to determine the performance and acceptability of the system. The total weighted mean for User Acceptance Test (UAT) is 4.10 with the verbal interpretation of "Agree". The clinic is satisfied and much willing to accept the implementation of the developed system.

Paper # 51

Twitter Sentiment Analysis towards Online Learning during COVID-19 in the Philippines

Abstract - It is clear that since the COVID-19 pandemic started in the Philippines, education is one of the most affected areas. After more than a year of struggling with different community lockdowns and the alarming consistency with the increasing number of confirmed cases each day, students and teachers are now left with the choice to voice out their frustrations, activism, opinions, and ideas regarding online classes through different social networking sites, most especially Twitter. With the influx of tweets available in the internet sphere, the authors of this study decided to conduct a sentiment analysis to categorize the overall opinions of Filipino citizens about the current state of education after more than a year of adapting with the distance learning practices that are now considered as the new normal. The authors utilized rtweet, a built-in package available in R programming to perform opinion mining on Twitter data collected through the package related to online class during pandemic. Through sentiment lexicons available in R such as bing and afinn, the results show that most of the tweets about online learning in the Philippines turned out to be neutral. The positive responses are 55.77% while 44.23% of the sentiments collected are negative. To evaluate the accuracy rates of results, the authors used three classification techniques namely Naïve Bayes, logistic regression, and random forest. Naïve Bayes and logistic regression both show 69.23% accuracy rate and random forest calculated 71.15% accuracy in identifying whether the given tweet is a positive, negative, or neutral sentiment.

Paper # 52

Design and development of a web GIS-based visualization and analytical platform for Farm-to-Market Road projects of the Philippines's Department of Agriculture

Abstract - This paper presents the design and development of a web GIS-based visualization platform for Farm-to-market road (FMR) project implementations of the Department of Agriculture (DA) in the Philippines. FMRs connect agricultural and fisheries areas to markets, allowing the farmers to transport their goods with relative ease and gain better prices and a broader reach for their products apart from stimulating the economy and empowering the rural communities. In monitoring and implementing FMRs, issues like FMR project duplication, overlapping, and segmentation of road FMR constructions arise. IROAD or Integrated Road on Agricultural Development initially addresses these concerns. It is an online interactive MIS that aims to consolidate, store/manage, and analyze GIS-based data of DA and other National Government Agencies' FMR projects. However, it is limited only to filtering and viewing Agricultural and Fisheries Infrastructure (AFI) projects according to specific criteria: Location, Program, and Type (Infra/Machinery). Also, the process of map rendering and visualization is slow and laggy. These limitations mark developing a more sophisticated web GIS application that can facilitate the visualization and analysis of FMR implementations. The utilization of Free and Opensource Software (FOSS) like GeoDjango, GeoServer, PostgreSQL/PostGIS satisfies the storage and visualization requirements of the system. User experience was made easy in terms of data management and generation of reports with the help of readily available scripting and styling libraries like Leaflet, JavaScript, and Bootstrap. The application aims to provide an avenue for transparency, inter-agency data sharing, science-based approach planning, and harmonization of FMR implementation through a web mapping portal. It is advantageous not just for the community of FMR beneficiaries but also to the stakeholders and various implementing agencies, as this builds an FMR information system among themselves.

Paper # 53

Two-Cell Contractions of a Filipino Braille Recognition Using Extreme Learning Machine

Abstract - Braille is widely used by blind people to read and write letters and numbers in form of dots. Filipino braille equivalent is mainly applied by the Filipino braille readers where there are unique braille characters compared to international ones, however, only a few studies about it exist and there is no practical device created exclusively for Filipino braille yet. This paper presents a study and development to the character detection of Filipino two-cell contractions using image processing and extreme learning machine. Raspberry Pi is used as the microcontroller alongside an adaptive camera slot for its machine vision and a case. Python programming language was used to implement the recognition of the system alongside the pre-existing libraries and scripts such as Scikit-Image, OpenCV, OBR, image processing, and image augmentation. The system was able to fully demonstrate how the machine vision works and was also able to translate documents that have a Two-cell Filipino Braille on them. In the future, the study is to be expected to have more datasets and applications of other Filipino Braille based on the DepEd Instruction Manual.

Paper # 54

Classification of Otitis Media Infections using Image Processing and Convolutional Neural Network

Abstract - Developing countries still to this day suffer from misdiagnosis of otitis media infections. Various studies to solve this issue with various success rates. This study explores a different variation of convolutional neural network (CNN), YOLO V3, or Version 3 of You Only Look Once. This algorithm detects particular objects in various forms of media, and one of them is images. Considering it is designed to detect specific objects, it was the perfect candidate to test on detecting Acute Otitis Media (AOM) and Chronic Suppurative Otitis Media (CSOM). These two variations have an object to look for whenever a doctor is diagnosing a case. Inflammation of the middle ear or otitis media (OM) are separate disease entities but may overlap. Hence, it may be confusing for a newly trained doctor to diagnose it correctly. This study achieved an accuracy rate of 75% when 20 images of AOM, CSOM, and normal tympanic membrane were tested. This result can be improved by adding more images into the training datasets using the same camera used in testing. Another appealing feature of YOLOV3 is the low cost of development and the availability of documentation on using and improving it.

Paper # 57

Integration of RESTful API to Student Information System for Secured Data Sharing and Single Sign-on

Abstract - Growth in the usage of REST APIs has been witnessed in recent years. Many businesses and companies, such as social media sites and online services, used API to interoperate with other benefits. REST was considered the most logical, efficient, and widespread standard in the creation of APIs. Hence, the main focus of the study is to develop a Web-Based Student Information RESTful API. This paper utilized the incremental model in the development of the system. A survey was used to validate the problems encountered in acquiring student information and determine the software quality based on ISO 9126 software quality metrics. Survey questionnaires were distributed to the system developers as the study respondents following the total population sampling technique. A five-point Likert scale was used to quantify the survey result and weighted mean to analyze and interpret the result. Based on the analysis and interpretation, the system developers recognized that the system is Acceptable with an average weighted mean of 4.44. This study also developed a profiling system that is connected to the Single Sign-On (SSO) API. The profiling system serves as the data source of student information of the REST API. Besides, the portal and the REST API were utilized by various information systems such as ID Generation Management System (SIGS), Event Management System (EMS), Faculty Performance Evaluation System (FPES), and Smart Card-based attendance and monitoring.

Paper # 58

Seepage Simulation Analysis for Isotropic Soils of Homogeneous Embankment Dams

Abstract - SEEP/W is a sophisticated finite element program for simulating groundwater flow in porous media. SEEP/W can also model simple saturated steady-state problems as well as complicated saturated/unsaturated transient analysis. This study aims to determine the effects of the different types of isotropic soils on the seepage and exit gradient of homogeneous earth dams through using seepage analysis simulation. A total of sixty simulations were performed to determine the effects of each six different types of isotropic soil, including gravel, silt, silty sand, silty clay, clay and sand, on the seepage and exit gradient of homogeneous earth dams. In the simulation data, the highest value of the exit gradient is from gravel, which is 0.50003672, while the lowest value is from clay, with a value of 0.500029. In terms of seepage flux, gravel and clay soil has the highest and lowest values, with a minimum and maximum value of 3.00E-04 m/s and 3.00E-02 m/s for gravel and 1.00E-11 m/s and 4.70E-09 m/s for clay, respectively. While the computed r- value is 0.623 and the tabular value is 0.2546766 with 58 degrees of freedom and a 0.05 level of significance. Due to the r-value of 0.623, which is in between the r-values of 1.0 and 0.5 in Figure 33, the seepage and exit gradient have a Positive Relationship between the two variables in terms of Pearson's Correlation Method Table. Based on this data, it is highly recommended to use clay soil for designing embankment dams as it has low value for both seepage and exit gradient, which could prevent piping. While gravel should be avoided among the six types of soil that were simulated since it has a high value for both seepage and exit gradient, making it more susceptible to piping, which is one of the major causes of dam failure.

Paper # 60

Gender Classification Hand Recognition System Using Key-Point Detection with Deep Neural Network

Abstract - Classification Systems evolve every day with new features, new engines, and updated hardware and software. It indeed depends on what type of system is being assembled and for what purpose. These classification systems will require some biometric-based mechanic to know what reference to identify a particular object or individual. These types of classification systems can be helpful within the public areas, like determining whether that person of interest in the video is a man or a woman. This can help authorities much more outstanding and can assist with their investigations. Our main objective is to classify, label, and compare the recommended biometric used in the gender classification system. This includes knowing the results like the classification type, accuracy, response time, type of biometric, and method used, like in this case, by using the key-point detection and the DNN. Overall, the researchers concluded that the gender classification system using hand recognition has a high accuracy rate with an overall total of 88.2353%, including a response rate of around 3-4 seconds from a total of 17 test trials.

Paper # 61

*Artificial Neural Network on Solid Waste Generation Based on Five (5) Categories Within
Barangay Sagrada Familia in Hagonoy, Bulacan*

Abstract - Solid waste generation, especially in places with crowded populations and inadequate implementation of solid waste disposal strategies, is one of the world's most prevalent challenges. There are several extant influencing variables on solid waste creation; nevertheless, the researchers focus on five (5) elements or categories that contributed the most to solid trash generation. And, among those five categories, the researchers sought to determine which one has the greatest influence on solid waste generation in Barangay Sagrada Familia to contribute to their future solid waste management plan, which could assist them in minimizing, segregating, and recycling solid waste that is one of the causes of their flooding problem. ANN (Artificial Neural Network) is a simplified computational model of the brain that is one of the most often utilized AIs in solid waste management because of its great competence. To get the desired outcomes, Matrix Laboratory (MATLAB) testing is essential. The researchers gathered information from studies, theories, and literatures in the field. The researchers next performed a survey to gather data and existing data in the barangay, and then used Excel and Matrix Laboratory (MATLAB) to construct and structure the model for a Neural Network analysis. Finally, the authors analyzed the Neural Network, with the goal value varying according to Pearson's Correlation Coefficient (R).

Paper # 62

*Classification of Fire Related Tweets on Twitter Using Bidirectional Encoder Representations
from Transformers (BERT)*

Abstract - Bidirectional Encoder Representation from Transformers (BERT) is a transfer learning model approach in natural language processing (NLP). BERT has different types of pre-trained models that can pre-train a language representation to create a model that can be finetuned on specific tasks using a dataset like text classification to produce state of the art predictions. Recent studies providing the use of BERT in natural language processing have highlighted that there are no publicly available Filipino tweet datasets regarding fire reports on social media that lead to a lack of classification models. In this paper, the researchers aim to design and implement a system that can classify Filipino tweets using different pre-trained BERT models. Upon creating a model exclusive for classifying Filipino tweets using 2,081 tweets as a dataset that contains fire-related tweets, the researchers were able to compare the accuracy of the different finetuned pre-trained BERT models. The data shows a significant difference in the accuracy of each pre-trained BERT model. The highest of which is the BERT Base Uncased WWM model with a test accuracy of 87.50% and a train loss of 0.06 during training of the dataset. The least accurate among the pre-trained BERT models is the BERT Base Cased WWM model, with a test accuracy of 76.34% and a train loss of 0.2. The result shows that BERT Base Uncased WWM model can be a reliable model in classifying fire- related tweets. The accuracy obtained by the models may vary depending on how large the dataset is.

Paper # 64

Smart Stick for the Visually Impaired Person

Abstract - Blindness is an impairment in which the patient requires constant assistance with even the most basic of everyday tasks particularly in traveling alone without occurring accident. The project was designed to improve the level of independence of a visually impaired individual in traveling, utilizing the Smart Stick to help them travel in flat and rugged terrain with high level of confidence as not to have accidents or injuries. The Smart Stick provides an obstacle detector and a speech synthesizer mechanism to guide the individual to certain obstacle and a change in the terrain elevation, it also helps the individual to locate the Smart Stick easily if they accidentally dropped or misplaced it, the device will create a sound through the buzz module. The following modules were also included; Obstacle detection, Terrain detection, Hand detection, Speech Synthesizer, and Sound module, all of which are connected to the Arduino Nano microcontroller. The prototype was tested considering all modules as mentioned above, having a 95 to 100 percent success rate for 20 testing trials in every module of the system. The study had presented an alternative way for the visually impaired individual to travel safely. The researcher recommended for future enhancement of the device to be paired with smart phones or an application based- GPS for tracking and monitoring.

Paper # 66

AlertQC: A Web and Mobile Disaster Utility and Incident Report Management System for Quezon City Disaster Risk Reduction and Management Office

Abstract - Quezon City is highly urbanized, it is both large and vast, covering one-third of the total land area of Metro Manila. It boasts a rapidly growing income and occupation for its population, the city with the most people. With the Philippines situated along the Pacific Ring of Fire and the path of the Typhoon Belt, this makesit susceptible to many natural disasters, not just storms and earthquakes. These disasters include floods, landslides, and volcanic eruptions, sometimes these disasters happen consequently or much worse, altogether. The creation of a disaster management system is vital to aid the people of Quezon City. This study we have developed an Incident Management System for the Quezon City Disaster Risk Reduction and Management Office, named AlertQC.

Paper # 67

E-Commerce System for Anywhere Fitness PH With Sentiment Analysis

Abstract - As people remain confined in their homes, more and more turn to the internet and social media daily for support, comfort, opportunities, and access to information. This presents an opportunity for businesses and e-commerce platforms to harness their own data and reach wide audiences through social media. An online store, Anywhere Fitness PH, took this opportunity which was launched to bring gym equipment to the comfort and safety of the homes of its consumers. However, the client, Anywhere Fitness PH, struggled in customer reviews and difficulties with its current e-commerce platforms. The researchers proposed a web application system that will provide their client an e-commerce platform that will utilize data analytics and sentiment analysis for its customer reviews and provide further improvements for the overall business operations of the client. The system passed for both evaluation of Customer Interface and Admin Interface with means of 4.27 and 4.49 respectively, making the Overall Evaluation have a mean of 4.38. All means are interpreted as "Strongly Agree" which means that the admins, the non-IT, and the IT staff strongly agree that the system passed Functionality, Usability, Reliability, Performance, Security, pertaining that the system is now ready for the use of the client.

Paper # 68

VIP-Guide: Development of Pedestrian Crossing Guide for the Visually Impaired People

Abstract - Visually impaired people sometimes travel alone or with a companion. These people travel outdoors with the use of a walking stick as their guide and travel mostly at a common route. However, when a visually impaired person wants to cross the street and cannot determine the signal on traffic lights and heavily depends on the sense of hearing. Visually impaired people are also prone to accidents and crime. Due to the lack of Audible Traffic Signal technology in the Philippines for persons with disabilities, the researchers developed a device that will guide the visually impaired to cross the pedestrian lane with traffic light. If the user is within range, the system will automatically be connected and synchronized with the traffic light. The device will notify the user of the countdown timer of the traffic light and notify the user whether the traffic light is in "Stop" or "Go" status. The device will also notify the user "Not to Cross" if the GO status counter is less than 2 seconds. Designated persons can send SMS with a system recognized keyword to the device to determine the exact location of the user. In case of emergency, a button on the device may be pressed by the user to notify the designated person of the exact location of the user. A cane is included for obstacle detection and will alarm the user via vibration on the handle of the cane. Maximum range of obstacle detection is 2.5 meters. If the obstacle is within range, the cane will vibrate and when the obstacle is nearer, the vibration on the handle of the cane intensifies, giving the user a sense of distance from the obstacle. The prototype can be used as alternative guide to visually impaired person when crossing the pedestrian crossing with traffic light.

Paper # 69

Waste-to-Energy Small Scale Incinerator Designed With Air Filters For Municipal Rural Area

Abstract - Solid waste management has been a major issue in developing countries such as the Philippines, as the nation goes to the improvement of living, economic growth, industrialization, and increase in population. Another major issue is the lack of electricity in the Philippines, particularly in the province. The Philippines' plan for full electrification of all households becomes difficult due to its topography, and geography. This study aims to provide an alternative solution for both issues by innovating through Waste-to-Energy. Waste-to-Energy is one of the alternative solutions in response to the worsening municipal solid waste in the world and source of electrical energy. A small-scaled incinerator was built for an alternative solid waste management machine and micro-electricity supply for rural communities. Instead of burning the waste or dumping it in the landfills, it will be processed in the prototype to lessen its environmental impact. This is possible using air filter bags and crushed mussels which lessen the air pollution produced during the incineration process of the waste as it builds up heat. The build-up heat would be absorbed by the thermoelectric converter, convert heat to electricity, and stored in a battery.

Paper # 71

Water Resource Potential Assessment for Pump Irrigation Systems for Open Source in Caraga Region, Philippines

Abstract - Irrigation water resource assessment is an important step towards maximizing water availability and land productivity in rainfed areas. The traditional fragmented approach of identifying potential sites for irrigation facilities is no longer viable, and a more innovative technique to assess water resources is essential. This paper presents the Geographic Information System (GIS) technique in identifying the water resource potential sites for an irrigation development project in Caraga Region, Philippines. The process includes digitizing satellite images, buffering water bodies, rasterizing thematic maps, reclassifying raster data according to suitability scale, and analyzing data using the GIS tools to generate a suitability map, particularly in rainfed agricultural areas. Results showed that only 59% (634,906 hectares) of the rainfed agricultural area in the region is suitable that encompassed marginally suitable, moderately suitable, and highly suitable with a suitability percentage distribution of 28% (180,143 hectares), 19% (121,338 hectares), and 12% (73,180 hectares), respectively. Based on the suitability map, the Caraga region has a high potential for future PISOS establishment. The generated suitability map served as a tool in the decision-making process by the concerned locals and stakeholders to optimize and identify the location to implement future projects effectively and efficiently.

Paper # 72

Controlled Environment for Spinach Cultured Plant with Health Analysis using Machine Learning

Abstract - The agricultural sector in an open field might result in harvest loss, thus the farmer must monitor the plant on a regular basis to keep it in perfect condition. The goal of the study is to improve traditional farming practices and identify the health status of spinach plants. Likewise, it aims to reduce human inspection and address issues that can lead to harvest loss in open farming. This project implements the evolutionary prototyping method to create an application and prototype that receive feedback from the user. The researchers develop and design a SPIMON application that could help farmers to monitor the temperature, humidity, soil moisture, and other parameters which aid the growth of the spinach. It also allows to do automation in detection, irrigation, air ventilation, and grow lights inside the controlled environment. Integrating Machine Learning with a nonlinear algorithm through the device helps to identify and classify the health condition of the spinach plant. The data are collected and stored in a cloud database and can be seen in a SPIMON application made by the researchers. As a result of the findings, it is now possible to detect healthy and unhealthy spinach using machine learning which has datasets and automates tasks based on the user's given schedule along with monitoring the environmental parameters and sensors in the application. Therefore, the researchers' design project provides convenience to monitor and know the health condition of the plant.

Paper # 73

Impacts of COVID-19 Pandemic on Mental Health Condition of PnC Engineering Students: A Basis for Development of Intervention Program Using DMADV

Abstract - This research study aimed to determine the mental health condition of engineering students from Pamantasan ng Cabuyao (PNC) during COVID-19 pandemic. The findings of this study were used to create an intervention program that mitigate the impact of pandemic on mental health condition. The researchers utilized DMADV methodology to clearly discuss the data gathered that were necessary for the study. The researchers used online survey which includes the demographic profile of the respondents and PHQ9 questionnaire to determine the mental health condition of the students. The total number of respondents based on Slovin's formula were 283 engineering students enrolled in the current school year. As a result, the researchers found out that before pandemic the average PHQ9 score of the respondents is 8.325 with verbal interpretation of mild in terms of experiencing negative emotions and feelings. During the pandemic, the PHQ9 score increases to 13.17 which indicates moderate in terms of level of experiencing negative emotions and feelings. The researchers also considered three main factors that affects the mental health condition such as personal life, social life, and academe. The average weighted mean for those factors were 4.179, 4.159, and 4.073 which indicates that the respondents often experienced the conditions under each factors. In conclusion, COVID-19 pandemic affects the mental health condition of engineering students. Therefore, the researchers proposed an intervention program that helped the students to cope up with any related mental health issues arose.

Paper # 74

*Tracelet: Contact Tracing and Physical Distancing Device with Blockchain Technology for
Pamantasan ng Cabuyao*

Abstract - In the Philippines, contact tracing is done in the conventional method where people fill-up health declaration forms. There is also no proper social distancing, especially in public places where it is almost impossible to practice it. This study focuses on concerns involving the conventional contact tracing process and social distancing in Pamantasan ng Cabuyao. The study is developed using modified incremental prototyping methodology. The intent of the study is developing a device that has a module with ranging position, which is triggered when the set one-meter distance is compromised, and will notify the users to practice social distancing. This also includes a web-based application interface for contact tracing in which the admin can update the status of the user and registration of the users. This also utilizes blockchain technology as storage to keep the users' information for contact tracing purposes. The device is developmentally designed, implemented and evaluated until it is done. Based on the series of testing, the device designed by the proponents notifies the users through blinking light to practice social distancing, and this also sets off the devices to exchange ID for contact tracing. Users' information is secured through the usage of blockchain technology as storage. When a user is reported to be COVID-19 positive, all of the users who have been in contact, will be alerted via text message.

Paper # 75

*Implementing a Wireless Sensor Network with Multiple Arduino-Based Farming Multi-Sensor
Tool to Monitor a Small Farm Area Using ESP32 Microcontroller Board*

Abstract - The Philippines is an agricultural country and in today's commercial agriculture, technology plays an important role in the development of different sectors of farm management, especially in resource utilization. This paper focuses on implementing a deployable wireless sensor network with multiple nodes centered in an ESP32 microcontroller board, wherein each sensor node has its own multiple sensors, using the ESP-WIFI-MESH protocol, which arranges the sensor nodes in a scalable, self-forming, self-healing, and autonomous mesh network topology for small farm-area monitoring. The input needed for this research are the plant growth parameters which include soil moisture, temperature, relative humidity, and ambient sunlight intensity; they will be obtained by the various sensors connected to a sensor node. The output is a collection of historical data to be displayed to and analyzed by farmers or other relevant groups. A node separation distance tested up to 100 meters can be achieved with RSSI of -88 dB. The paper also includes calibrations and testing to improve the capabilities of each node for 10 trials each, wherein the soil moisture has an RMSE=2.55% and SD=1.30%, the ambient sunlight intensity has RMSE=4.12 lux and SD=4.84 lux, the temperature has RMSE=1.31 °C and SD=0.50 °C, and lastly, for the relative humidity have an RMSE=1.73% and SD=0.96%. The power consumption of each of the nodes in the system is 0.865 W, wherein an average current draw of 173mA drawn from a power supply with a rated capacity of 10,000 mAh. The sensor nodes can last for up to 57.3 hours, but the power supply is charged during daytime with the help of solar panels.

Paper # 76

Development of a Portable Electrospinning Device with Tunable Voltage for Nanofiber Production

Abstract - Electrospinning is a unique approach in nanofabrication that is gaining a lot of interest recently. The focus of this paper is to develop a portable electrospinning device that has varying voltage to produce nanofibers using Polyethylene Oxide (PEO). A sample of 103 strands per input voltage were measured through the magnified image from the Scanning Electron Microscope that was uploaded to ImageJ. The data gathered were used in two-tailed unpaired T-Test to compare the diameters of the electro-spun nanofibers. Using a 95% confidence interval, the T-score falls into the critical region bounded by the T-critical value; the input voltage shows a significant difference in the diameter of the electro-spun nanofibers. This concludes that as the voltage increases the electro-spun nanofibers are thinner and only proves that the applied voltage plays an important role in Electrospinning process. The researchers recommend expanding the range of input voltages and to create a constant flow rate for future studies. Also, to test the capability of the device for medical applications; trial on pig skin is recommended.

Paper # 77

Dog Identification System Using Nose Print Biometrics

Abstract - Advancement in technology has improved identification systems by integrating biometrics as a form of reliable authentication. Besides human biometrics, biomarkers are also present in nature and throughout various species of animals. Dogs are known to have unique patterns on their nose analogous to human fingerprints. This paper reports developing and implementing a system designed to recognize dogs with their nose prints as biometrics. The identification system employs various image processing techniques developed in past research papers. You Only Look Once (YOLO), and Scale-Invariant Feature Transform (SIFT) extract an image's unique vital points and descriptors. These unique descriptors, along with the dog's information, are saved for future matching. The matching is done with the Fast Library of Approximate Nearest Neighbor (FLANN). The system was able to identify 18 dogs out of 20 correctly. A total of 20 comparisons were made, making the overall accuracy of the system 90%.

Paper # 78

E-nose Based Classification of Drying Method Using Local Tea Leaves Gas Signature

Abstract - This study describes the classification of the different drying methods of local tea leaves using support vector machine. The benefit of this study is to give information that shows that there is a practical solution in classifying the drying method used in local tea leaves using an electronic nose and support vector machine. The study resulted in a success where the researchers were able to predict the drying method used on tea leaves by training a model on the raspberry pi and then classifying the data. The researchers obtained an accuracy of 75% for Pandan and 72.22% for Banaba by training the support vector machine algorithm with the collected data. The researchers concluded that the electronic nose system created could predict the drying method based on the gas signatures emitted by the tea leaves using a support vector machine.

Paper # 79

Fuzzy Controlled LED Lighting Compensation for Aeroponics System

Abstract - Solar is one of the primary sources of light energy for plants, and it is significant to its energy conversion process – photosynthesis. Due to some unpreventable factors and restricted locations, plants do not constantly receive their needed energy, affecting the crops. With technological advancements, artificial lightings are integrated into agricultural systems to compensate for this lack of supply. The given aeroponics system uses two different spectra of light-emitting diodes (LED) – white and an equal combination of red and blue – as lighting compensation. These artificial lights are controlled by fuzzy logic, which treats the lux value as the input and the brightness as the output. On this setup, having a p-value of 0.0006 compared to 0.1592, the blue and red light compensation creates a significant improvement. The same is for the number of leaves, with the blue and red having a value of 0.0398 and white with 0.1828. Lastly, the identical light spectra created the most prominent gap with the weight reading 6.25g. The combination of red and blue had proven a better effect than white and regular sunlight concerning the plants' height, weight, and the number of leaves.

Paper # 81

Development of Load Moment Control and Monitoring System for 2nd-Hand Mobile Heavy Load Cranes

Abstract - This study was conducted to develop a fully functional controlling and monitoring device to be used during the actual industrial operation of mobile heavy load cranes. The project aimed to provide a cost-effective and user-friendly load moment indicator that meets the requirements of industry safety standards. The control system of the device measures and monitors the main parameters such as boom length, working radius, tip height, maximum load capacity based on crane load chart, actual load, efficiency, and (actual load/maximum load) ratio. It was developed using the advanced application of Programmable Logic Controller (PLC) and the latest technology of Human Machine Interface (HMI). The interface of Delta PLC and Delta HMI was able to replace the traditional controlling panels which need extensive wiring and the monitoring screen allows the user to complete settings through touchable keys on a user-friendly window. The performance of the implemented load moment control and monitoring system was evaluated and compared to the standard manufacturer-rated lifting load chart. A series of tests were conducted and the results attest that the developed device successfully attained its functionality with an average of 99% accuracy on all the readings.

Paper # 82

Gender Identification Using Keras Model Through Detection of Face

Abstract - Gender identification is a critical topic in which research is still ongoing. Many gender prediction systems have been developed utilizing various designs. With the help of the Raspberry Pi 4 Model B and Raspberry Pi Camera Module V2, this paper provides a real-time system for gender identification from images. Gender identification from face images has become a significant issue in recent years. In computer vision, various practical techniques are being explored to address such a difficult challenge. The face characteristic acquired are sent into the neural network as input or test data. The neural network was created to extract features and to function as a classifier to detect genders. However, the majority of these methods fall short of great precision and accuracy. With Python as the programming language, several functions such as OpenCV, Keras, and TensorFlow were utilized to assess the effectiveness of the design. A thousand samples were tested for foreign and Filipino datasets, yielding a training accuracy of nearly 90 percent and less than 1 percent loss accuracy. As a result, the system is a reliable device for determining a user's gender.

Paper # 83

Tongue Biometrics Extraction Based on YOLO Algorithm and CNN Inception

Abstract - Biometrics is the measurement of the uniqueness of the person's physical characteristics. The tongue has its unique features. The texture, shape, and color of the tongue are different from one another. This paper envisions the development of Tongue Print Biometrics. This study is accomplished by providing the system with data captured by the Camera Module that is connected to the Raspberry Pi. The images captured are trained using two algorithms: the YOLO algorithm and CNN Inception. The process is divided into two parts: Enrollment and Testing while the Training part was included in the enrollment phase. Based on the results, the first algorithm which is YOLO yields a rate of 98.8% accuracy while the second algorithm which is CNN Inception yield a rate of 39.44% accuracy.

Paper # 86

IoTFisher: A Fish Feeder Mechanism with Timer/ GSM based

Abstract - Automatic feeders remain the greatest alternative for feeding fish to replace the human technique, and they are also the cheapest and most accurate method due to the low cost of microcontrollers. The study aims to design a project that would automatically dispense feed based on the user's preferences through the timer and to message thru GSM the owner if the feeding process was done using the Fish Appetite Index (FAI) algorithm. Prototypes are used to see if designs perform as they are supposed to and according to development and testing the project was proven that the design was effective and efficient. Based on the result of the evaluation. The proponents found out that the majority of the respondents agreed that the proposed application has been met. The proposed application will be a great help to the fishermen and aquarium owners because they will be relaxing and defendant to the application.

Paper # 88

Complete Blood Count (CBC) Analysis Mobile Application

Abstract - Complete Blood Count is one of the most commonly performed medical laboratory procedure today. It is required to detect various types of diseases. Presently, some small- scale clinics in the country still does the tedious, manual method of counting the blood cell. With Complete Blood Count Analysis System through Image Processing, automated CBC can be performed by mounting the smart phone camera on the viewer of the microscope. The input image will go through several image processing algorithms such as: Binary Thresholding, Clustering, and Hough Circle Technique. The result will be computed through the formulas used in the manual method of the CBC process. Experimental results show the developed system gains 94% of accuracy for counting the Hematocrit, Hemoglobin, Red Blood Cell, and White Blood Cell values.

Paper # 89

Car Damage Detector: A Comparative Study of Haar Cascade Classifier Algorithm and Convolutional Neural Networks

Abstract - In this study, the researchers applied the two image processing algorithms, Haar Cascade Classifier Algorithm and Convolutional Neural Networks. The goal is to compare their accuracy and the significant difference in detecting car damage. The researchers developed a software application, Car Damage Detector, to assess the accuracy of the algorithms. They applied this software to examine each application in detecting car images with damage, and images without damage. Convolutional Neural Network achieved a total accuracy of 80%, while Haar Cascade Classifier Algorithm attained a total accuracy of 56%. Using the T-test method resulting 2.526 with a critical value of 2.011, the researchers concluded that there is a significant difference between the two said algorithms.

Paper # 91

PUPRBLMS: Development And Acceptability of a Proposed Library Management System

Abstract - Managing the library in a university or school is not an easy task especially if it has huge number of books that is open for utilization and borrowing to students. The librarian faces challenges in tasks like tracking of the books on-borrow due to uncontrolled demand more particularly during examination period or research seasons. In this study, the proponents sought to measure the acceptability of the proposed Library Management System capable of handling tasks for library management. The proposed Library Management System was primarily implemented at the Polytechnic University of the Philippines, Ragay, Camarines Sur Branch to address the challenges of the university in terms of library management and was evaluated using a survey questionnaire that was participated by 64 students, 2 library staff, and 10 faculty members for the period of January to March 2020. Evaluation shows that there is an average rate of 4.18 with a verbal interpretation of highly acceptable. Given the evaluation results, it is believed that the proposed library management system can be implemented for library management.

Paper # 92

Volume Approximation Using Kinect Sensor

Abstract - Kinect has already contributed to object detection, 3D modeling, autonomous navigation, and scene mapping studies. This research aims to use Kinect's ability to collect depth data by approximating the volume capacity of an open-top subject and producing a 3d representation of it based on the data collected from Kinect and image processing. The experiment included taking the subject's ground truth volume and comparing it to the system's volume output. Using Linear Regression for the data interpretation indicates that the device created is reliable enough to produce a correlation coefficient of 0.9621. A significant positive association of the two datasets: experimental volume and theoretical volume. The prototype arrived with an average error rate of 9.003%, implying that the system can get accurate results.

Paper # 93

Development And Acceptability of a Student Daily Attendance Monitoring System

Abstract - Attendance plays an important part in education – students who attend classes regularly have a higher chance of succeeding in school and becoming a valued member of the school community. It is also important for tracking time and attendance when they are at school. The researchers developed a tool that is capable of tracking and recording students' attendance in school for reference purposes using the Waterfall Model and is initially implemented in the Polytechnic University of the Philippines, Ragay, Camarines Sur Branch. The proponents evaluated the developed tool by the use of survey evaluation which was participated by 50 students to identify the level of acceptability of the proposed student attendance monitoring system which shows a promising result of 4.63 with a verbal interpretation of Highly Acceptable. Through the evaluation result, it is believed that utilizing the proposed system will be advantageous for the organization.

Paper # 95

Strengthening Module Development to Full Online Modality: Faculty and Student Adaptation in the Pandemic Era

Abstract - The COVID-19 pandemic has led education administrations worldwide to adhere to flexible learning environment and search alternatives to face-to-face instruction or the already manifested blended learning. Full online teaching and learning have been forced used by universities, the faculty members and students had to make the adjustment in an exceptional scale. This paper presents how a faculty has prepared and strengthened the content of the modules from the course learning outcomes, key performance indicators, delivery for teaching and learning, assessment methods and tools, and the course's evaluation target. Findings from the course Integrative Programming and Technologies was employed as the module contents for its 18-week duration was presented and the students' performance reflected more than 60% attainment in its course learning outcome (CLO) targets.

Paper # 96

Arduino Rice Pest Trap Using Laser Sensors

Abstract - This device can be useful by rice field owners to decrease the number of pests in rice fields, also this will provide a non-chemical and energy saving way utilizing UV LEDs to attract bugs and capturing them then the system will be controlled by a microcontroller. Rice, the staple food of over half of the world's population, is locally known in the Philippines as palay, bigas, or kanin. As population grows, demand for rice increases. Thus, the need for sufficient rice production is also needed. Different agrarian problems come with the production of rice the most destructive are pests. The results we've yield were, the pests were attracted best in UV light. Also, the laser sensors we're effective in detecting and capturing the pests. Basically this device won't harm the rice crops resulting to a greater production and more profit because it is a non-chemical device and energy saving way utilizing UV LEDs to attract bugs and capturing them.

Paper # 97

An Optimization Algorithm Using Fuzzy Logic and Weibull Distribution for Bioretention Systems

Abstract - Bioretention systems, one of the types of Low Impact Development (LID) best management practices are dependent on localized climate and catchment characteristics. Frequency and patterns of the daily rainfall data from 3,337 storm events from 1990-2020 were described using Weibull probability distribution. In this study, the rainfall depth of storm events that influenced the design of bioretention systems were analyzed using Weibull distribution and fuzzy logic. These lead to a better understanding of the trends in annual and daily precipitation that affects bioretention rainfall events used for the computation of water quality volume (WQV). Furthermore, the fuzzified data may be used for studies on rough set-based data models for bioretention cells. The result showed that a fuzzy value of 11 to 18 prevailed in all bioretention rainfall events. Identifying the fuzzy value of 18 as the 90th percentile of cumulative rainfall establishes it as a critical classifier to be used in modelling and designing LID technologies that can effectively capture and store most of the annual runoff and efficiently treat pollutant load.

Paper # 98

Automated Rbc Morphology Counting And Grading Using Image Processing And Support Vector Machine

Abstract - Red Blood Cell (RBC) morphology such as Target Cells and Elliptocytes characterize early pathognomonic determinants in certain diseases like Iron Deficiency Anemia and Thalassemia. Significant amounts of target cells or elliptocytes in a blood sample can be used to grade the existence of Blood Related Disease. In the Philippines, 37.6% of Filipinos have Iron Deficiency Anemia (IDA) and 27.8% suffer from Thalassemia. This study automates the classification, counting, and grading of RBC morphology using image processing techniques and SVM classification. The researchers acquired PBS samples and designed a prototype capable of analyzing these with a Raspberry Pi computer. The device classified, counted, graded and provided associated disease considerations of the sample PBS test. Comparison of the machine and hematologist's reading of the normal red blood cells, target cells and elliptocytes samples gave an average accuracy of 95.77%.

Paper # 103

Deriving Heart Rate and Respiratory Rate from Pulse Oximetry Using Neural Networks

Abstract - The inductive belt placed around the abdomen and ribcage is vital at point of care testing to determine the respiratory rate (RR). Nowadays, extraction became more convenient with the invention of portable and smart devices. Different algorithms have been explored in various studies; however, the downside is that the prototype devices tend to be sold by reputed companies at a higher price point when the actual electronics and resources used are affordable and readily available at the market. This led to the customization of pulse oximeters that provides heart rate (HR) and RR in one compact device. The extraction of RR from HR was done using an Artificial Neural Network (ANN) using a pulse oximeter programmed in Python language. The selected five features namely, time of peaks, peaks, time of valleys, valley and time since last peak provides proper estimation of RR. The neural network helped in the classification labels of valleys such as inspiration, expiration, and neutral. Overall, the MSE computed for the HR and respiration rate was 4.93 and 0.95, respectively, versus a medical-grade device.

Paper # 104

Classification of Filipino Braille Codes with Contractions Using Machine Vision

Abstract - Knowledge in Braille is ultimately necessary to maintain learning for the visually impaired. In the Philippines, class attendance has been showing low rates for visually impaired students caused by the shortages of teachers and the absence of the specialized tools intended for teaching them. A proposed solution in addressing this problem is the usage of computers for the automation in the process of the extraction of information in Braille which can facilitate teaching. In recent years, a considerable amount of effort and attention have been devoted to the development of this kind of technology however in languages other than Filipino Braille. Codes in Filipino Braille with its contractions, and even the Filipino language itself has unique features as compared with other languages. In this paper, a system is proposed which uses machine vision in recognizing Filipino Braille codes including one-cell and two-cell contractions. Synthetic Braille images undergo cascade object detection, image processing, extraction of HOG features to develop the three-stage multiclass SVM classifier. Experimental evaluation results reveal a good performance of Filipino Braille classification and translation to texts.

Paper # 105

Behavior-Based Early Cervical Cancer Risk Detection Using Artificial Neural Networks

Abstract - In a worldwide perspective of the most common cancer diseases, cervical cancer is ranked fourth most frequent whereas the worldwide mortality rate is at 54.56%. In the Philippines, the second leading site among women is cervical cancer next to breast cancer. Research shows that cervical cancer is one of the most treatable cancer forms if detected and managed early. Currently, the most reliable diagnosis and prevention method of cervical cancer is thru a regular testing via Pap Smear test and HPV vaccination being performed in hospitals worldwide. However, according to the Centers for Disease Control and Prevention in California, the cervical cancer screening rate of regular testing in hospitals went down significantly during the stay-at-home order by the government due to the COVID-19 pandemic. Also, there are limited research based on the behavior information in relation to cervical cancer risk prediction, but existing studies proves the possibility of the risk prediction based on behavior information. This paper presents an Artificial Neural Network-based model for early cervical cancer risk detection based on behavior information. The neural network was trained using scaled conjugate gradient back propagation. The system showed 98% overall correctness in early cervical cancer risk prediction.

Paper # 106

Reverse Vending Machine with Power Output

Abstract - Polyethylene Terephthalate (PET) bottles are containers used widely in beverages and food containers, and most of the PET bottles are not recycled. The study focuses on how to recycle PET bottles. This study used image processing to ensure that the input PET bottles are in the state of recycling. It used the YOLOv3 framework algorithm for the training of images. This algorithm is advantageous when it comes to its fast speed while maintaining its high accuracy. For image detection, it used a camera to take an image. Then, the data will be sent to raspberry pi to classify the input bottle. If the input bottle satisfies the conditions, a signal will be sent to the DC motor to open the PET bottle platform. The corresponding type of bottle, including the PET bottle's equivalent time, will be displayed on the LCD screen. The research conducted was successful. It has an accuracy rate of 90% and 10% error rate. The device's time delay is 10.966 seconds. As a result, a reverse vending machine is one of the alternatives for recycling.

Paper # 107

Android-Based Mobile Grade Viewer Application Using PHP

Abstract - This study focused on the development of online Mobile Grade Viewer allowing access to student grades. It used the descriptive research method and employed the QUIS 7.0 questionnaire. The survey involved 350 respondents composed of parents/ guardians, teachers, students and technical experts. Data were treated using frequency count, percentage, and median. The application can access records from the Registrar's database and can be retrieved through a web browser using a desktop computer, laptop, and mobile phones, allowing greater portability and timely grade querying. The application enabled accounts for students, parents/ guardian, and teachers. It included a log-in page, an account page, an assessment page, a view grade, and summary of grade pages. The application was found by the user- respondents to be easy to operate, easy to learn, consistent and helpful, making it usable to the end-users.

Paper # 110

Image-Based Shrimp Length Determination using OpenCV

Abstract - Shrimp species belong to the class of Crustacea under order Decapoda under suborder Natantia. The shrimp species are characterized with semi-transparent body which grow up to more than 20 centimeters. In terms of economic impact, the shrimp industry is considered highly profitable based on the studies by WorldAtlas and Philippine Statistics Authority. Therefore, as part of the necessary better management principles (BMPs), shrimp growth should be monitored. However, for the shrimp length is typically measured by a manual tool like rulers or calipers which is known to be a tedious process most especially when large number of samples are considered. Hence, in this study, image processing via OpenCV was utilized to estimate the length of shrimp species. The performance of the image-based approach is compared with the manual measurement and yielded a relative percent error of 4.81%. Based on the results, it can be concluded that the image-based approach can be utilized to determine the shrimp length.

Paper # 113

Study on Seedling Disc Pellets Made from Rice Straw and Cow Manure

Abstract - Seedling disc made from rice straw and cow manure as a substitute for seedling disc made from coco coir as Most of the seedling disc pellets that is readily available in the market used non-biodegradable plastic mesh to hold seedling substrates. It can be an alternative medium for growing plants when there are no available pots, trays, and soil. But the coco coir pellets have some of the drawbacks when used because it caused the yellowing of plants. When deemed an agricultural waste, the coconut coir is soaked and processed to extract excess minerals. Therefore, the researchers studied to provide an alternative material to coco coir to be more environment friendly and use other raw materials for product development. The researchers made various testing to determine what optimal ratio or combination of materials would be the best for plants to grow. The produced seedling disc made from rice straw and cow manure were then compared to the existing seedling disc which is made from coco coir. The optimal ratio among the trials made found in the study was 30 grams of rice straw, 15 grams of cow manure, 5 grams of quicklime and 10 milliliters of water. The target market is plant shops, nursery plant shops and possibly members of the community that likes to grow and nourish plants in their own home whom resides at Laguna. The initial investment shares were equally divided into Php 5, 502,526.84 for each member. The business' financial statement for the next five years show that the business was profitable, and the payback period of the investments would be after 4 years and 340 days.

Paper # 117

Development and Characterization of Energy Harvester using Electromagnetic Linear Generators in Bicycle Shock Absorbers

Abstract - With the promise of having the least carbon footprint, as well as the capability to reach remote places. Several technologies offer ways to harness energy for supplementing the need of energy in some auxiliary devices of bicycles such as lights and horns, however several points where force is applied, having the potential of generating energy, is left untapped. The researchers proposed the characterization and fabrication of an energy harvesting device using a linear electromagnetic generator attached inside the suspension system of a mountain bicycle. The generators were placed on the shock absorber supporting the frame from the rear end, and another one attached on the fork of the steering sector of the bicycle. Experimentation was conducted within 10 kilometers of travel through a smooth and a rough pavement, maintained with a 20kph speed, 0.091Wh – 1.039Wh of energy in smooth terrain and 0.477Wh – 1.241 Wh in rough terrain respectively, The suspension system was also validated to withstand rider weights of up to 77kg within the recommended sag percentage -- proving its proposition to be a prospect of supplying electricity to power banks while being utilized as a suspension system within the rider's comfort. The prototype is anticipated to bring an impact as an effective power source for charging or supplying devices such as lights, horns, as well as GPS devices and cellular devices.

Paper # 118

Precision Agriculture Detecting NPK Level Using Wireless Sensor Network with Mobile Sensor Nodes

Abstract - Agriculture is one of the most important things to be considered in a nation because it is one of its backbones. The nutrients plants need most and will not survive are referred to as the primary macronutrients are Nitrogen, Phosphorus, and Potassium. These nutrients are necessary for healthier crops and higher yields, so NPK fertilizers are used to supplement the soil's lack of nutrients. To detect the amount of NPK in soil, this paper proposed a wireless sensor network using mobile sensor nodes. For detecting soil nutrients, the device used a lux sensor. To prepare the soil for sensor calibration, the sensor is calibrated using controlled NPK. To ensure that the nutrient in the soil sample is correct, the soil-controlled NPK is checked with the UPLB Soil Test Kit. Soil samples are used to calibrate and determine the thresholds for low, medium, and high nutrient levels in each soil. Different forms of soil and lighting conditions will be used in the tests. The average percent difference between different soil type's NPK values is as follows: 6.30%, 16.88%, and 13.65%. The values are higher than 5%. While, for the different lighting conditions, and the average values are as follows: 0.54%, 1.21%, and 1.11%. The following percentages are less than 5%. The system is only limited to following a straight line, is not waterproof, and cannot be used in muddy or extremely rough conditions. In addition, the device should be calibrated for each use under various lighting conditions and soil types.

Paper # 119

Implementation of a Hybrid Plant-Shaped Energy Harvester Using Flexible Polyvinylidene Fluoride(PVDF) Piezoelectric and Solar Film

Abstract - Several studies have shown that Polyvinylidene Fluoride (PVDF) Piezoelectric Films can be a great developing tool in energy harvesting, medical surgeries, and robotics applications; however, the progress in the implementation and development of this piezoelectric component in energy harvesting remains to be utilized. While solar films are widely employed, applications in the Philippine residential community are not widely practiced. In this paper, nine PVDF piezoelectric films were connected in parallel which produced a maximum output of 16.5mW in controlled environment testing and 16.6mW in uncontrolled environment testing at a wind speed of 2.3m/s; and to be able to make use of the harvested energy, three solar films were combined in the system to produce a hybrid energy harvester implemented into a 3D printed artificial plant. Combining the piezoelectric and solar energy systems produced a constant 3.6V output in the terminals and a maximum of 150mW. This hybrid plant-shaped energy harvester provides a significant contribution to the development of an economical and reliable renewable energy that can be an additional source for typical small residential house, streetlights, vehicles, or other loads exposed in wind and sunlight; and in utilizing the applications of the PVDF piezoelectric and solar film.

Paper # 121

Steady State Estimation of Power Distribution Networks with Distributed Generation using Integrated DC Load Flow and Weighted Least-Square Algorithm

Abstract - Monitoring of a power system is essential in order to ensure reliability, safety, and security. However, metering devices, which are commonly used in a power system are prone to errors. Most of the time, these errors occur at random and due to man-made means, environmental, or system failures that can greatly affect the whole power system. Several methods and estimation techniques are emerging to anticipate such occasions. In this study, the researchers performed power system state estimation on an IEEE 14-Bus Test Case with Distributed Generation injection using Weighted Least Square method. At least three metering devices that were subjected to errors were considered; there were also cases that contained zero reading and contingency. To be able to perform state estimation, the researchers performed DC load flow analysis to acquire the power flows of the line. Then, an error ranging from -5% to +5% were injected to the selected meters. The data coupled with error was then simulated to the modelled WLS algorithm. To verify the result from the algorithm, it was compared to ETAP and the researchers conducted T – Test. Based from the parametric test (or statistical test), the t – value is less than the t – critical. The estimated data from MATLAB is almost equal to the true value from ETAP. Therefore, the researchers were able to develop an accurate PSSE using WLS method.

Paper # 122

Waste to Energy Generation: A Multi-Criteria Decision Analysis for Municipal Solid Waste Management in the City of Manila, Philippines

Abstract - In this paper, a Multi-Criteria Decision Analysis (MCDA) is utilized to provide a better strategy and increase the efficiency of solid waste management. The method aims to determine the suitable Waste-to-Energy (WTE) technology for Manila City, Philippines using a pairwise comparisons method known as Analytical Hierarchy Process (AHP). AHP utilized a hierarchy structure consists of objectives, criteria, sub criteria, and alternatives. The criteria selected were environmental, economic, technical, and sociocultural. The WTE technologies selected were anaerobic digestion, incineration, and pyrolysis. Results show that the environmental aspects with 63.80% is the chosen priority. It is followed by the economic and technical aspect with a close relative value of 14.86% and 13.32%, respectively. The sociocultural aspect is the least priority with 8.02%. Using the criteria, WTE technologies were scored and tabulated. After evaluation, it revealed that an anaerobic digester is suitable WTE technology for Manila City, Philippines. Result also revealed that 249,318 m³ biogas can be generated after 21 days.

Paper # 123

Design And Simulation Of A Small-Scale, Power-Generating Device By Carbon Sequestration

Abstract - Demand for energy resources keeps increasing each year because of the rapid population growth and humans spend a tremendous amount of it without knowing that these energy resources comes from fossil fuels that can affect our environment by burning and converting it to energy. Carbon dioxide is one of the highest contributors to global warming over the past century and excess carbon dioxide comes from deforestation, emission from subsurface reservoirs, and burning of fossil fuels. Due to the increase of industrial activity, the atmospheric temperature of the earth also increased, and it will result to global warming. One solution to mitigate this problem is to have an environment-friendly device that can generate electricity by extracting the carbon dioxide from the air. This study aims to design, simulation and test a small-scale power generating device by carbon sequestration. The design and simulation of the device was done through Autodesk Fusion 360, Vue, Vuetify and Amazon Web Services. The particulate matter, humidity ratio and carbon dioxide concentration are input parameters for this study to simulate the power output of the device after carbon dioxide was captured. Considering the effect of the input parameter on the expected power output, which is based on theoretical value of 2.9784 Ah, two simulation tests were done where test 2 having humidified air as an input. It produces more power output compare to the theoretical value having atmospheric air as an input. Test 2 has more power output results having a humidified air as input while having more carbon dioxide concentration as well indicating the simulation effectiveness based on Coulomb's Law.

Paper # 124

e-hAC: Interactive Health Access Card Dispenser Kiosk to aid Outpatient Queuing in Jose Reyes Memorial Medical Center

Abstract - Various transactions involving utilization of health access cards have been evolving continuously in different countries. Most of these are products of advancement and integration of smart technology to provide patients with more convenient and accessible healthcare. In the Philippines, public healthcare system facilities and services are not as impressive as those from other countries. They provide health cards but manual process in providing services is one of the problems that is time-consuming and troublesome for patients. To cater this problem, this study aims to design and develop an interactive dispenser kiosk system that can speed up the process of providing health access cards, give access to history of visits and create a queuing system for patients using RFID technology. The kiosk's functionality was analyzed based on the card displacement from dispenser, data retrieval's accuracy from database, average transaction time of the processes, and satisfactory rating of respondents. Test shows that the use of servo motor with 5.5 kilograms per centimeter applied torque has been proven to be more efficient in achieving the minimum card displacement of 5.8 centimeters than push-pull solenoid. Experiments attained 100% accuracy in detecting multiple accounts and retrieving registered user accounts from the database. E-hAC obtained the minimum average transaction time of 3 minutes for dispensing health access cards while 2 minutes in data retrieval with queuing number. Ultimately, the satisfactory rating of respondents proved that e-hAC can speed up the process of providing health access cards and queuing system in Jose Reyes Memorial Medical Center.

Paper # 125

Influence of Storage Periods and Temperatures on Postharvest Quality of Fresh-Marketed Lycopersicon esculentum Mill.

Abstract - A food production system does not end in harvesting crops rather it extends up to the postharvest phases like storage, transporting, marketing, and consumption. Diamante Max F1, a hybrid tomato, is resistive to most diseases but it is one of the most highly perishable tomatoes because of its high moisture content and thin skin that can be easily affected by hot temperatures. In this study, a new non-invasive characterization technique for tomato fruit was developed using integrated computer vision and computational intelligence modeling. The Diamante F1 Max Philippine tomato (*Lycopersicon esculentum* Mill.) variety was used as fruit cultivar and exposed to two postharvest storage treatments: room temperature with 23-34°C uncontrolled atmosphere; and cold room with constant 18°C throughout the 14 days of storage period. Multigene genetic programming generated four predictive models of the architectural phenotypes: daily weight loss, surface area, total color difference, and tomato color index as functions of storage temperatures and periods. To say that fresh-marketed tomatoes are degrading, its surface area and total color difference should be decreasing, and its daily weight loss and total color index should be increasing. Morpho-anatomical analysis was performed to further analyze the degree of quality degradation in the pericarp, columella, placenta, seed membrane, and fruit epidermis. Pericarp cells shrink due to dehydration and locular gel around the seeds reduces manifesting weight loss. Overall, the influence of temperature and storage period should be managed right after harvesting the fresh produce to preserve its quality and prolong its shelf life for human consumption.

Paper # 126

Innovating Green Wall: A Sustainable Way of Enhancing the Vertical Planting System

Abstract - Farming has been beneficial until today due to its contribution in agriculture of plants, and vegetables which are essential to human life. The problem is that traditional farming requires a lot of time, energy, space and manpower for the plants to grow. In addition, abnormalities in plants can occur due to water consumption, pest controls, season in a year, etc. As a result, vertical planting is introduced. These modern method of farming plants has been a widespread today not only to reduce the space and manpower of in planting but the innovation it makes to also reduce the time and energy in farming. Hence, the researchers created an Indoor Hydroponic system, which is a type of vertical planting system, which can monitor the conditions around the plant and schedule the basic needs of the plant which is water and sunlight using related possible sensors, Arduino Mega and Android Application. These components are instrumental to managing the project by providing a real-time update of the temperature and humidity around the area and water level and pH level in the reservoir to the system itself and the Android App. Also, it helps the user schedule the system in terms of irrigating the plants, turning on and off the grow light and trimming the plant once it reached the certain height. These are proven effective than the traditional farming and are supported by data that states the efficiency and betterment of the vertical planting system.

Paper # 127

Classification of Healthy and Unhealthy Abaca leaf using a Convolutional Neural Network (CNN)

Abstract - Early suppression or identification of Abaca plant diseases is one of the difficulties for the farmers in Abaca fields, relying only to the manual process of identifying Abaca plant diseased which were lack of time efficiency and feasibility solution that can cause widespread outbreaks of the diseased Abaca plants. But through the help of the system using the Raspberry Pi 4 together with the Raspberry Pi HQ camera, the developed prototype can identify the healthy and unhealthy leaves through the deep learning algorithm of the CNN upon the architecture method of the ResNet50. The system trained over 200 images sample through the gathered data by the researcher with two classification sets of images consisting of 100 healthy leaves and 100 unhealthy leaves samples under the approval and labeled by the PhilFIDA Catanduanes. The data sets on the Abaca leaves were manually taken by the researcher from the Abaca plantation area in Barangay San Miguel Baras Catanduanes. The thorough division of the Abaca leaf training model by the CNN – ResNet50 and reaching the accuracy training and validation rate reached 100% and the precision rate of the two-output data classification reached 100%.

Paper # 128

Impacts of COVID-19 Pandemic Crisis in the Transportation Sector: A Classification Analysis in Regard with Preferred Modes of Transportation Using Random Forest Algorithm

Abstract - The study observes the Pandemic Crisis (Covid 19) that resulted in impacts toward the Transportation category in the area National Capital Region. Public Transportation is an important aspect of human's ability to travel to different places whether its personal or business purpose, it's a part of life that people take for granted and can't be taken away easily. But due the pandemic era people have been careful in their choices which resulted in the change standard when it comes to public transportation choices. With that said, to be able to understand and observe these impacts, a scenario must be made such as before and after the Pandemic designed as an environment for the study to take root. The study has utilized the use of machine learning called Random Forest Algorithm with the used several parameters to create a prediction model. As for the method in gathering data a survey of Google Form is utilized to gather 200 participants of the National Capital Region with varying parameters for their choice of public transportation. The machine algorithm has shown satisfactory accuracy of 89.88% and 88.88%. As an important note it is observed that travel expense has more impact in the choices of public transportation compared to other parameters. The Random Forest Algorithm has been utilized in creating classification type of models and can be said help future researchers to improve machine learning approach

Paper # 129

Seasonal Mapping and Air Quality Evaluation of Total Suspended Particulate Concentration Using ArcGIS-Based Spatial Analysis in Metro Manila, Philippines

Abstract - Air pollution is the atmospheric condition in which substances are present in the air in such concentrations and duration that are detrimental to human health and his environment. The effects of air pollution on public health are being felt worldwide. These are the common air pollutants which include lead, nitrogen oxide, Sulphur dioxide, carbon monoxide, and Total Suspended Particulates (TSP), the latter being the most widespread and the most serious for human health. This study presents a GIS-based mapping as a means for generating high resolution maps over large geographic areas. A wide range of data collected from different air monitoring stations in the Metro Manila, Philippines can be managed in the frame of spatial models developed in GIS. The approach of this study is demonstrated by modelling concentrations of Total Suspended Particles for the Metro Manila. Mapping of the air pollution using the GIS for seven different stations during the dry and wet seasons from 2016 up to 2020 was developed. The concentration of TSP for the dry and wet seasons were visualized in planar view. The visualized result generated by the GIS has the potential to offer valuable information in demonstrating the air quality index of Metro Manila over the span of 5 years. The results showed that during the wet seasons the air quality became good. On the other hand, the dry seasons showed the air quality being consistently moderate and, in some parts, changing from being good to moderate. Generally, we can conclude that the public can still enjoy and experience usual activities outdoors, although the results may seem to be at no risk, it is best to be mindful of the current conditions especially in the present-day, climate change is getting worse.

Paper # 131

Phasor Measurement Unit (PMU) based Power System State Estimation with Distributed Generation (DG) using Integrated Alternating Current (AC) Load Flow with Weighted Least Square Algorithm

Abstract - In operating electrical power systems, security control is key in assuring that the power systems are operating within normal conditions, this is by being able to determine the “true” state of the power system on a real time basis. However, due to the different environmental and man-made factors that may contribute to the decrease in reliability of the state estimates, measuring instruments such as meters are much more likely to malfunction and yield unreliable results. In this study, the researchers applied power system state estimation on the IEEE 14-Bus Test case with Distributed Generators and Phasor Measurement Units using Weighted Least Square method. The researchers performed an AC load flow Analysis to obtain the power flows of the line. Then, the WLS algorithm was applied along with the measurements with error. After which, the ETAP software was used to verify the results of the algorithm. A statistical treatment was applied on the results, specifically the T- test, in order to determine the accuracy of the algorithm. Results from the T-test conducted on Microsoft Excel shows that the t-critical is greater than the t-value, which means that the hypothesis is accepted and thus there is no significant difference between their means and therefore be concluded that the data estimated from the MATLAB software.

Paper # 133

GENERATION OF FLOOD HAZARD MAPS IN MARIKINA CITY USING GIS-MCDA INTERVAL ROUGH AHP (IR'AHP)

Abstract - Flood is a natural occurring disaster mostly caused by typhoons that deals health, property, and economic damages to areas affected by the inundation especially on low lying areas such as Marikina like in the times of typhoon Ondoy and typhoon Ullyses. The aim of this study is to develop an accurate flood hazard map with the use of interval rough numbers to improve the urban management and flood response of the local government. The methodology considered elevation, slope, distance from water surfaces, drainage density, land use/land cover, and soil profile as factors that would be relevant to the flooding of Marikina city. Online surveys were distributed to different experts under the scene of urban planning, hydrology, environmental protection, water supply and sanitation, and transportation to rate each individual factor's importance with regards to the other factors by using the Saaty rating scale. Interval rough numbers, fuzzy, and crisp AHP were applied to the matrices of the experts' rating of the factors and will later be integrated with the generated flood hazard map. The generation of flood hazard maps was done with ArcGIS by utilizing different spatial maps gathered from online sites. After integrating the different MCDA techniques, comparison was done to identify the most accurate on all the techniques and validation was done through utilizing historical flood data of Marikina City. After the application of the different MCDA techniques to the produced flood hazard map and validation by utilizing flood points of Marikina, the Rough Interval AHP proved to be the most consistent out of the two methods with an accuracy of 95.82%, 90.23%, and 80.72%, respectively. The results showed that from the total area of Marikina City, 33.16% out of it is under the classification of “very high” hazard, 24.42% is under the “high” hazard category, 17.67% is under the “moderate” hazard, 13.20% is under the “low” hazard, and 11.55% is under the “very low” hazard.

Paper # 135

Design And Fabrication Of An Arduino-Based Self-Balancing Walking Robot's Lower Limb

Abstract - The study is focused on the design and fabrication of a robot's lower limb, considering different factors including the effect of center of mass (COM) and joint angular movements to achieve human walking pattern. The bipedal robot can balance and withstand a specific amount of force while at rest and in motion while walking on an even straight path. The researchers used Arduino IDE in programming the robot to make it balanced and stably walk while in motion and at rest. The robots' ability to withstand and self-balance at an external force not more than millinewton while at rest and in motion was achieved in this study. The researchers also compared the motion of the robot to the characteristics of human walking pattern based on its stability and accuracy in terms of step length, center of mass, center of pressure and joint angular movements. The robot was able to produce data about its movement based on the accuracy of joint angles, step length, and data records of its COM.

Paper # 136

Face Mask and Face Shield Detection Using Image Processing with Deep Learning and Thermal Scanning for Logging System

Abstract - With the crisis of the COVID-19 pandemic, it has become apparent in the Philippines that protocols need to be put in place that ensures the health and safety of the people. Included in those protocols is contact tracing and the proper use of face masks and face shields. The purpose of this research is to develop a system of face mask and face shield detection using image processing with deep learning and thermal scanning for logging system to automate the task of surveying and compliance to wearing of face mask and face shield. A model for classifying the five classes: face mask, face shield, face mask and face shield, none, and no face was created and trained using the MobileNet architecture, with collected dataset using the Maixduino camera. An overall accuracy of the entire system was found to be at 90%. No face and none classifications have provided results of above 90% in precision, recall, specificity, and F1 Score. While values of the only face mask, only face shield, and both face mask and face shield fluctuate in values in computations, their F1 scores still falls within the range of 80%-90% in performance. The implementation of the MobileNet model on the Maixduino board for was successfully accomplished with considerable classification capability.

Paper # 137

External Battery Charge Limiter for Consumer Electronic Devices

Abstract - This paper aims to create a hardware solution that will help reduce battery degradation and preserve the battery health of the device. The hardware will go between a consumer electronic device and its charger, which limits its maximum state-of-charge to reduce the change of two parameters of the battery. The BAh capacity for constant current charge and the Open-circuit voltage after constant current charge. The rate-of-change or slope of Ah capacity for CC charge of 80% is 0.0001669 which is less than the 0.004721 of the 100%. The open-circuit voltage after CV charge of 80% is 0.0002366 which has less magnitude than the 100% which has a slope of 0.0002394. Further reducing the depth of charge to 60% lessens the degradation even more. The rate-of-change or slope of Ah capacity for CC charge of 60% is 0.0002337 and the slope of the open-circuit voltage after CV charge for 60% is 0.0001023. The study determined that reducing the depth-of-charge increases the lifespan of the lithium-ion battery inside a mobile phone. The study can successfully develop a hardware solution to reduce the depth-of-charge of the battery inside a mobile phone. Preliminary results presented here indicate that the battery of a mobile phone sees its useable life extended when using our hardware solution to limit its state of charge to 80% or even lower versus unoptimized charging (charging fully to 100%).

Paper # 138

Development of a One Way, Imaging Based Fish Fingerling Counter Using Raspberry Pi

Abstract - Aquaculture is also growing much faster than capture fisheries. Through this study, it can greatly benefit the country, especially the fishermen and fish companies, to automate the way of counting the fish instead of counting them manually. The researchers are able to create a Raspberry Pi system in order to count the fish fingerlings considering one-way, imaging-based process. For the housing, an angle of depression of 3 degrees is considered; thus, the program can detect and count the colors within its boundary. The fish fingerling counter has an accuracy at least 90% for Running Total and Binary Classification.

Paper # 139

Wireless Semi-Autonomous Gas Contaminant Detection Robot

Abstract - This paper presents the development of a robot that can be controlled semi-autonomously and has the capability to detect toxic and combustible gases. The purpose of this research is to develop a semi-autonomous robot that can detect gases that are harmful to human workers. The robot is designed to be able to function properly with little human intervention. It has the ability to detect specified types of gases inside a confined space and move on its own to cover the specified operating area. The study is composed of component designing, programming, calibration, development of the user interface, fabrication, initial gas concentration test, mobility tests, and actual tests. The design of this robot is an improvement of the previous model. The mobility and semi-autonomous function of the robot is programmed using Raspberry Pi microcomputer and the sensors are programmed using the Arduino microcontroller. The gases that the robot can detect are alcohol (C_2H_6O), benzene (C_6H_6), hydrogen (H_2), carbon monoxide (CO), LPG, and methane (CH_4). The sensors that were used are MQ3 for alcohol and benzene, MQ7 for hydrogen and carbon monoxide, and MQ9 for methane and LPG. The results of the tests showed that the robot can operate semi-autonomously and in an omnidirectional manner easily. The actual testing procedures were done inside a confined parking area, printing shop, and LPG storage area.

Paper # 143

Modeling and Simulation of D-STATCOM based on Phase Shift Control Applied in IEEE Bus 5 System: Mitigation of Voltage Sag, Swell and Harmonics Due to Fault Conditions

Abstract - Power Quality (PQ) issues, namely, voltage sag, voltage swell, impulse, and harmonic distortions, have been affecting businesses and households in which these issues might cause damage to highly sensitive industrial equipment and household appliances. This study aimed to model and simulate D-STATCOM based on Phase Shift Control applied in IEEE Bus 5 system addressing the PQ issues due to fault condition. There were two tests performed: without and with D-STATCOM. For both tests, Three Phase (3P) fault, Single Line-to-Ground (SLG) fault, Line-to-Line (LL) fault and Double Line-to-Ground (DLG) fault were injected with fault resistances of 8 ohms, 50 ohms, and 100 ohms in between transmission line 1-3 of the system. The D-STATCOM was also placed where the remote fault was connected. Through the simulation in MATLAB Simulink, the RMS voltages were obtained from buses 1 to 5, and where the total harmonic distortion (THD) percentages were taken. The result showed a statistically significant three-way relationship between D-STATCOM, Bus No., Fault Resistance, and RMS Voltage according to the P-value which was 0.006 which is less than the significance level of 0.05. The THD values without and with D-STATCOM are taken using Fast Fourier Transform (FFT) Analysis showed a mitigated PQ issue at 50 ohms and 100 ohms fault resistance.

Paper # 144

Hybrid Renewable Energy Resources Utilizing Hybrid PSO and Cuckoo Search Algorithm

Abstract - Renewable Energy Sources (RES) are the catalysts for climate change for these environmental challenges we are in. From the Philippine Development Plan from 2017-2022, sustainable development supports required massive investment and fast track to improve power generation using renewable energy sources. The system's reliability is still a challenge due to its intermittent supply of energy dependence on nature. Hybrid Renewable Energy System (HRES) is widely known today to ease effect and balance energy supply. HRES requires a wide selection of techniques to be used to satisfy the demand of a given grid. A recent study was conducted calculating the values of Levelized Cost of Energy (LCOE) using optimization technique; result yields with LCOE and LPSP higher than the current values. This study developed software for Hybrid Renewable Energy Systems in Pamarawan Island that will reduce the Levelized Cost of Energy using Hybrid PSO and Cuckoo Search Algorithm. The result appears that the HPSOCS Algorithm gives an optimized solution that leads to a value of LCOE that is within the acceptable range of the current actual value. For the twenty independent runs of the program, the average value of LCOE is 0.1508 \$/kWh, and LPSP is 0.1096 or 10.96%. The researcher assessed the level of significance of the hypothesis using a right-tailed test for the values of LCOE. In all instances, all the observed values of LCOE using Hybrid PSOCS are lower than those of LCOE using HPSOGSA. This means that the Hybrid PSOCS yields LCOE significantly better than HPSOGSA, with a 39% relative difference at a 5% level of significance. Thus, the algorithm used has an excellent performance in the optimization method of HRES. Also, the HRES software calculator can be used in sizing HRES in different locations in need of sustainable energy sources.

Paper # 146

Development of Vessel Monitoring and Reporting Application of Automatic Identification System

Abstract - This paper presents the study discussing the developed system that utilizes Raspberry pi 3 B, dual-channel receiver, and VHF antenna for receiving AIS messages 1,2,3 and 5 from the nearby vessel to be decoded by the python LIBAIS then sends the decoded message to the shared webserver of raspberry pi and the laptop. The developed application using C# will serve as the graphical user interface to display the decoded messages in the overview tab table format that contains the vessels' dynamic information. The static and voyage information will be display in the vessel info tab. The google map is the map interface that displays the location of the vessel. The user can search for the vessel information using search fields to search according to vessel ID, date, and time and checkbox filter to search only according to vessel types. In determining the system's performance, the developed receiver was compared with the commercially available marine application. For the developed application, the researchers determine the average time of searching according to the number of data stored in the application. Lastly, the researchers survey the possible users to determine its performance.

Paper # 148

Dog Skin Disease Recognition Using Image Segmentation and Gpu Enhanced Convolutional Neural Network

Abstract - Some, if not all, veterinary clinics do not have a record of skin diseases of dogs when they diagnosed them; this is due to lack of manpower over the number of different kinds of animal patient that they cater per day. This also causes some delays in diagnosing other non-visually diseases that other patients might have. Having a system that can be used in pre-examination for visually available infections such as dog's skin disease and automatically records this diagnosis, can give an advantage to veterinary clinics. This helps the clinics prepare for the kind of patients that they will tend in certain time of the year. Developing a system that can be used in identifying common dog skin diseases for the pre-examination purpose and creating a dashboard that generates a numerical result can be used as an advantage for the veterinary clinics. These can be achieved by using Image Processing Techniques for the prediction model and Convolutional Neural Network (CNN). However, using a common CNN approach, where the main core uses the Central Processing Unit (CPU), tends to train the model longer. To overcome this problem, the use Graphics Processing Unit (GPU) is implemented to enhance the speed of training the model for the system. Having this kind of system really helps the veterinary clinic for their daily work, but this can still be improved by using other approaches to the trained model without ignoring the efficiency and accuracy of the algorithm that is being used.

Paper # 149

Energy Harvesting on Playground Slide with Implementation of Lead Zirconate Titrate (PZT) Cantilever and Gear System with IoT Monitoring

Abstract - This paper assesses the design and implementation of a cantilever and gear system for a piezoelectric transducer for a playground slide. The prototype is composed of a roller playground slide that resembles an incline conveyor, gears, cantilevers, a battery, an Arduino Uno for monitoring, and sandbags to simulate the slide of child. The performance of the prototype is tested in every trial where parameters such as voltage, current, power, and efficiency were gathered and observed on controlled and uncontrolled conditions. With the IoT used as monitoring, the output power reached up to 4.4mW which will charge 0.94% of the battery. This research is sustainable, safe, and help encourage kids in playing outside at playgrounds. This research also helps promote clean source of energy where the design can also be applied in other system that use rollers and/or conveyor.

Paper # 150

*Development Of Piezoelectric Tiles That Utilizes Human Kinetic Energy From Walking To Provide
48 Watt-Hours Of Energy For A 16w Led Light Bulb*

Abstract - As the population increases per year, the power demand also increases that is why scientist and engineers venture to renewable energy to acts as substitute for non – renewable resources such as fossil fuels. This study focuses on renewable energy specifically piezoelectricity or the conversion of mechanical stress to electrical energy which can be utilized to produce energy for light bulbs and other electrical equipment. The researchers were able to fabricate and test three energy harvesting tile that consist of 72 pieces of piezoelectric transducer per tile and the materials used are from local hardware and furniture shops. The tiles are subjected to three tests (Maximum and minimum load test, AC/DC Voltage test and Energy harvesting test) to determine the electrical capacity of each tile. The results showed that the tile can withstand the weight allotted by the researchers and each tile have produced electricity every time someone steps on the tile.

Paper # 151

*Development, Installation, And Testing Of Solar Distillation System Integrated With Salt
Gradient Solar Pond*

Abstract - With the growing world population and alarming issues of global warming, the threat to drinking water supply in rural communities substantiates. Solar water purifiers offer a low-cost technology and simple operation to purify water obtained from natural bodies of water. This paper presents a novel approach to improving the productivity of a solar distillation system using fin-wick type solar still with the integration of a solar pond for preheating. Further, the paper examines the effect in efficiency and productivity of each setup, and investigates the performance of the system based on heat transfer coefficients. The results indicate an actual efficiency increase by 15.93% and 0.58% by the fin – wick and solar pond preheating modifications, respectively. In terms of productivity, daily distillate output increased by 31.25% and 4.08%, respectively. The system produced a 100% potable water.

Paper # 153

Design And Control Of A Wireless Six Degree Freedom Robotic Arm

Abstract - In the rapid development of the world, robots have become involved in different aspects of human lives. A robotic arm is a type of machine that is able to manipulate its end effector in two or more axes, thus more mobile than a human arm would be. The most common restraint of a robotic arm is how it needs to be connected to the user through wires, which limits the overall capabilities of the robotic arm. The prototype was then tested on its accuracy and on the maximum distance for safe performance when it is unobstructed and when it is obstructed by a glass window. The ability of the robotic arm to carry load depends on the type of servo motor used in the robotic arm, however, the researchers opted to focus more on the accuracy of the robotic arm and not on the load carrying capacity.

Paper # 154

Development and Application of an Omni-Directional Robot for the Detection of Combustible and Toxic Gases

Abstract - This study presents the development of an omnidirectional robot for the detection of combustible and toxic gases. The purpose of this study is to fabricate a robot that can detect combustible and toxic gases that are harmful to the human body. The design of the robot aims to limit the chances of exposure of humans from hazardous gases. The omnidirectional robot is designed to have the mobility to traverse on confined and cramped spaces such as ducts and pipes where gas leakages can occur. This study consists of designing, programming, GUI development, fabrication, approximation of gas concentrations, preliminary tests, sensor tests, and actual tests. The robot is based on existing designs and mecanum wheels are used for the omnidirectional function. The robot is programmed using Arduino microcontroller for motor control and sensor readings. For gas detection, gas sensors such as MQ3, MQ7 and MQ9 were used. The robot was tested based on its mobility and capability in determining specific gas concentrations. There are six gases that the robot can detect namely alcohol, benzene, carbon monoxide, hydrogen, methane, and LPG. Results showed that the omnidirectional feature of the robot allows it to traverse obstacles with ease. In addition, the developed robot shown its capability in detecting gas concentrations using preliminary and actual tests. The actual tests were conducted on a commercial building, basement parking, and printing company.

Paper # 156

Detection of Outer Throat Infection using Deep Convolutional Neural Network

Abstract - It is integral for physicians to be able to assess through a thorough history and physical exam. However, it has been increasingly difficult to perform rigorous physical examinations because of the COVID-19 Pandemic. Thus, there is an increasing relevance of improved techniques of assessment through image classification using Deep Convolutional Neural Network. The ResNet50 architecture will be used as a classifier in Convolutional Neural Network. This type of network subtracts the feature learned from any given layer for which the ResNet50 learns by utilizing the found shortcut connections which proved to be easier compared to some types of Convolutional Neural Networks. The learned features from ResNet50 are essential to Fully Connected Layers in Neural Networks as it aids the neural network to decide based on the features extracted and come up with a result using softmax function. The researchers are able to train a network and test it. It is very convenient for a patient, especially in the midst of COVID-19 pandemic, to be assessed without having to be consulted by the physician physically. In GUI, the patient must register on the web app and take a photo of the throat and send it – the patient will receive a notification containing the diagnosis of the photo. The network obtained good results having a 92% accuracy rate in looking for healthy, inflamed throat, inflamed throat and swollen tonsilitis, inflamed throat/ swollen tonsils, and white spots in throat images.

Paper # 158

Water Quality Assessment Using Microcontroller-based Robot in Aquaculture Consideration in Samal River

Abstract - The continuous degrading of the water quality on the different bodies of water all over the world has greatly affect the aquaculture and the way of living for many people. This study was able to help create a device which provides pH, temperature, and turbidity by testing the quality of underwater on three different depths of Samal River. A circuit board, series of sensors, 3D printed materials and other different components were used to assemble and create a device programmed by a software for the task of gathering data from underwater. The data was gathered by retrieving water samples from different depths and testing it using sensors; the gathered data is then wirelessly delivered to a mobile phone using a communication device. The gathered data from the actual test were analyzed and compared to the standards given by the Department of Environment and Natural Resources (DENR) for aquaculture applications. The computed data shows that the time of testing does not have significant effect on the values gathered but there was on the depth of testing, it also shows that that the measurements for the pH, turbidity and temperature are within the range of the standards set by the DENR.

Paper # 159

Development of a Controlled Hydroponic Growth Chamber for Solanum Lycopersicum "ROMA" Production

Abstract - The dramatic climate change and uncontrollable nature cause drastic effects to plant growth and development. To minimize the dependency of the crops to nature, a controlled plant growth chamber incorporated with Deep Water Culture hydroponics system was developed. In the study, the controlled environment system aimed to monitor and regulate the considered ambient and root environment parameters. The values of the environmental parameters and the morphological parameters of grown plants in the controlled and environmental systems were compared and analyzed using t-test. The results showed that the ambient conditions were not regulated according to ideal values, however, the root system was controlled effectively. Based from the morphological tests conducted, it was found out that the growth of plants in the controlled system are statistically better than the growth in the conventional method.

Paper # 161

Fuzzy-Controlled Based Methane and Electricity Measurement on Anaerobic Digestion of Musa Subspecies' Peels

Abstract - Non-renewable energy resources which are our main source of energy are causing harmful effects to our environment, health, and are also running low. Different studies have been done on possible alternative energy sources such as orange and banana peels; however, such studies focus only on either the methane or electric potential produced by the substrate. This study is focused on observing both variables, specifically their relationship in terms of the amount produced during the anaerobic digestion of banana peels. Data analysis shows that methane production and electric generation are independent of each other, this means that conducting methods that would focus on enhancing the production of methane would not affect the generation of electricity and vice versa; also, this would significantly help us in researching for renewable energy sources by enabling us to efficiently maximize the production of both variables in a single substrate.

Paper # 163

*Water Level Monitoring and Flood Warning System using Light Detection and Ranging (LiDAR)
Sensor with Hybrid Renewable Solar-Wind Power*

Abstract - This paper describes the design and implementation of water level monitoring and flood warning system using light detection and ranging (LiDAR) as water level sensor. The integration of hybrid solar-wind renewable power supply is also included in this paper. The developed system was installed at Bucayao Bridge in Calapan City, Oriental Mindoro. The system used a floater object, enclosed in heavy-duty plastic mat, as reflector of light pulses from LiDAR sensor. During a 5-day observation period, in which red rainfall warning was raised at test site in Calapan City, the water level monitoring system measured a maximum height of water at 4.52 m. Whereas, during good weather conditions, the system water level measurements were only around 0.28 m to 0.44 m. The algorithms were embedded in microcontrollers and made it possible for the system to provide early flood warnings via short message service (SMS) and siren. The maximum output power of wind turbine was detected during around 6:00 PM with 370 W at wind speed of 5.56 m/s. While the high output power of solar panel was recorded during noon time until around 3:00 PM with 290 W to 320 W. The hybrid solar-wind power produced a maximum of 454.97 W when the weather was mostly clear and windy. The combined output power of solar panel and wind turbine met the daily power requirement of the water level monitoring and flood warning system.

Paper # 164

*PWM Speed Control of Brushless DC Motor for Inrush Current Regulation of Solar Water
Pumping System*

Abstract - The increasing utilization of electricity, high diesel costs, and global drive towards reducing carbon footprint made solar-based water pumping a promising and viable alternative to conventional electricity and diesel-based water pumping system. The significance and abundant availability of solar energy in the Philippines is at large due to its geographical location and has been effectively utilized for powering electrical loads with different applications such as direct current (DC) motor. The main objective of this study is to design and implement a brushless dc (BLDC) motor-based solar water pumping system with improved in-rush current load regulation. Speed control of BLDC motor is very important for critical conditions like current surges which is proportional to power surges resulting to a greater system loss. Hence, the proposed design uses pulse width modulation (PWM) method as an efficient and dynamic BLDC motor speed control. ATMEGA2560 microcontroller controls the settling time of the PWM duty cycle in proportion to the speed and power requirement of the motor thus, regulating the startup surge current of the dc motor. Results on the actual tests confirm that the successfully implemented system design can be used for any water pumping system in rural and urban areas and can improve the inrush current regulation effectively.

Paper # 165

Bearing Fault Detection of a Single-phase Induction Motor Using Acoustic and Vibration Analysis Through Hilbert-Huang Transform

Abstract - Bearings are widely used as a low friction component for rotating machines, engaging research on the bearing is important to increase life span and improve the reliability of a motor. The main objective of this study is to design a bearing fault detection system for a single-phase induction motor using acoustic and vibration analysis through Hilbert-Huang Transform (HHT). An experimental setup was developed to measure the vibration and acoustic signal of a motor rated at 230V and with 125W nominal power. This study introduced an advanced approach to optimizing signals based on Hilbert-Huang Transform (HHT) technique through MATLAB software. HHT can be used to describe nonlinear distorted waves in detail. Empirical Mode Decomposition (EMD) is the one that deals with the nonlinear and non-steady-state processes to extract complex signals into a finite number of Intrinsic Mode Functions (IMF) which should be achieved for Hilbert Transform (HT) to illustrate the energy time-frequency response of a system. This study successfully developed a single-phase induction motor fault detection system using HHT and the results showed that the inner race fault can be detected with 69% accuracy, outer race fault has 75%, ball bearing fault has 87%, and contaminated bearing lubrication has 68%. The overall accuracy of the detection system could be achieved up to 74.75% accuracy.

Paper # 166

Design, Fabrication, and Testing of an Automated Pneumatic Braking Program with the Use of Ultrasonic Sensor

Abstract - Vehicle collision or most commonly known as vehicular accident often occurs almost everywhere in the country and reasons for such accidents are endless but not being able to break on time was a major one. This research was about testing the performance of an automated pneumatic braking program, which can initiate sudden or gradual braking automatically using an ultrasonic sensor, by integrating the program to a fabricated prototype which consists of a pneumatic system and a mounted tire neglecting its weight and friction. Several tests on the prototype were conducted to present various types of braking which can be triggered depending on the distance between the obstacle and the ultrasonic sensor, and the obstacle will always be placed in front of the prototype to simulate a frontal collision. The outcome of the study showed that the ultrasonic sensor, speed sensor, and braking pressure are accurate in several series of trials showing little difference between the actual values and the gathered values, and the calculated stopping distance during braking was less than the distance between the objects which means that no collision is bound to happen. In which, the overall result of the performance test showed that it was feasible to achieve a safe braking operation.

Paper # 167

Finite Element Modal Analysis and Harmonic Response Analysis of a 3D Printed Vibration Sensor Enclosure

Abstract - Maintaining motor is complex but with the help of vibration sensors that quickly get changes in vibration that may cause more significant problems in the future is a game-changer. The structure and design of a vibration sensor are critical and its enclosure to ensure its accuracy. An unstable enclosure design may lead to wrong calculations. In this study, Additive Manufacturing (AM) and Finite Element Analysis (FEA) is applied to create a faster prototype and assess the design's vibration. The actual working conditions and environment of the vibration sensor are also considered to see the reaction in terms of the resonance frequency. Sinusoidal vibration pattern of the motor is simulated in this study. The results show that the resonance frequency is around 1200 Hz which is above the specification and working condition of the vibration sensor. The validated finite element (FE) model is employed to predict the amplitude and frequency of the vibration. The final design suitable for the vibration sensor was fabricated using an extrusion-based 3D printer. Furthermore, comparison of the actual testing versus the results from FEA is recommended for future studies.

Paper # 169

Swarm Collision Avoidance using Moving Particle Semi-Implicit Method

Abstract - The advantages of swarm robotics show the potential of the technology in different application areas. The control of swarms, however, remains to be the challenge. Collision avoidance in swarm robot systems can be a crucial factor in the success of the swarm system. This paper aims to present the Moving Particle Semi-Implicit Method as a method for controlling swarms, focusing on collision avoidance. The results of the study show the capability of the method to avoid collisions with the environment. Additionally, actual robot collisions can also be avoided with some parameter adjustments.

Paper # 170

Development of a Wireless Magnetic Climbing Robot for Visual Inspection of Galvanized Cooling Towers in a Commercial Building

Abstract - Accessibility and safety is a concern in visual inspection of cooling towers. During inspection of cooling towers, there are areas that are difficult to reach due to dark and confined spaces. This study focuses on the development of visual inspection robot to lessen or prevent human intervention in the inspection of cooling towers. The robot is a magnetic wheeled wall climbing robot that has an action camera for visual inspection and it is wireless to be able to reach difficult areas for humans. In the development of the prototype, its body was designed using AutoCAD 2017 and was fabricated using a 3D printer. Neodymium magnets are used for the wheels, and a Mobius action Camera attached to a pan and tilt mechanism was used for the visual of the robot. In addition, Gizduino microcontroller, UHF receiver and transmitter, AV transmitter, Li-Poly battery, and servo motors were used to run and to make the robot wireless and was programmed using Arduino. After the actual inspection of the cooling tower at J.Y Campos Centre, BGC using the wireless magnetic climbing robot, results showed that rusting, scaling and organic matter build ups were present on the surface of the cooling tower. The remarks done based from the standard is to have a repainting and to have a cleaning operation to waterproof the surface and to address the problem of organic matter build ups.

Paper # 172

Implementation of Online Education by the Mechanical Engineering Department at FEU Tech During the COVID-19 Pandemic

Abstract - The Mastery-based Individualized Learning Enhancement System (MILES) was implemented by the FEU Institute of Technology (FEU Tech) in August 2020, in response to the policy of the Philippine government to suspend the conduct of in-person classes during the COVID-19 outbreak in the country beginning the March 2020. The MILES program was designed to facilitate distance learning, with emphasis on mastery learning and on-demand education. MILES features progression of students in a course based on their mastery level of topics, both synchronous and asynchronous medium of instruction, personalized pacing of students, and increased availability of instructors to address student concerns. The mechanical engineering department was among the academic units at FEU Tech to implement the program. This paper documents the experiences of the department in the implementation of MILES to serve as an additional resource for other engineering schools looking to benchmark their own distance learning strategy and delivery of quality education during the COVID-19 pandemic.

Paper # 173

A Generator 1-kilowatt Output Powered by Biogas

Abstract - The scope of this study folds out the terms of electrical power output generated by the combustion of methane gas in the production of the portable anaerobic digester in kilo Watthour. When the gas flow meter indicated that there is sufficient gas to enter the generator, gas chromatography will again be conducted this time to ensure that the entering gas is really methane. Since there is small load to be powered and only 0.3 m³ of methane that would enter the generator, 1 kW generator would be used to yield sufficient energy which is equivalent to theoretical value of 4.5811 kWh (usable energy) as further explained.

Paper # 174

Stimulation of Static Electric Field and Exposure Time on Germination and Stem Tissues of Hybrid Philippine Zea mays Genotypes

Abstract - The Philippines has a tropical and maritime climate that inhibits the agricultural lands from continuous production. Because industrial crops are sensitive to electrotropism, stimulating them may break the germination dormancy and improve the growth and quality but the amount of effective electric field depends on each genotype. In this study, three hybrid Philippine maize genotypes namely, NSIC CN 282, IPB VAR6, and PSB CN 97-97, were cultivated in three replicates in an electroculture system with 0.4 V/cm electric fields. Four treatments were employed: 5 minutes daily (T5), 10 minutes (T10), 15 minutes (T15), and control. Germination rate of each genotype was modeled using 5-gene genetic programming. To verify the impact of the electric field to plant tissue, morpho-anatomical microscopy was performed. Longer exposure time to a static electric field (T10-T15) resulted in more basal roots, longer and heavier root and shoot systems. T15-treated seedlings exhibited an advanced proliferation in stem and parenchymal tissue thickness. Also, T15-treated seedlings were observed to have more dominant and thicker xylem and phloem vessels that biologically allow the ease of water transport and sugar mobilization from leaves to other parts of the plant system, thus, accelerating growth. NSIC CN 282 and PSB CN 97-92 are more sensitive to electric field stimulation than the IPB VAR6. Based on the findings, the germination is not completely and directly relational to the growth after two weeks of cultivation but having high germination score revealed to be a relatively good determinant of root and shoot quality.

Paper # 175

Mga Kwento ni Lola Basyang: An Augmented Reality on Selected Philippine Folklore

Abstract - Children storybooks have gone far, from flat books to embossed to Audio-book to Pop-up book and now Augmented Reality books. Augmented Reality or AR is one of the innovative technologies that will be universally used given its potential and fascination. The goal of this study is to create a new way of learning with children storybooks with new technology. The innovation underpinning this research is the Augmented Reality 2-Dimensional of children's book. The proposed approach is a 2D Augmented Reality mobile application. The research used mobile phone where the Augmented Reality App has been embedded. Mobile refers to portability and usefulness of the application itself, thus mobile AR application can be referred as a portable Augmented Reality application. The research provides an insight into what was done using AR on children's story books enabling the reader to place this example of AR in perspective and understand it more clearly. This paper specifically highlights an innovative development of the interfaces for providing an AR children storybook that enhances story reading and learning experience for preschool and young schoolers children via mobile AR application. Findings from the initial observational study based on the developed prototype are also presented. For future work, there will be a series of interactive mobile AR magical playbooks using other old folklore stories. Augmented Reality opened new roads to escalate the learning process for young minds.

Paper # 176

Application of Associative Classifier for Data Sparsity in Predictive Analysis Recommendation

Abstract - The researchers developed a web-based tool entitled, BizScout: Application of Associative Classifier for Data Sparsity in Predictive Analysis, which recommends an appropriate business that can be established in the chosen area of interest by utilizing associative classifier and apriori algorithm. The study aims to help individuals who plans to venture into entrepreneurship but lacks the knowledge on what business to start. Also, this study will help in regards to Computer Science students in terms of using Associative Classification on predictive analysis as well as apriori algorithm on data mining. The developed tool uses two main process the pre-processing and the Associative Classification. The developed tool resulted to 76.67% of accuracy in terms of business recommendations for the chosen area of interest and 4.44 weighted mean which is Moderately High for the appropriateness of the recommended business for the chosen location using associative classification.

Paper # 177

Tagnorm: Tagalog Text Normalization With Slang Word Detection And Classification Of Type Of Slang Word Using Support Vector Machine

Abstract - TagNorm: Tagalog Text Normalization with Slang Word Detection and Classification of Type of Slang Word using Support Vector Machine was designed to normalize informal word and transform it to their canonical forms. The study aimed to improve text normalization in the Filipino domain in which the informal texts such as Alphanumeric Abbreviation and Phonetic, Stylistic variation, Combined Words, Misspelled words/ typographical errors (except rumpled letters), Omission of Vowels and Slang Words can decrease the performance of Natural Language Processing. Using the Facebook data the accuracy of the system in terms of informal text types the researchers got an accuracy of 91.23% in Alphanumeric Abbreviation and Phonetic, 77.61% in Repetition of Characters, 85.19% in Stylistic variation, 69.64% in Combined Words, 72.41% in Misspelled words/ typographical errors, 90.78% in Omission of Vowels and 93.89% in Slang Words, while the data from previous study obtained an accuracy of 86.96% in Alphanumeric Abbreviation and Phonetic, 66.67% in Repetition of Characters, 57.14% in Stylistic variation, 80% in Combined Words, 85.29% in Misspelled words/ typographical errors, 93.15 in Omission of Vowels and 75% in Slang Words.

Paper # 180

Neuro-Fuzzy based Safe Landing Control System for UAVs

Abstract - The number of aerial drone users continue to increase due to its availability, usage, and depreciation. The low cost of drones results in low-quality components that are prone to damage. One of the most common problems of drones is the landing system, where most drones crash due to uncontrolled maneuvering of the drone. In this study, Adaptive Neuro-Fuzzy inference Systems (ANFIS) using MATLAB was developed to perform a safe landing system on low-cost drones where the Gaussian Bell Membership function was used due to a low training error of 0.0015693.

Paper # 181

AMBUAPP: Ambulance Response Application

Abstract - The usage of android phones is rising exponentially. In real-world scenarios, contacting and getting an ambulance quickly during an emergency is a real challenge. Searching for an available ambulance nearby has been one of the hustling factors that are faced by the fast pace community. The researchers are proposing this system entitled "AMBUAPP: Ambulance Response Application," the new idea to automate this process of requesting an ambulance faster using mobile phones. This project aimed to develop an Android application that lets its users find an available ambulance through GPS and send an emergency notification to a nearby hospital in case of an emergency. This app helped the user to get any available ambulance without calling the hospitals to check for the ambulance availability. The app reacts with just one tap on the button, and it will send a notification of the user's details and location via GPS to a nearby hospital. If the request is accepted, the ambulance driver can receive the GPS location, which will lead to the user's location. This will be more efficient and reliable for the ambulance driver, hospital, emergency rescue respondents, and also for users, for they can view a map that shows their location and the ambulance responding.

Paper # 182

ACMS: An Android-Based Class Management System

Abstract - The developed system will play a significant role in promoting quality education. This system helps teachers in taking attendance in a class, and also provides an automatic computation of grades every grading period using an android mobile phone quickly and simply, thus saving time and lessen the hassle in bringing class record and attendance sheet every day. Teachers can monitor students' attendance throughout an academic term. The system supports the push-notification feature. The teachers will send this push notification to the parents of those students who are absent. The developed system has been evaluated by Junior High School teachers using an android mobile device. The results indicate positive feedback has been obtained from the teachers. It is recommended to use an RFID card or tag for a more faster checking the class attendance.

Paper # 185

Performance Analysis of Machine Learning Algorithms in Generating Urban Land Cover Map of Quezon City, Philippines Using Sentinel-2 Satellite Imagery

Abstract - As urban expansion is expected to persist and may even accelerate in the coming years, understanding and effectively managing urbanization become increasingly important in achieving long-term progress specifically in making cities and human settlements inclusive, safe, resilient, and sustainable as envisioned by the United Nations Sustainable Development Goal 11. One way to accomplish these is to obtain reliable and updated information about the land cover characteristics of an area in the form of a map which can be done using remote sensing and machine learning. However, the practice of using these technologies for urban land cover mapping was observed to occur in the geographic locality level, and in the case of the Philippines, this is a domain that needs to be further explored to quantitatively comprehend urban extent. In this study, a map of man-made structures or built-up areas and natural structures or nonbuilt-up areas was generated over Quezon City and nearby surrounding areas where rapid rise in population occurs along with urban development. In addition, since related previous studies used various machine learning algorithms in doing the classification, this study compared the performances of three algorithms specifically random forest classifier, k-nearest neighbors, and Gaussian mixture model to identify which performed best in this particular application. The satellite imagery of the area of interest was collected from the Sentinel-2 mission satellites of the European Space Agency. All the three algorithms attained high accuracies across all measurements with small variations but greatly differed in the time consumed doing the classification. The highest over-all accuracy of 99.32% was obtained using random forest classifier despite taking the longest time to finish the classification, next is 98.95% using the k-nearest neighbors algorithm which also ranked second in terms of speed of classification, and last is 97.17% using the Gaussian mixture model despite being the fastest to complete the classification. Further studies may explore other machine learning algorithms as well as deep learning techniques to harness their capabilities in feature extraction for more complex applications. Aside from Sentinel-2, other satellite missions may also be utilized as sources of satellite imageries which can offer different spectral, spatial, and temporal resolutions that would fit a specific application.

Paper # 186

Performance Improvement of the DWT-OFDM System Using Convolutional Coding

Abstract - OFDM is an ideal high-speed data transmission scheme using closed space carriers that can be modulated at low data rate. Conventional OFDM systems employ Fast Fourier Transform method for multiplexing signals over the subcarriers. In order to reduce inter-symbol interference, a cyclic prefix is appended before transmission. However, adding a cyclic prefix reduces data throughput and consequently decreases power efficiency. One option to overcome these problems is to use a wavelet transform popularly known as the Discrete Wavelet Transform - Orthogonal Frequency Division Multiplexing (DWTOFDM). DWT-OFDM outperforms the Fast Fourier Transform - OFDM (FFT-OFDM) by improving the spectral efficiency without introducing cyclic prefixes. Previous studies that investigated the performance of different OFDM systems did not consider integrating coding techniques for error detection and correction. In this paper, a convolutional-coded DWT-OFDM is proposed to improve its bit error rate performance over an uncoded system. Convolutional encoder paired with Viterbi hard-decision decoder blocks were added to the typical DWT-OFDM system. Uncoded and coded DWT-OFDM systems with different code rates have been simulated in order to verify that an improvement in the bit error rate performance has been achieved.

Paper # 187

Cost Optimization for the Allocation, Production, and Distribution of a Plastic Manufacturing Company Using Integer Linear Programming

Abstract - Optimizing the allocation of raw materials, production of raw materials to finished products, and the distribution of finished products can be quite difficult especially if the network of suppliers, production plants, and customers is vast. Linear programming (LP) can be utilized to ensure optimality. Specifically, integer linear programming (ILP) is used in this paper. An ILP model was built to determine from which suppliers and how many raw materials from these suppliers should be acquired, how many raw materials each production plant of the company should acquire, how many of the finished goods each production plant should produce, and from which production plants the finished products should be distributed to the customers. The aim of the model is to minimize total cost incurred which is composed of raw material purchase costs, production costs, and transportation costs. Data such as raw material supply, raw material costs, raw material requirements, production capabilities, production costs, raw material and finished product conversions, customer demand, and transportation costs were gathered from the plastic manufacturing company. The software MATLAB was used to determine the optimal solution. It was then determined that the total cost would be minimized from ₦23,615,400 to ₦21,940,000. Through the use of ILP, the total cost was reduced by ₦1,675,400 or 7.09%. (Conversion rate: ₦50 ~ \$1).

Paper # 191

Under Voltage Load Shedding Algorithm using Fast Voltage Stability Index (FVSI) and Line Stability Index (LSI)

Abstract - As demand grows and grids become complex, voltage stability has been researched throughout the years. A problem occurs if loads, particularly reactive loads are greater than generation, which causes the voltage to drop and could affect the entire grid. An Undervoltage Load Shedding (UVLS) scheme is one of the ways to prevent such scenarios from happening. Using MATLAB to interface and process data from OpenDSS we used an IEEE 39 bus model, and use FVSI and LSI stability indices to determine which loads to shed when undervoltage condition occurs. From the results and statistical treatment with t-value around 0.498353 to 0.908307 which is lower than the 95% confidence interval of ± 1.986675 , it can be concluded that the system performance after load shedding does not significantly differ than the base case, hence it is considered stable after the said load shedding is performed.

Paper # 192

Developing a Record Archiving System in Eastern Visayas State University

Abstract - Records archiving, and storage pose a strategic role in managing the university system efficiently and effectively. It also documents the planning and implementation of certain services, allowing proper tracking of work. In this study, the researcher developed a record archiving system for Eastern Visayas State University Burauen Campus. The system is able to provide a paperless records management system, deliver an easier pace for retrieving and recording data, and secure a reliable database backup. The researcher utilized a system developmental research approach that consists of two phases, the analysis phase where the needs are being assessed and the design and development phase of the record archiving system.

Paper # 193

Modelling New Cases of Covid-19 in the Philippines using Polynomial and MLP Regression

Abstract - Covid-19 has been a serious issue in the Philippines for the past two years. Its spread has taken a toll on country's economy and the society. Furthermore, the populous has been suffering all through out the pandemic as new cases and deaths are increasing. These massive problem warrants research on modelling and predicting this pandemic. Although there are numerous research with regards to using statistical modelling, Machine learning, deep learning, and artificial intelligence to model and understand the pandemic all throughout the world, few researches focus on Philippines alone. In addition to that, it simple models are seen to fit the Covid-19 data more than complex ones. With these in mind, the authors fit and modelled Philippine new cases of Covid-19 using Sklearn Polynomial and MLP regressors. It was found out that Polynomial models fit the entire data, but MLP fits recent data better. Further research using different countries as case studies or different models is recommended

Paper # 195

Application of Neuro-Fuzzy Logic on the NewsVendor Inventory Model

Abstract - Challenges arise in inventory management and control when there is uncertainty involved. In the newspaper inventory model where demand levels are stochastic, ensuring the optimal quantity of inventory for each time period is crucial in optimizing profit. In this paper, neuro-fuzzy logic is utilized to evaluate this optimal quantity of inventory through the use of the software Matlab. The input variables are purchase cost, selling price, salvage value, mean demand, and standard deviation demand while the output variable is quantity. Iterations of the experiment were done with the objective of minimizing error and maximizing correlation values. The best iteration of the experiment achieved a training error value of 0.0012437 with a coefficient determination value of ~1 for both the training data and testing data.

Paper # 196

Utilization of Banana Peel and Carton Waste in Manufacturing of Thermal Insulation Board

Abstract - As the temperature continues to rise year after yearly due to global warming, the used of polyurethane thermal insulation foam board has become prevalent over the recent years. Despite its usefulness, it has a wide-ranging impact on our environment because the production of a pound of polyurethane foam board emits 3.7 pounds of carbon dioxide. Several studies have found that due to their thermal resistivity, banana peel and carton waste can be used as a potential substitute in the production of polyurethane thermal insulation foam board. As a result, the researchers were inspired to develop a product that can use banana peel and carton waste as the primary materials in the production of thermal insulation board. The researchers considered four different test experiments which includes; flammability test, bend test, screw test and thermal capability test to determine the best proportion to be used. After analyzing the test result the researchers determine that the best proportion for the product is 31.33% percent of banana peel, 31.33% of carton waste, 23.50% percent of banana resin, 7.8% of polyvinyl acetate and 6% of chlorinated rubber paint. In terms of the product and the business feasibility, the product can be produced as long as it undergoes series of processes which includes; washing, drying, extracting, grinding, weighing, mixing, molding, pressing, cooling and trimming, and the computed payback period is 4 years and 266 days, indicating that the business is feasible.

Paper # 198

A Systematic Analysis on the Trends and Challenges in Autonomous Vehicles and the Proposed Solutions for Level 5 Automation

Abstract - Autonomous vehicles (AV) are technologies that are continuously developing in the past years. Systems are currently under development to make driverless cars a possibility. This paper presents the technologies that are adapted in developing autonomous vehicles as well as the hindrances and challenges of this innovation. The electronic design of AVs is focused on evolving the technological advancements on automated driving systems (ADS) which centralizes in the navigation system, path decision, surrounding perception, and controlling system. With this, the progression of AVs has drastically improved from human interacted vehicles to conditional automation though the technology is still far from achieving fully autonomous driving. This paper discusses the trends and application of analog electronics as well as the various challenges that hinder achieving full automation of the AVs. Furthermore, specific solutions are proposed to aid the mentioned problems. Only the academic studies from 2017 and up were explored in gathering information for this literature review.

Paper # 199

Eco-Friendly Concrete Roof Tiles Reinforced by Coconut Shell Powder and Coir

Abstract - The researchers conducted a study regarding the wastes from coconuts which were considered agricultural wastes and were used in open burning which harms the environment. The country produces coconut wastes that were hard to dispose of which were from the overwhelming supply of coconut in various coconut plantations in the country, and it is for this reason that the researchers came up with the idea of other ways to utilize the wastes by producing a product that uses coconut shell and coir as its raw materials. It was used to produce light and durable ecofriendly concrete roof tiles which utilize the wastes from coconut. The researchers used experimental research and made various testing to the trials made to determine the optimal ratio or combination of materials to use that will result in the best specification and quality which will pass the standards set for roof tiles. The optimal ratio among the trials made found in the study was 1 kilogram of cement, 0.75 kilograms of color cement, 0.10 kilograms coir, 2.25 kilograms of coconut shell powder, and 1 kilogram of sand. The initial investment shares were equally divided into Php 12,023,588.00 for each member. The business' financial statement for the next five years shown that the payback period of the investments would be after 2 years and 247 days

Paper # 200

A Handheld Global Positioning System with Compass and VHF Radio Transceiver

Abstract - GPS is already widely used today. Still, a device that has a multifunction VHF radio, GPS, Compass, temperature, humidity, time display, and location tracker is not yet accessible in one single device. This study aims to construct a multipurpose instrument that is portable and easy to carry-handheld machine. The device can approximate the general location of the person who's holding the prototype through the use of a Cell SMS notification. It is capable of two-way radio communication with a channel ranging from 134MHz-174MHz with an average 40.1dB result to 20 trials of the said channel. The study concluded with the successful creation of two similar multifunction devices.

Paper # 202

Arduino-based Digital Plant Control System

Abstract - The study and implementation of an Arduino-based Digital Plant Control System involve the study of many disciplines, which include but is not limited to, the study of plants, the study of feedback and control systems, and the study of microcontroller systems. Due to the ongoing pandemic as of the time of this writing, the experiment was conducted on a simulation basis, wherein an Arduino circuit was constructed on a simulation software called Tinkercad. The system involves a temperature sensor that acts as an indirect controller to the watering system. Whenever the plant's temperature would exceed a predetermined temperature threshold, it would prompt the watering system to provide water to the plant. Just the same, the key properties of the feedback and control system created were successfully implemented and measured. The watering system's response time, peak time, and settling time were all measured and analyzed in the experiment, which gave the group a deeper understanding of feedback and control systems as a whole.

Paper # 204

Hybrid Solar-Hydrokinetic Powered Automated Irrigation system

Abstract - Agriculture in the Philippines has not advanced in ages, and there have not been many contributions to develop this sector. This paper proposes a design of an automated irrigation system powered by solar and hydrokinetic energy. Scaling down to 10sqm garden, simulating it according to rice fields, different irrigation points were tested within the area to distinguish the most conservative amount of water distributed while ensuring that the site is adequately irrigated. In power generation, Solar Panel serves as the primary power source for the whole system. In contrast, the turbines serve as the secondary power source, focusing more on regulating the battery and the load. Results also showed that the Soil Moisture content is the most essential in providing nutrition to the crops, and Temperature and Humidity provide optimum conditions to ensure proper irrigation.

Paper # 205

PACK: Technology, Pedagogy, and Content Knowledge for Paraeducator in the Context of Sustainable Development Goal 4

Abstract - During the COVID-19 occurrence, educational institutions were closed, and students worldwide were confined to their homes. In an academic environment, students rely upon collaborative learning (CL) to strengthen their learning performance. This study addresses the critical concept of CL during the COVID-19 pandemic by assessing social media use among students in teaching. The connection between social media use and the performance of students is crucial to understanding the role of social media during a virulent disease. This study relies on constructivism theory then the technology acceptance model. Effective technology integration for teaching subject material requires knowledge of content, technology, and pedagogy and their relationship to every other. Against the setting of planning understudies for a digitalized future, supporting paraeducators by technological pedagogical content knowledge (TPACK) becomes vital in training. Educators need assistance in partnering successfully with communities and embracing parents as critical allies. E-learning has been introduced and adopted rapidly by higher educational institutions to facilitate the teaching and learning of scholars, despite the potential of e-learning to bolster education and training performance if users don't accept it as a learning tool. With an increased need for contact between families and teachers, this is often an ideal time to ascertain guidelines for parent involvement. The future directives correspond to collaborating effectively to motivate and trust parents' allies instead of obstacles, hence, we will be able to support students as a whole.

Paper # 206

Light Emitting Diode Systems for Artificial Photobioreactors Used in Algal Biofuel Production: A Systematic and Trend Analysis

Abstract - Photobioreactors (PBR) support the production of algal biomass which is a known resource in producing biofuel. Different LED system configurations however, affect the growth of algae. This study aims to do a literature review on the different light utilization trends of photobioreactors used for cultivating algae. This study also seeks to fill in the gaps common to the trends by using engineering principles. Photobioreactors and their working principle is introduced. Importance of light in photobioreactors is emphasized and different journals on LED trends such as LED placement, light intensity, flashing light and light spectral quality are peer reviewed. Results show that bottom surface directional lighting helps the cultivation more in comparison to upper surface directional lighting. Higher levels of light intensity on the other hand support the growth of algae although excessive levels cause the protective mechanism to weaken. Flashing light is also found to be slightly more conducive than continuous light mostly on the basis of flashing light being more energy efficient. For light spectral quality, it was reported that blue and red lights are important to promote growth of the culture. However, the best spectral composition of light for one algae strain may differ from that of another strain. As such, investigation of the best spectral composition of light for the strain to be used must be done when designing a PBR. Some recent LED system advancements were discussed and were found to be efficient devices that can be used for photobioreactors although costing remains to be a problem. Application of electronics engineering principles on the possible synchronous use of solar and artificial light are recommended to lessen the costing. Such advancement can pave the way for efficiently using LEDs in photobioreactors for large-scale deployment.

Paper # 208

Prediction of Moisture Content of Chlorella vulgaris Microalgae Using Hybrid Evolutionary Computing and Neural Network Variants for Biofuel Production

Abstract - Moisture content is an imperative indicator of biofuel lipid content in microalgae. This paper developed a reliable, computationally cost-effective combination of artificial neurons and an optimization tool for moisture content concentration prediction using computational intelligence. A total of 83 data of microalgae var. Chlorella vulgaris moisture content parameter factors were utilized. Using feed-forward, recurrent, and deep neural networks as prediction models, their MSE and R² values were analyzed. Genetic programming GPTIPSv2, a multigene symbolic regression genetic programming (MSRGp) tool, was used to create objective functions of the ANNs. This convergence function was the main element in developing a genetic algorithm (GA)-optimized recurrent neural network model considered to suggest the optimal quantity of neurons in each of the hidden layers in neural network architecture. The feed-forward artificial neural network with 22 neurons in its layer was recommended using the Levenberg-Marquardt training tool. The MSE (5.27e-6) and R² (0.9999) results of this model surpassed the other neural networks models. Hence, it implies that the developed optimized Levenberg-Marquardt-based feed-forward neural network is an effective moisture content predictor as it provided highly accurate and sensitive results at a low cost.

Paper # 209

Fuzzy Logic Controlled Motor Speed in Rotating Aquaponics Based on Chlorosis and Necrosis Severity of Lettuce Leaf and Temperature

Abstract - Necrosis and chlorosis are some of the leaf conditions that contribute to losses in crop production, which is the browning and yellowing of leaves caused by improper irrigation and fertigation. A rotating aquaponics, crop cultivation conceptualized initially by NASA to save space and grow their food on space stations is the inspiration of application of this study. A fuzzy logic-controlled (FLC) DC motor speed controller was developed using the Mamdani system to automate the rotating mechanism that is responsible for watering turns of lettuce crops. Using CIE L*, a*, color space and environment temperature as input linguistic values, the motor speed will adjust depending on the status of the physical pigment condition of leaves as well as the intensity of temperature. The generated fuzzy logic controller has four triangular membership functions with 16 rules on each of the inputs. This resulted in four possible outputs of rotating aquaponics motor speed measured in rpm: very slow (0.25), slow (0.5), slightly fast (1.25), and fast (2). The modeled FLC was simulated in a Simulink environment in MATLABR2021 software and had 10 step size and manifested essentially accurate results with 100% correct outputs based on input characteristics and rules developed. This developed FLC model is a substantial contribution to mitigating losses on lettuce crops grown under rotating aquaponics by automating the water absorption frequency depending on the status of the crop and the temperature of its environment.

Paper # 210

Intelligent Permaculture: A Sustainable and Profitable Practice for Tropical and Maritime Climate Urban and Peri-urban Agricultural Ecosystems

Abstract - Permaculture is a land management and regenerative agriculture that is the integration of technological advancement and the natural agricultural ecosystems. It is usually manifested in green architecture and balcony gardens in an urban area. However, peri-urban geographical regions are those situated in between urban and rural areas that are experiencing the impacts of modernizing community and conventional farming. This study discusses the technological drivers making intelligent permaculture ecosystems and applications, the current issues and challenges in this emerging agricultural and horticultural scheme, and a set of future directives in intelligent permaculture ecosystems in a tropical and maritime climatic setting. Based on the systematic analysis, this study had established a guideline that compliance to UN sustainable development goals, controlled environment engineering, and planting of fruit-bearing trees and vegetables in sidewalks can solve the issues of public knowledge, ecological stability and environmental sustainability, profitability issue, and technological constraints concerning intelligent permaculture systems.

Paper # 211

ANcoustics: A Systematic Analysis in Acoustics with Active Noise-Cancellation Technology

Abstract - With the advancement of technology, especially regarding electronics and digital progression, the paper focuses on the provision of information on how acoustic factors relate to analog electronics, from principles and components, trends and applications, issues present, and a proposed solution to combat noise and acoustic discomfort. Sounds and acoustics are encountered in daily living, and with that comes relevant issues, mainly noise pollution and acoustic discomfort. Aside from the life-easing roles of electronic acoustics in society through modern applications in devices and components such as mobile devices and electrical instruments, there are also acoustic issues that can be found. With that, aside from presenting reliable and credible pieces of literature found on the trends and applications of analog electronics in acoustics, the paper also presented different sources that identified related issues and challenges, namely noise present in different common venues such as one's neighborhood, public spaces, shopping malls, churches, and recording studios. To combat the issues, the authors propose an active noise-cancelling (ANC) post module system which consists of microphones, filter, inversion circuit, power amplifier, and speaker. The paper provides a brief but substantial learning experience and overview on vital and significant knowledge and innovation on acoustics through analog electronics, solving timely and relevant challenges on noise and acoustic discomfort.

Paper # 215

Body Pain Assessment on Sitting Time of Fifth Year Engineering Students of Pamantasan ng Cabuyao During E-Learning Setup

Abstract - Millions of plastics are produced for wide applications, and that includes Low-Density Polyethylene or LDPE plastics. LDPE plastics will later on turn into microplastics that releases toxic chemicals that harms the environment and will eventually degrade in as long as 500 years [1]. Because of the rising plastic waste pollution, the researchers developed a feasible solution that will decrease and later on eliminate the use of seedling bags in Cabuyao City Laguna. Calamansi are widely available anywhere in the Philippines, commonly used as food ingredients, condiments and also as a drink. After the calamansi pulps are extracted, peels are already viewed as waste or can be used as a compost. The researchers used an experimental research to determine if the proposed product is feasible in terms of technical, cost and if its profitable. Experimental research is a scientific approach in which the researchers manipulated variables under controlled conditions. The researchers conducted and performed tests such as appearance test, drop test, water absorption test, and nutrient content test that was conducted in Division of Soil Science of University of the Philippines Los Baños College of Agriculture and Food Science (UPLB CAFS) Agricultural Systems Institute through Soil Testing Kit and concluded that the seedling cup is high in nitrogen and medium in phosphorus. This research confirms that biodegradable seedling cup made of calamansi peel is feasible as an alternative to the existing seedling bag made of low-density polyethylene to decrease microplastic.

Paper # 216

Innovation of Biodegradable Seeding Cup Made of Calamansi Peel: An Alternative Solution to Decrease Microplastic

Abstract - Millions of plastics are produced for wide applications, and that includes Low-Density Polyethylene or LDPE plastics. LDPE plastics will later on turn into microplastics that releases toxic chemicals that harms the environment and will eventually degrade in as long as 500 years [1]. Because of the rising plastic waste pollution, the researchers developed a feasible solution that will decrease and later on eliminate the use of seedling bags in Cabuyao City Laguna. Calamansi are widely available anywhere in the Philippines, commonly used as food ingredients, condiments and also as a drink. After the calamansi pulps are extracted, peels are already viewed as waste or can be used as a compost. The researchers used an experimental research to determine if the proposed product is feasible in terms of technical, cost and if its profitable. Experimental research is a scientific approach in which the researchers manipulated variables under controlled conditions. The researchers conducted and performed tests such as appearance test, drop test, water absorption test, and nutrient content test that was conducted in Division of Soil Science of University of the Philippines Los Baños College of Agriculture and Food Science (UPLB CAFS) Agricultural Systems Institute through Soil Testing Kit and concluded that the seedling cup is high in nitrogen and medium in phosphorus. This research confirms that biodegradable seedling cup made of calamansi peel is feasible as an alternative to the existing seedling bag made of low-density polyethylene to decrease microplastic.

Paper # 217

Manufacturing of Biodegradable Cushion Packaging Material Using Compound Properties of Chicken Feather and Cornstarch as Alternative to Expanded Polystyrene Foam

Abstract - Expanded polystyrene foam is one of the many internal packaging materials used across the world, and the most well-known brand is Styrofoam, one of several plastics contributors around the world. Every year, an estimated 2.3 million tons of polystyrene wind up in landfills around the world. Meanwhile, chicken feather wastes are one of the most significant contributors of biomass waste in the Philippines. As of October 1, 2020, the total inventory of chicken was 186.33 million birds. Several studies have found that chicken feather wastes can be regarded as one of the best raw materials while cornstarch can also be used as a natural, biodegradable binding ingredient that is capable of producing environmentally acceptable alternative. As a result, the researchers developed a product by using chicken feathers and cornstarch as a biodegradable cushion packaging material as an alternative to polystyrene foam. The product underwent various testing procedures facilitated by the researchers which includes vibration test, drop test, and compression test in order to assess the strength, durability, and capability of the researchers' product. After analyzing the test results, the researchers determine the optimal proportion for the product composition which are 18.9% chicken feather, 75.6% cornstarch, 5% combination of glycerin and polyethylene glycol and 0.5% of ammonium bicarbonate. In terms of product feasibility, it can be manufactured as long as it goes through a series of processes such as washing, drying, pulverizing, mixing, gelatinizing, plasticizing, molding, and oven drying.

Paper # 218

Systematic Analysis of the Implementation of Sustainable Development Goals on Energy, Industrialization, Infrastructure, and Innovation: A Multifaceted Philippines

Abstract - The Philippines has been one of the countries that commit to the 2030 Agenda for Sustainable Development. This agenda encloses the 17 Sustainable Development Goals (SDG) of the United Nations that provide a holistic framework for global transformation by taking actions to end various issues and concerns around the world. Among the 17 goals, this paper aims to systematically review the current state of the national implementation of SDGs about the utilization of accessible and clean energy resources, development of manufacturing industries, and improvements in infrastructures and innovations. It focused on discussing the challenges faced by each sector, plans and opportunities set by the national government, and the progress report based on the SDG Watch that is compiled by the Philippine Statistics Authority as the official repository of SDG indicators in the country. Future directives were also provided from the perspective of the research industry, human resources, and government. Overall, this study provides a closely summarized review in monitoring the progress of the Philippines in achieving SDGs 7 and 9.

Paper # 219

A Bibliometric and Trend Analysis of Applied Technologies in Bioengineering for Additive Manufacturing of Human Organs

Abstract - The escalating demand for organ replacement in the entire world drives researchers and scientists to develop a new technology of 3D bioprinting. The advancement in additive manufacturing, 3D printing, tissue engineering, and regenerative medicine have made it possible to create or regenerate tissues and damaged organs to their standard functionality. Different methods and other combinations are required to come up with a successful production of bio-inks for printing. Trend analysis conveys the rate of acceptance and emerging development in this technology and which aspects affect its continuous development such as ethical and legal issues, safety, risk, and accountabilities. In this study, bibliometric mapping is used to visualize the volume and co-occurrence relations between keywords, the number of citations and journals published from the past 18 years, and the authors who commonly write literature works about 3D bioprinting. Overall, this paper aims to present the continuous development of this technology with the increasing number of published research in Scopus and other databases. Based on the polynomial growth of the trend, the predicted result shows that number of publications may reach up to 850 in year 2032 from the current 208 documents for year 2021 and only two publications at year 2003. The challenges that may hinder or slow down the growth of this technology are the following: (1) ethical and regulation issues, (2) policy in clinical practice including its accuracy, (3) unaccepted mechanical properties of materials for bioprinting, (4) process duration, and (5) the high cost of this biotechnology.

Paper # 221

Hardware Development of a Humanoid Robot Head: "Gabot"

Abstract - Gabot is a Humanoid human head developed. This study aims to mimic the Anthropomorphic specifications of a human head by using available modern equipment such as the 3D printing machine. The proponents developed mechanisms to meet the Anthropomorphic data of a human head, angle of actuation, and the angular velocity of the mouth, eyes, and neck. The proponents also tested motor torque and stress on the parts to ensure the robustness of the machine, which yields 520 N-mm and 27.74 Mpa on the neck tilting, 188 N-mm and 24.74 Mpa on neck swinging, 114 N-mm, and 12.09 Mpa on the neck panning, 73 and 7.052 Mpa on the Eye Tilting. The maximum angular velocity of each part is 266.33 deg/sec on neck tilting, 262.33 deg/sec on neck swinging, 314 deg/sec on neck panning, 795.66 deg/sec on eye tilting, and 785.66 deg/sec on eye panning. The Proponents used the MPU-6050 accelerometer to test for the result of this study to achieve the required data. The effectiveness of the machine is as follows; eyes, 92.43% for panning, 93.60% for tilting, neck, 89.20% for panning, 75.66% for tilting, 75.52% for swinging, for the mouth, 81.94%.

Paper # 222

Design and Development of Robotic Arm Movements and Body Frame for a Social Robot for Graduation Rites

Abstract - The COVID-19 pandemic has brought crisis to people from around the world resulting to a transition from face-to-face classes to an online class in the academic sector. Graduation ceremonies also transition into an online ceremony where students passively attend the session. In this study, a Social Robot named "Gradbot" is developed to help the students participate actively in their online ceremonies. The Body frame was designed using Fusion360. The Gradbot is composed of the Arduino microcontroller, servo motors, Bluetooth module, mounted on a 2WD car chassis and was simulated using Tinkercad and MATLAB. This study also includes the investigation of the degrees of freedom, type of joints, workspace, and the cartesian product of the developed Gradbot.

Paper # 223

Portable Desalination Equipment for Fishermen

Abstract - A portable desalination system is being developed to provide anglers with an alternative source of potable water during long hours of fishing in open seawater. The equipment's body is made of marine plywood, and the inside is covered with black-painted aluminum to increase heat absorption. The equipment is made of regular clear glass, and the floater is made of polyurethane foam. The body of the equipment is square, while the glass is triangular. The equipment has a surface area of 6450 mm². The evaporated seawater is trapped by the triangular glass, which then slides down to the hose leading to the bottle collector. It collects seawater and uses evaporation to produce potable water. The equipment could collect 450mL of seawater and produce about 20mL of distillate.

Paper # 226

Indirect Prediction of Aquaponic Water Nitrate Concentration Using Hybrid Genetic Algorithm and Recurrent Neural Network

Abstract - Nitrate concentration contained in the aquaponic water has a crucial effect which influences the growth of lettuce crops. However, most of the existing methods of testing its presence remains mostly destructive, expensive, utilize multiple sensors. To address this issue, a hybrid method of indirectly identifying the nitrate concentration present in aquaponic water of lettuce growth chamber was developed, bridging the integration of computer vision and computational intelligence. The dataset is composed of 720 images of loose-leaf lettuce taken from an aquaponic vertical farm located at Morong, Rizal, Philippines. Graph-cut segmentation was used to segment vegetative green pixels from the background. A regression tree (RTree) multi-feature dimensionality reduction technique was employed to reduce the number of significant features to 15 (a*, correlation, B, R, S, Cb, contrast, H, Cr, energy, b*, entropy, homogeneity, G, and L). To determine the number of optimal hidden layers for the recurrent neural network model, a multigene symbolic regression (MGSR) tool called GPTIPSv2 was employed to derive a fitness function. This function was deployed for optimization using Genetic Algorithm which led to a 107-85-69 hidden-neuron-combination pick. The GA-RNN15 network surpassed its unoptimized version with 10.25% higher R² for training, 12.28% higher R² for validation, and 7.28% higher R² for testing. The findings proved that a non-destructive, cost-efficient, and accurate way of indirectly identifying nitrate concentration levels in an aquaponic farm chambers is feasible.

Paper # 227

OryzaNet: Leaf Quality Assessment of Oryza sativa Using Hybrid Machine Learning and Deep Neural Network

Abstract - Plant diseases are the major cause of agricultural production losses. Visual leaf assessment based on human capability is the traditional diagnostic approach but leads to errors that contribute to losses. As a response, the analysis of rice (*Oryza sativa*) leaf quality through the development of a diagnostic method based on computational imaging was explored in this study. Feature-based machine learning (ML) algorithms including decision tree for classification (CT), k-nearest neighbors (KNN), Naïve Bayes (NB), linear discrimination analysis (LDA), and support vector machine (SVM) were configured to classify the health status of rice leaf based on the spectro-textural features of image samples. A total of 17 features were extracted through the HSV color space thresholding technique which was further simplified through neighborhood-principal component analysis (NCA-PCA) selection that resulted in a four-feature vector (a^* , Cr, contrast, homogeneity). Further, Deep neural networks (DNN) comprising ResNet-50, ResNet-101, GoogLeNet, MobileNetv2, and Inceptionv3 networks were used to categorize the disease variants. As a result, all ML models exhibited excellent classification performance. Additionally, the KNN model delivered an accuracy rating of 97.92% for health condition classification. Also, among the created DNN models, DNNRN50 produced a disease identification accuracy of 95.83%. With that, a vision-based diagnostic tool, OryzaNet, was established. This technique is a non-intrusive and novel approach to phenotyping and assessing the quality of rice leaves.

Paper # 228

Optimization of Vacuum Drying Properties for Chlorococcum infusionum Microalgae Moisture Content Using Hybrid Genetic Programming and Genetic Algorithm

Abstract - Biofuel production serves as a viable alternative to conventional energy production systems which primarily relies on fossil fuels. Because of its increased protein and lipid accumulation properties, algal biomass has been deemed a feasible source for biofuel generation among the many types of biomass materials. Microalgal drying process, a preliminary process prior to biofuel production, is a crucial procedure which consumes a lot of energy. Thus, optimization of this process must be considered. As a response, this study aims to determine the optimal vacuum drying parameters such as the biomass thickness, drying temperature and vacuum pressure in reference to the moisture content of the microalgae, *Chlorococcum infusionum*, using hybrid evolutionary strategies of genetic programming (GP) and genetic algorithm (GA). GP was configured using the GPTIPSV2 tool to generate a symbolic function which is a fundamental element of GA optimization. GA was utilized to generate candidate solutions which were evaluated for goodness of fit through the developed function. Based on the results, this optimization generated parameter values of 5 mm, 69.4°C, and 178.3 mbar for biomass thickness, temperature, and pressure, respectively, which converges at the function value of 121.344. This developed technique served as a non-invasive optimization model to computationally determine the optimal microalgal drying parameter values.

Paper # 229

Solar-Assisted Electric Boat Power and Propulsion System Simulations

Abstract - This paper created a digital representation of an electric boat's power and electrical system to have an insight of the boat's operation using the electrical components that will be installed in the electric boat. Having these insights will give the ability to explore options regarding the boat's operation. A model of individual electrical components has been simulated and interconnected to mimic the boat's operation. The power speed curve of the electric boat was also curve-fitted to get the equation for ship powering. By comparing existing boat operation in the area, given the speed, the corresponding required power can be determined. Results show that the components selected is adequate for the boat's operation. Results also show that improvements can be made with the addition of battery bank capacity or strategic placing of charging stations along the deployment site and commencing charging while waiting for passengers.

Paper # 230

Chemical Reaction Optimization (CRO) of Deep Neural Network (DNN) Model for Characterization of Algae Drying Kinetics

Abstract - Drying is an essential step needed to improve the extraction of lipids and other valuable compounds in the algae for biodiesel production. However, there is a limited amount of information available regarding its drying kinetics. Previous researches have utilized computational intelligence such as artificial neural network (ANN) and deep neural network (DNN) in the characterization of the drying kinetics of algae. In this study, a more recently proposed metaheuristic optimization technique called Chemical Reaction Optimization (CRO) is used to determine the best number of neurons to be used in a Deep Neural Network (DNN) model that will give the minimum root mean squared error (RMSE). One of the advantages of CRO is the possibility of faster computational time since the population does not need to be coordinated in each computing units. The molecular structure in the CRO contains the set of neurons, while the potential energy (PE) corresponds to the RMSE of the DNN model. At a minimum RMSE value, the accuracy of the moisture removal rate prediction increases given maximum temperature, sample temperature, time of drying, heat rate, and percent weight of the remaining algae. The DNN model created obtained an RMSE value of 4.9430×10^{-4} which corresponds to R-value of 0.9996 and 0.99958 in the training and validation phases.

Paper # 231

Irescue: Tracking Device using RuBee – based Technology

Abstract - This study constructed a system of interconnected devices (Rescue Strap, Local Interface, Access Point, Base station integrated with PC program and a mobile application) that utilizes RuBee-Based technology. The prototype provides a hefty improvement on real-time tracking, in terms of communication blackouts during rescue operations. In times of disaster, it provides certain functions that will help the rescuers and volunteers to enhance search, rescue and retrieval operations without any mandatory issues on wearing a device. During regular days, it serves as an identification system that is admissibly needed in cluster groups (e.g. schools and companies). The performance of the prototype was tested based on different sets of situations in relation to the speed of data, accuracy & precision of location, range of the device as to visibility. Evaluation of results showed that the prototype was highly acceptable in terms of functionality, effectiveness and reliability. Implementation acceptability was evaluated by Laguna Disaster Risk Reduction Municipal Council.

Paper # 232

Development of IoT-based Fish Tank Monitoring System

Abstract - The aquaculture management system will be significantly improved with the adoption of recent technological advances. This study introduces the development of a fish tank monitoring system using the Internet of Things (IoT) modules with four subsystems—water quality monitoring, video surveillance of the fish tank, on-demand feeding machine, and Cloud data storage. During the evaluation, the calibrated sensors for water quality monitoring were accurate for the monitoring purpose. In contrast, the simultaneous transmission of the sensors' gathered data from the IoT modules to the Cloud storage was 100% successful from 0.25 Mbps to 10 Mbps upload speed. The automated video surveillance was able to record 98.45% of the scheduled time.

Paper # 233

Clustering and Predicting of Smartphones Features using Gaussian Mixture Model Algorithm

Abstract - In this research, the Gaussian Mixture Model algorithm was used to identify common functionality and patterns of the 8,806 Smartphone data specifications using Python, and the Knowledge discovery in databases (KDD) method. Consequently, smartphones with higher cameras, higher memory, and higher battery specifications, and a bigger display size could be considered camera smartphones. Moreover, smartphones with high resolution, bigger screens, and higher memory and battery storage but of lower cost could be considered as gaming and entertainment smartphones. Multiple Regression was used to predict smartphone display size and battery capacity. Two models were developed; the first was able to predict the display size of the smartphone using the attributes including display resolution width, display resolution height, and body dimension width. The other model was able to predict the smartphone's battery capacity using the attributes: display resolution width, display resolution height, display size, primary camera, secondary camera, internal memory, and loudspeaker as predictors.

Paper # 236

Development of Predictive Machine Learning Model using Neural Network for Threshold Value Determination of Buildings

Abstract - Machine learning (ML) is so prevalent today to the point that people use it without even realizing it. It is a subset of artificial intelligence (AI) that makes softwares and applications give more accurate results without being programmed explicitly. In the past years, engineering had been showing growing interest over the application of AI in the field. In fact, several studies had been conducted to see what advantages it can bring to the engineering discipline. It is evident that ML is now being applied in lots of field of engineering. However, ML as applied to structural health monitoring (SHM), specifically to the determination of threshold for buildings has not yet been established. The threshold plays a very important role in SHM as it will be the basis for evaluating the integrity of a structure after it ages as time goes by or even after earthquake events. This study focuses on developing a predictive machine learning model that will be incorporated in an earthquake recording instrument that will give the threshold value specifically for a building given specific input parameters. To do the predictive model, structural data of thirty (30) buildings were collected. It consisted of acceleration data, maximum displacement on non-linear and linear state, lower and upper limit of moderate damage state, and its threshold. The proponent was able to gather 3750 rows of data to be used for the training of network. Creating of the neural network model was done using the MATLAB neural network tool, and trained using the Levenberg-Marquadt algorithm which yielded the best performance among the training algorithms in MATLAB neural network tool. After training, a MATLAB function was generated and run compatibly with python to allow integration with the earthquake recording instrument. Furthermore, an accuracy test was done wherein it produced a 91.77% accuracy. Through the predictive ML model, structural engineers are expected to experience a great amount of savings in terms of time and effort on determining the threshold value for a specific model

Paper # 237

*Cocobot: Design and Implementation Of A Robotic Arm To Ameliorate The Process Of Stirring In
The Coco Sugar Production In Alabat, Quezon*

Abstract - This study aims to increase the yield of coco sugar production while ensuring the quality and cleanliness of the product through the design and implementation of an articulated arm for the stirring process of coco sugar production in Alabat, Quezon Province. An articulated robot arm is a robotic representation of human arm having three axes connected to two revolute bases. In order to design and implement the robotic arm, comparison between motors in terms of heat dissipation and time it takes to travel the work envelope is scrutinized to better actuate the joints of the proposed articulated robotic arm. Linear guides and DC geared motors are used for the three degrees of freedom which represents the shoulder, elbow and wrist part of the robot arm. A current sensor is connected to the DC geared motor on the wrist part of the arm which served as the viscosity sensing mechanism of the articulated robot arm. Arduino Uno is used as the microcontroller that controls the whole system. The stirring time to complete the process has decreased compared to the existing method while the yield of the coco sugar produced using the automated process increased compared to the yield produced using the manual process. The coco sugar produced using the automated process undergone third party testing and was compared to the standards established by the Philippine National Standards (PNS) in terms of physical, chemical and microbiological properties and have complied to these standards using the proposed process.

Paper # 238

*Towards the Integration of Computer Vision and Applied Artificial Intelligence in Postharvest
Storage Systems: Non-invasive Harvested Crop Monitoring*

Abstract - Agricultural production system does not end with the actual harvesting of crops rather it extends to the postharvest system which primarily consists of crop storing, marketing, and transportation. However, temperature and humidity directly affect the quality of stored agricultural products. In a tropical country like the Philippines, tomato, lettuce, and other thin-skinned and highly moist crops degrade its quality and experience shape deformation over time. This study is a thematic taxonomy of intelligent postharvest storage systems discussing the techniques in the phenotyping of agricultural produce and emerging needs, trends in computer-vision-based postharvest systems, integration of artificial intelligence in postharvest systems, the current issues, challenges, and corresponding future directives in intelligent storage systems. Based on the systematic analysis, technical modeling of the storage system and postharvest crop quality grading are the emerging challenges in effectively storing crops for human consumption. It was found out that non-invasive high throughput methods for evaluation of quality and shelf life are needed. This can be done through vision-based fruit and vegetable quality grading and vision-based adaptive controls in the storage chamber. Overall, computer vision allied with artificial intelligence can make an intelligent postharvest storage system that is sustainable, profitable, and easy to implement.

Paper # 239

Analytical Hierarchical Process-based Material Selection for Trailer Body Frame of an Underground Imaging System

Abstract - Underground imaging technology has been functional in the detection of utilities in the subsurface through land surveying. One way to ensure the quality gathering of data is to identify the best material that can be used for its trailer as it will undergo chaotic movements when used in uneven terrain. Material selection is a vital part of any design process and product development. Thus, this study contributes to the development of an underground imaging system body trailer by using Analytical Hierarchical Process in material selection. AHP technique was employed in structuring multi-criteria decision-making problems by weighting and ranking criteria such as mechanical properties, material quality characteristics, and manufacturing considerations in respect to their corresponding sub-criteria and alternatives. Mild carbon steel, galvanized iron, polypropylene, and cold-rolled steel are the materials assigned as alternatives. Survey form containing the pairwise comparison competing criteria, sub-criteria, and alternatives were given to target respondents as decision makers. Furthermore, the utilized AHP calculator was used for all the computations for consistency analysis. Based on the results, mild carbon steel is the most suitable material to be used as the core material in the fabrication of the underground imaging trailer body. It obtained the highest score in total weight ranking alternatives with a 0.269 weight value surpassing the galvanized iron, cold-rolled steel, and polypropylene with 0.198, 0.180, and 0.104 weight values, respectively.

Paper # 240

A Maximization Model for Food Aid Distribution using Integer Linear Programming

Abstract - The covid-19 pandemic has severely affected the economy of the Philippines. With 90% of the labor force being affected, hundreds of thousands of families turn to their respective local government units for assistance. LGUs have begun distributing food box assistance to every family under the Food Security Program to ease the economic burden. However, such a program having a vast number of recipients will require a large budget. This study presents the optimization of the content of the food packs used for food aid distribution through linear programming using Matlab. The study's goal is to maximize the nutritional content of the food pack while being under the constraint of a limited budget to ensure the best utilization of scarce resources.

Paper # 241

AI To Predict Price Movements in the Stock Market

Abstract - This paper presents a study on how to integrate recurrent neural networks in creating an algorithm that can predict stock market price changes. Trading in the stock market can be overwhelming due to its volatility in price changes. As a result, traders become indecisive and can miss several gaining opportunities offered by the market. The dataset for this research includes existing historical price data of the Philippine Stock Exchange index, which comprises the weighted mean of the top 30 publicly traded companies in the Philippines. The dataset is utilized for creating the predictor model using recurrent neural network algorithms. The researchers constructed a model that can potentially help forecast future price movements of the stock index by dividing the datasets for testing and training, and by using regressions and long short-term memory network (LSTM). This research is beneficial not only to the academic community but will also bring great value to the traders and investors of different markets.

Paper # 242

Damage Identification of Selected Car Parts Using Image Classification and Deep Learning

Abstract - This study presents the use of image classification and deep learning in the field of insurance claims and management for the identification and assessment of damaged vehicle parts. Image classification is a branch of computer vision that focuses on identifying distinct information in an image and uses it to segment image groups based on classes. It delves deep into comparing the relationship of pixels in the image in order to be able to find out the similarities and differences in the pictures so that they may be split into groups where they may likely belong. Today, insurance claims on vehicles require appraisers to decide the damage of their car. The goal of the study is to develop a machine learning-based system that can decide whether the damage on car parts is severe or not severe. To create a machine learning system, datasets are fed into a training and validation algorithm. By utilizing CNN technique, the prediction accuracy of 76.67% for the first dataset tackles the classification of car parts(1st level detection). Just like the first dataset, the algorithm was able to garner a prediction accuracy of 76.67% for the second dataset which covers the damage detection in parts(2nd level detection).

Paper # 243

Strawberry Quality Classification Utilizing Convolutional Neural Network

Abstract - Strawberry quality has been a crucial factor when it comes to consumer satisfaction. Having quality and cost-efficient strawberries would increase consumer satisfaction while increasing sales from the merchants' perspective. As such, being able to classify strawberries into the desirable and undesirable categories would aid small businesses and consumers in determining whether the strawberries sold and bought are desirable based on key indicators such as shape and color. To address that, this study was conducted with the use of convolutional neural networks. The strawberry datasets used are a combination of a pre-classified dataset from another study and a dataset of images photographed solely for the purpose of this study. The images are classified as desirable and undesirable wherein 350 images of each set are used for training, 200 images for validating, and 100 images for testing. The model, which was generated from the convolutional neural network, was set to cycle through 15 epochs with a batch size of 8. This generated a model that has a training accuracy of 98.41%, a validation accuracy of 92.75%, and a testing accuracy of 100% which makes the model efficient in classifying strawberries into the desirable and undesirable categories.

Paper # 244

Automated Tungsten Inert Gas Welding Process using Fuzzy Logic Operation

Abstract - Industrial welding processes involve significant human inputs that consequently include a deviation in the accuracy of the system and risk of human errors. Automation for welding processes lessens the possibility of obtaining human welding errors and improves workplace safety due to less human interaction. The study utilizes fuzzy logic operation to control the welding process by setting categorical inputs and outputs based on the function applied to the fuzzy logic. The input parameters and output values will adjust the welding device accordingly for the duration of the process.

Paper # 245

A Case Study on Waiting Line Management for the Land Transportation Office of the Philippines

Abstract - The Philippines' Land Transportation Office (LTO) has the task of evaluating and processing citizen's applications for driver's license for professional and non-professional purposes. The office sees many customers each day and the need for an efficient waiting sitting was needed. Several process optimization and productivity improvements will be discussed in this research. Improvements along the lines of robotic process optimization, social media bots, existing efficient and effective processes, and the like, will be considered in developing suggestions for optimizing waiting line management in the LTO. In addition, existing congestion surveillance methods are explored to consider more solutions. The LTO currently implements a multi-channel, multi-phase line management system for all branches in the country. The research aims to evaluate its effectiveness in processing new driver's license applications in the National Capital Region within a set period of days. The system has proven inefficient based on recent data taken between 2019-2020 [1], even considering the decline in applications because of the COVID-19 pandemic. There is an expected spike in citizens applying for driver's licenses once the quarantine restrictions are lifted entirely, and an effective waiting line management system will be needed. A solution can be created by taking inspiration from efficient process systems from the United States and United Kingdom.

Paper # 246

Optimizing the Allocation of Renewable Energy Generation and Energy Consumption of Power Plants in the Philippines using Linear Programming

Abstract - The Philippines has consumed over 108,000 and 101,000 GWh of energy in the years 2019 and 2020, respectively. This consumed energy is generated by different providers such as the Manila electric, Visayan electric, and Negros Occidental electric cooperative which mainly provides for the residential, commercial, and industrial sectors. Moreover, the country utilizes four main energy generation types namely, coal, oil-based, natural gas, and renewable energy. As reported in the Department of Energy's 2020 Power Statistics Report, figures show that the recent COVID-19 pandemic resulted in an increase in generated energy for the household sector. Inversely, the generated energy for commercial and industrial sectors dropped. This is due to the lockdown urging people to have a work or study from home set-up rather than face to face. With this shift in energy distribution may come cases of incorrectly measured power consumption that increases electricity bills of each sector and the companies involved. Therefore, this study aims to apply linear programming to optimize the allocation of energy generation and consumption of power plants in the country. The results of the program will then be compared to the results from and several mathematical models, such as the Gauss-Jordan, M-Method, and Two-Phase Methods to verify its results.

Paper # 247

Modeling the Flow Dynamics of the Ostreavent II using Scilab

Abstract - The global pandemic declared by the WHO in March 2020 made urgent the need for an affordable adult ventilator for the Philippine market. An existing low-cost infant ventilator, the OstreaVentTM (Fig. 1), developed by Dr. Enrique Ostrea, Jr [1] more than ten years ago, was targeted for re-design and upgrading into one suitable for adult use. A team of Doctors, Engineers, and Technicians was formed to address the challenges of the project. The team was tasked to develop a pressure- and volume-controlled ventilator for adult (and infant) use. One of these challenges is to develop the ventilator at the soonest possible time. A model of the ventilator simulating all aspects of its behavior was created to address this challenge. The model was created using Scilab [2] and was used to predict the behavior of the ventilator and its components before it was built entirely. The model was validated by data from tests and experiments on the components used, and it was able to predict the flow dynamics of the new ventilator. The predictions of the model were used to guide the design of the adult ventilator. This concurrent activity allowed the adult ventilator to be built in less than four months.

Paper # 248

i-Detect: Voice-Activated Home Automation with Smoke and Fire Detection and Mitigation System

Abstract - In the Internet of Things field which is paired with Artificial Intelligence projects are centered on the utilization of technologies in connecting the world. This system mainly used the ESP32 IoT development board as its brain. The researchers developed i-Detect project to provide home automation in smart lighting and switching, smoke and fire detection and mitigation systems that will contribute to disaster risk reduction and management. The project uses a water-scrum-fall approach under agile methodology in developing the system since it involves integration between hardware and software. During the tests conducted in three (3) trials, the results were successful because it performed according to the intended function. The voice-activated home automation carried the commands accordingly; the exhaust fans activated when smoke/gas was detected, and water pumps activated when a fire was detected. It was observed that as long as the internet connection is stable the home automation will successfully execute. On the other hand, the smoke/gas and fire detection and mitigation can still be executed without relying on the internet connection. SMS notifications were also responsive as well as the real-time responsive web server. For a better upgrade of this system, the researchers recommend a better Printed Circuit Board (PCB) design that is ready for mass production.

Paper # 249

*Implementation of Project Study Courses at the Mechanical Engineering Program of FEU Tech
During the COVID-19 Pandemic*

Abstract - The threat of a massive spread of the SARS-CoV-2 virus in the Philippines prompted its government to implement community lockdowns all across the country. The first of which was implemented in Metro Manila beginning on 15 March 2020 and lasted up to 15 May 2020. During the lockdown, all schools were prohibited to conduct face-to-face classes while businesses were encouraged to implement work-from-home arrangements. FEU Institute of Technology (FEU Tech), located in Metro Manila, Philippines, was able to quickly adapt to the health crisis mainly due to its previous implementation of Canvas, an online learning management system, in 2017. The mechanical engineering department at FEU Tech revised its strategy in its implementation of its undergraduate Mechanical Engineering Project Study course (MEPROSTUD) to adapt to the class disruptions caused by the community quarantines imposed in Metro Manila. Comparing student performance before and during the pandemic, it was observed that there was a significant decline in oral communication and a significant improvement in written communication in MEPROSTUD1 and MEPROSTUD2, respectively. This paper documents the experiences of the mechanical engineering department at FEU Tech in its implementation of MEPROSTUD courses during the pandemic and intends to provide additional information to other engineering schools about how to remotely implement their undergraduate thesis courses.

Paper # 250

Coral Health Identification using Image Classification and Convolutional Neural Networks

Abstract - The health of the coral reefs is at risk due to the increase in water pollution and climate change. The destruction of these coral reefs becomes relevant as the Philippines has a huge coral reef presence making it the second largest in Southeast Asia. The early detection of coral bleaching and deterioration may be able to decrease the death rate of corals. This study focuses on the use of Convolutional Neural Networks (CNN) to identify a coral's state: (1) Healthy, (2) Dead and (3) Bleached. The model developed in this study will then classify these corals to determine which corals need harvesting or regeneration. There are two datasets used in this study for comparison purposes. To build the dataset for this study, the researchers compiled images from known datasets used in other studies. The images for alive corals were taken from the RSMAS, dead corals from EILAT while bleached corals were taken from ReefBase. The results of the second dataset have an accuracy of 84.93% which is better than the first dataset that have an accuracy of 68.75%. The results showed that datasets which have larger sample size perform better than smaller datasets. It also showed that for machine learning models, the quantity outperforms the quality of image data.

Paper # 251

Electronic Nose Technology and Application: A Review

Abstract - In this paper, the researchers intended to review the electronic nose. Electronic nose is a technology that has the capability to detect odor and it mimics the human nose. Using Optical Sensor System, Mass Spectrometry, Ion Mobility Spectrometry, Gas Chromatography, and Infrared Spectroscopy are the different technologies in the field of electronic nose. Metal-oxide, Photoionization detector, Catalytic bead sensors, Electrochemical gas, Acoustic wave, Optical, Quartz crystal microbalance, and Conducting polymer are the sensors that have a significant part in detecting the chemicals or odors. With the use of computational intelligence such as Artificial Neural Network, Principal Component Analysis, Support Vector Machine, and Pattern Recognition, are some of the algorithms that are incorporated in the electronic nose. Using artificial intelligence in the electronic nose, the detection, classification, and prediction is easier and has a higher accuracy rate. The electronic nose has many applications. Food Industry, Environmental Monitoring, Disease Diagnosis, and Safety and Security are some fields where the application of an electronic nose is feasible. There is no doubt that with continuous research and developing electronic noses this technology will be part of our life that can help the society.

Paper # 252

A Comparative Study on the Use of Raw and Filtered Images for Multi-class Image Classification

Abstract - Manufacturing processes have since then developed to accommodate the ever-growing consumer demand for a wide range of products. Being so, for businesses to adapt, they must engage in the manufacturing and selling of various types of products. Oftentimes in the factory, one would oversee the overall manufacturing processes of several products. This has been proven to be workable, yet, at times, inefficient. Multi-class image classification may serve to be the answer for increasing efficiency in monitoring the overall manufacturing process. To demonstrate the technology and apply it in an electronic device manufacturing setting, the researchers created their own dataset that consists of 4 different classes (with each class having 1000 images -- 1000 for training, 518 for validation, and 5 for testing). Following the Convolutional Neural Network (CNN) model, the researchers made use of the Python programming language to execute the multi-class image classification program. It was investigated if there would be any difference in the model and output accuracy if the images that would be fed to the program will undergo no filtering and gaussian filtering. Training and testing were performed for a total of 5 times for each set, and training loss, training accuracy, validation loss, validation accuracy, and actual accuracy were recorded. The mean values of the aforementioned show that Gaussian filtered images yielded much more favorable results as actual accuracy was at 95% -- which is 5% higher than the actual accuracy for the set of raw images.

Paper # 253

SIMD Implementation of Modified Zhang's Three-Frame Alignment Algorithm

Abstract - Gene expression involves the alignment of organisms to understand their genetic information. DNA toprotein alignment is the important first step in gene expression which involves alignment of DNA sequence to a reference. However, protein alignment algorithms are implemented sequentially via recurrence relation. Thus, making alignment slow. This paper discusses an SIMD implementation of a DNA to protein alignment algorithm using AVX2 instructions to speedup implementation. Result shows a speedup ranging from 1.81x to 6.1x as compared to sequential implementation.

Paper # 254

Development and Analysis of Footstep Power Harvester – A Case Study for the Viability Of the Device in Surigao City

Abstract - This study develops a footstep generator and its viability to harvest energy in a two-shopping center in Surigao City. The footstep power harvester module was enclosed in a wood-tile type 3x2ft size where parallel piezoelectric were embedded inside to increase the output current and placed strategically in the main entrance where people generally pass through. In this research, a microcontroller was used to regulate the dc from the piezoelectric to the 3.7-volt battery. The voltage sensor, like the current sensor, was used to figure out how much voltage was contained in two AA batteries. Data collection of harvested energy was done using two establishments, 12hours from 6 am to 12 pm and 12 to 6 pm. The total average amount of harvested power on one 3x2ft size was equal to 668.5mW. Tripling the footstep power harvester module would increase the power generated to 2W, enough to charge a mobile phone.

Paper # 255

Analysis Of Water Leaking Pipes Using Impulse Radar: A Case Study In Surigao City, Sdn Philippines

Abstract - Water distribution and transportation are carried out via subsurface plastic and metal pipelines. This study aims to determine the position of leaky pipes and discriminate between metal and plastic pipes to pick appropriate handling tools during excavation. Leaking pipes in the water distribution facility were identified through visual inspection and limited information about the position and kind of pipe, where rigorous excavation with proper instruments caused substantial damage to the water pipes. Meanwhile, the approach employs impulse radar, in which signals are broadcast to subsurface pipes, and the reflected signals are gathered and analyzed using a radargram. The simulation is carried out by using soil radargram results as a base, which are then compared to the radargram results of metal pipe, plastic pipe, metal pipe with water, plastic pipe with water, metal pipe with leaking water, and plastic pipe with leaking water which is buried underground in the soil. When examined to the soil radargram, the results reveal dissimilarities of radargram depiction of metal pipe, plastic pipe, metal pipe with water, plastic pipe with water, metal pipe with leaking water, and plastic pipe with leaking water.

Paper # 256

Energy Potential Of Macopa Irrigation Using Pico-Hydro Power Plant Design Using Under-Shot Type Waterwheel

Abstract - This study aims to analyze the potential of the water flow in Macopa, San Francisco, Surigao del Norte irrigation and utilize the energy to construct a pico-hydro power plant. The study was carried out using a microcontroller to measure and record the water flow's speed and velocity and calculate the irrigation flow's hydraulic power. The average water speed of the irrigation based on the design of a head size 2.7034m is 7.283 m/s and the average volume of water in a day is 1,391.36 m³/hr. It can be shown in the graph that water volume is consistent over the whole day. The average power delivered by the irrigation is 4.35W from the average of 62 rpm of the under-shot type water wheel with respect to the design generator and specification. It was also evident on the graph that the power has consistent over the whole period of the day. The results show that it has potential renewable energy, which is the irrigation flow can be achieved as a water resource for the construction of a mini hydroelectric power plant to provide electricity such as street lighting all over the community.

Paper # 257

Analysis Of Wind Power Potential Using The Developed Windmill With Data Logger

Abstract - Wind power generation is expensive and needs a thorough feasibility study to come up with a decision to build and invest. Wind Power Table is the guide that categorizes feasibility to build wind power potential base on the wind data provided by the satellites, which are predicted values. This research is conducted using actual values of wind data, then analyzed using Weibull and Rayleigh Distribution and compared the computed values to the Wind Power Classification Table as the basis for wind power potential of the target area. The recording used to automate the process of gathering data for wind speed assessment is using a developed windmill with a data logger powered by Linux-based raspberry pi 4 and a sensor to measure wind speed which will be stored onto the system. It also has a graphical user interface to feature to be user friendly that show the simple analysis such as graphs and tables through an LCD. The data gathered is analyzed using Weibull and Rayleigh distribution analysis. The device data-log the wind speed for one week on the island of Masapelid Barangay Pateño and extract the data through a CSV file. Data are then used to compute the wind power potential using Weibull and Rayleigh and then compared the results to the Wind Power Classification Table. The results show that the average computed Weibull is 312.81 w/m² where is classified as excellent for rural and good for utility. Also, the computed average Rayleigh value is 263.63, which is classified as good for utility and moderate for rural. The wind power potential of the island of Masapelid Barangay Pateño is classified as good for rural based on the computed.

Paper # 258

Development of a Raspberry Pi-based Underwater Camera System for Inland Freshwater Aquaculture

Abstract - Optical vision-based system is one of the tools for non-invasive monitoring of freshwater fish ecosystems. This system can be utilized to gather visual data from underwater scenes (in the form of images and videos) that contains information about the freshwater fish environment. Currently, action camera with waterproof housing is the most common choice for underwater visual data acquisition, due to its low cost and accessibility. However, this type of underwater camera is limited by its on-board battery and storage capacities, which makes the operations of placement and retrieval of and the extraction of data from this camera being appended to the many manual processes of freshwater aquaculture management. In contrast, the proposed system automates the data acquisition process by developing an underwater camera system that automatically captures and stores data into local and remote storages. The proposed system is based on Raspberry Pi, an open-source computing platform that allows rapid prototyping, with low-cost, modularity, flexibility, and accessibility being the defining benefits of such system. Upon several simulated runs, the proposed system was able to capture series of 8 MP underwater images during each scheduled acquisition instance at 6.244 - 6.528 frames per second. With a steady Internet connection for cloud storage, the proposed system was able to upload underwater images at 0.388 – 0.469 Mbps at 0 – 5.55% error.

Paper # 259

Prediction of Weld Current Using Deep Transfer Image Networks Based on Weld Signatures for Quality Control

Abstract - The utilizing electrical resistivity tomography (ERT) in land surveying, one approach is using trailers to locate fluid or underground utilities in large-scale subsurface constructions. It is known that welding is an ideal manufacturing process to incorporate a well-assembled finished product such as a trailer system used in subsurface imaging. However, there are conditions where inconsistencies are generated in a weld metal called welding defects that results from poor welding procedure or improper welding patterns. Welding flaws can develop on both the exterior and interior of the weld metal if the current setup is too low or high. The objective of this paper is to identify and categorize weld current using integrated computer vision and deep learning. There are nine deep transfer image networks in MATLAB namely, DarkNet53, DenseNet201, EfficientNetB0, InceptionV3, MobilenetV2, NASNetLarge, ResNet18, ResNet101, and Xception, which were trained and tested for weld current detection and classification. Augmented images were pre-clustered into four current levels: 60 A, 80 A, 100 A, and 140 A. The test phase confirmed that ResNet101 exhibited the highest accuracy among other trained deep learning models. The image spectral thresholding used in the extraction of image texture features explained the reason for the low accuracy in other networks. Overall, this study will have a contribution to the quality control of the welding process outcomes by introducing another phase of non-invasive determination of current used in welding the metal joints and sections of a road tomography trailer.

Paper # 260

Analytical Hierarchy Processing for Sustainable Intensive Caged Tilapia and Milkfish Cultivation Site Selection in the Philippines

Abstract - Tilapia (*Oreochromis niloticus*) and milkfish (*Chanos chanos*) are the highly consumed and the most commercially important fishes in the Philippines. Due to the industrialization of the country, numerous natural sites intended for rearing these fishes are affected by environmental emissions on top of climate change and the possibility of having an effective and sustainable production will decay in the long run. Also, each geographical region in the Philippines is differentially impacted by the weather system. In this study, analytical hierarchical processing (AHP) was employed in selecting the priority sites in Luzon Island, Philippines, for sustainable intensive caged tilapia and milkfish cultivation. Scientists, biologists, aquaculture engineers, urban planners, and academic researchers from both private and government agencies and institutions responded to the online survey. Based on the multi-criteria decision-making through AHP, water quality and hydrometeorology are the most significant determinants in selecting a site for aquaculture followed by sustainability, land features, and socioeconomic factors. Among the eight regions in Luzon Island, CALABARZON was considered as the priority site in cultivating tilapia and milkfish and the Ilocos Region is the last alternative. CALABARZON has the highest score in water supply and quality, soil quality, and vegetation that has a great potential to support aquaculture. Thus, AHP is confirmed to be an effective tool in site selection for aquaculture.

Paper # 261

Six Sigma fiascos: a failure in the consensus of perspective

Abstract - In the mid-1980s, a process management program – Six Sigma – is developed to produce high-quality, zero-defect products by reducing process variations. The Six Sigma approach promises to offer significant improvements on overall firm performance as its primary focus points more toward the satisfaction of customers. As more companies worldwide attempt to implement the approach since its inception, several accounts on both its success and failure have been documented in the literature. Several scholars further attempted to examine the underlying premises as to how the methodology succeeded in one case and at the same time failed in another. Such efforts resulted in the identification of critical success and failure factors of the implementation of Six Sigma. At a wider scope, it can be noted, however, that the factors for success and failure lie in the lack of consensus among perspectives. It is, therefore, the goal of this paper to present a comprehensive review of the major pitfalls of Six Sigma as a concept and as a structured problem-solving methodology. Lastly, this paper presents the implications of such pitfalls as a way forward for Six Sigma including its ancillary methodologies.

Paper # 262

State-of-charge Monitoring and Actuation System for Photovoltaic Solar Cell System

Abstract - This paper presents a data monitoring and control for transfer switch of Solar Power System. The system is designed to solve lacking charge indicator and transfer switch mechanism for setups with photovoltaic solar cells and lead acid battery bank. Actuation system is also designed for automatic switching in the time of acquisition. LabView designing software is used in creating the whole data monitoring and control system. The state-of-charge cycle monitoring is developed through fuzzy logic. Temperatures along the PV cells are used as indicator of the upper and lower limits of maintaining charge level. Evaluation of results signified that the proposed system efficiently predicted the state-of-charge, assumed a charge limit based on average temperature and switch or maintain the system to a particular mode.

Paper # 263

Fish Centroid Matching using Modified k-Dimensional Tree Nearest Neighbor Search in Stereo Images

Abstract - Stereo matching is one of the primary determinants of 3D reconstruction accuracy. This study proposes a modified k-d tree algorithm to match the detected centroids of the fish in 527 pairs of stereo images. The primary purpose of the modified k-d tree is to eliminate the matching errors caused by the close proximities of the fish. With the closest fish proximities at not greater than 500 convex hulls, the probability of successful matching is only 5%. Considering all the 527 input image pairs with convex hulls of 0 to 6500, the centroid matching using the conventional k-d tree can be as high as 87%. With the implementation of the modified k-d tree, the matching precision has increased to 100%, which means that errors in centroid matching were eliminated with all the varying levels of fish proximities.

Paper # 264

BahurApp: Development And Implementation Of Coral Bleaching Monitoring Application Using Convolutional Neural Network

Abstract - This study aims to improve the accuracy of the coral bleaching monitoring method through the development and implementation of mobile application that can classify bleached corals images from non-bleached images using convolutional neural network. Monitoring the reef will be significant in finding the extent of damage, the current state of the Philippine coral reefs, and the possible reefs of hope. The system operates using Convolutional Neural Network (CNN) in classifying the bleaching severity of the corals. It is currently running on Android phones from 4.0 release up to 11. Researchers found that at least 3000 images are needed to train the CNN of the proposed coral bleaching application to achieve at least 90% accuracy, and 0.92 MP, -1 EV and 1600 ISO produces 93% accuracy. Salinity and turbidity of seawater was tested and presented that 1.000-060 g/cm³ of salinity and turbidity using 500-1000 grams of sand does not have substantial effect on the proposed system's accuracy. The GPS used in the proposed system is 95% accurate. Finally, the researchers recommend for the continuous improvement of the dataset to produce better results in the future.

Paper # 266

Impact of COVID-19 on Air Quality in Hanoi and Ho Chi Minh City, Vietnam

Abstract - Vietnam has had one of the fastest growing economies in Asia over the years. However, the COVID-19 pandemic has proven to be a major hindrance to this growth as the country's GDP plummeted significantly. Air pollution can further amplify the impact of the pandemic since residents exposed to high levels of pollution are likely to increasingly suffer from respiratory illnesses, such as asthma. This paper investigates the impact of COVID-19 on air quality and how air quality can influence the spread of the virus. Finally, the paper proposes suitable machine learning practices for predicting air quality, based on historical trends, using spatial and temporal data.

Paper # 267

Automatic Harmful Gas Detection Using Electronic Nose Technology

Abstract - In this paper, the researchers intended to create an automation of gas detection using electronic nose technology. Harmful gasses nowadays is dangerous to the human health and it can cause death. Detection of harmful gases is essential to the society especially in the industry. It can prevent an accident that will going to happen. MQ2, MQ4, MQ7, MQ8, MQ135 are sensors used in the system to detect harmful gasses such as Propane, Methane, Hydrogen, Ammonia, and Carbon Monoxide. Electronic nose is one of the breakthrough technologies develop in our community. It has the capability to detect gases and mimic the human nose capability to smell. If the presence of gas is in the area the system will detect the gas. The sensors is responsible for the detection of the gas and the microcontroller will process the data. The system will produce an output via SMS messaging. It contains gas name and its concentration in PPM. Through testing the system, the gasses obtained percentage error of Propane (C₃H₈) 2.95%, Methane (CH₄) 6.64%, Hydrogen (H) 6.35%, Ammonia (NH₃) 7.47%, and Carbon Monoxide (CO) 6.35%. It has an average percentage error of 5.77%. The system can detect harmful gases. It can help the community to provide safety to all humans.

Paper # 268

Development of a Sign Language Glove Translator Using Microcontroller and Android Technology for Deaf-Mute

Abstract - There are about 70 million deaf and mute people in the world using sign language, but apart from them, only a few people know how to communicate with them using sign language. The goal of the project is to develop a sign language glove translator that can convert American Sign Language gestures into text and speech. The prototype can translate within 3 seconds numbers one to ten, alphabet, and 50 basic words/phrases using flex sensors and accelerometer. The output of the translation can be seen through an Android application. The glove translator will be connected through Bluetooth to allow wireless activity. The prototype has an accuracy rate of 95%. The aim of this study is to help the deaf-mute community talk to those that do not understand sign language.

Paper # 269

A Genetic Algorithm-based Approach for Temperature Optimization to Improve Lettuce Quality

Abstract - This paper presents a Multigene Genetic Programming (MGGP) approach in optimizing the temperature of romaine lettuce inside an artificially controlled environment (ACE). In this research, MGGP is used to find the prediction model that will lead to the optimum temperature for growing lettuce crop. The system used a 1000 population using tournament selection with 40 generations. A mutation probability of 0.14 was applied to validate if it is at global optima. When the iterations reached the termination criteria, the system stopped, resulting in the best temperature model for growing lettuce crop. Training and testing of predictions were done. The model developed in this study can be used for the control system of the temperature setting inside the ACE which can provide optimal condition.

Paper # 270

Faster R-CNN based Fish Detector for Smart Aquaculture System

Abstract - One of the potential applications of computer vision and deep learning is object detection. Faster R-CNN was utilized in this work to create a fish detector that locates occurrences of fish in a frame. The performance of the developed model was evaluated using accuracy, root mean square error (RMSE) and intersection over union (IoU). After training and validation, the developed model achieved a mini batch accuracy equal to 99.95 percent with RPN mini batch accuracy equal to 100 percent. The system has a mini batch RMSE equal to 0.12 with RPN mini batch RMSE equal to 0.28. The computed mean IoU is equal to 0.7816.

Paper # 271

Vital Signs Evaluator and Blood Type Identification using Deep Learning for Blood Donation

Abstract - This paper presented an automated system that aid the process of the whole blood donation, specifically from checking the vital signs of a donor such as weight, body temperature, blood pressure, pulse rate and hemoglobin level and to identify the donor's blood type. The said vital signs were measured by the sensors and other digital measuring devices and the readings were acquired by the system using Arduino microcontroller and MATLAB. The study focuses on identifying eight (8) blood types, specifically Rhesus positive and negative A, B, O and AB. Deep learning model using Python IDE was used. VGG16 was used as the deep learning model to develop the blood type identifier. After training, validation and testing, the system's overall accuracy is equal to 99.50%.

Paper # 272

*Python Based Defect Classification of Theobroma Cacao Bean using Fine-Tuned Visual Geometry
Group16*

Abstract - The study aims to classify cacao bean defects based on the captured image using vgg16. Seven classes of cacao beans were gathered including broken, cluster, flat, germinated, good, insect and moldy. One hundred images per class were captured using an enclosed capturing box with c920 Logitech camera inside and LED as light source. Image augmentation was done to increase dataset. Transfer learning technique was implemented by utilizing the pre-trained vgg16 model architecture adding 10% Dropout after FC2 layer and using default weights of several layers through fine-tuning. Three methods of fine-tuning were conducted by freezing the convolutional blocks. Performance of the trained model using several optimizers (such as Adam, RMSprop and SGD) and loss functions (such as categorical crossentropy and mean squared error) were analysed. The effect of the no. of epochs as well as different learning rates during training was considered and checked. The metrics used in choosing the model were based on the confusion matrix. The chosen model is using vgg16 architecture with 10% dropout + adam optimizer + 0.0001 learning rate + categorical crossentropy loss function run in 20 epochs. It has 95.33% average accuracy. The model was embedded in a processor for actual testing. It has an accuracy of 97.29% based on the actual testing on prototype with 37 testing samples.

Paper # 273

*Aerodynamic Analysis and Vibration Response of Spherical Shell with Meshed Net for Unmanned
Aerial Vehicle Application*

Abstract - Shelled unmanned aerial vehicle (UAV) has proven to be efficient and effective in visually inspecting wide varieties of structure types in challenging locations including narrow or complex environments. In bridge inspection, shelled UAVs can encounter another problem considering the outdoor environment such as the presence of wind. Improving the flight performance by reducing the overall drag means decreasing the overall area of shell as well. However, this could danger the UAV because of the larger openings of the shell. Prospect solution is the additional protection of the spherical shell by adding meshed net. In this study, the aerodynamic characteristics of the fullerene type spherical shell with meshed net was investigated at different wind speeds and sideslip angles. Moreover, in the presence of wind, the spherical shell with and without meshed net will experience significant vibrations that will also affect the flight performance of UAV due to the combination of the wind load and its material structure. Thus, the vibration response was also investigated at different wind speeds. For the aerodynamic investigation, computational fluid dynamic (CFD) simulations and wind tunnel experiments were conducted to determine the performance of the shelled UAV with and without meshed net. The contribution of drag force by the spherical shell increased by an average of 3.95. For vibration response, a wind tunnel test was performed. Experimental data at different wind speeds were extracted and analysed via the MATLAB vibration toolbox. Based on the evaluation on the frequency-response, the spherical shell with multifilament fishing line mesh indicated higher amplitude value compared to the spherical shell with monofilament nylon mesh.

Paper # 274

You Only Look Once on Power Line Components: A Multi-Class Detection Using Unmanned Aerial Vehicle

Abstract - The traditional practices of foot patrol and manned airborne survey for inspecting electric utility assets are now deemed slow, costly, albeit subject to inaccuracy and hazard. As a result, current efforts turned to unmanned aerial vehicles (UAVs) with onboard cameras and equipped with computer vision technologies. In this paper, the authors address two main challenges of a computer vision system for unmanned aerial vehicles in utility asset inspection: (i) the scarcity of data; and (ii) the detection of six power line components, namely transformer bank, high voltage bushing, low voltage bushing, arrester, radiator fins, and cutoff fuse. In addition, the new curated dataset contains images of the subject of interest in pole-mounted and pad-mounted assemblies taken inside the university using an unmanned aerial vehicle. Furthermore, flipping, injecting different brightness adjustments, and other data augmentations to the dataset simulate the real environmental conditions. Finally, the authors re-trained the You Only Look Once (YOLOv5) pre-trained checkpoints on the collected custom data. The experimental results reveal that the proposed system is accurate and precise in detecting and classifying the power line components, with fewer missed detections.

Paper # 275

Semantic Segmentation Models for Crack Detection: Using Shelled Unmanned Aerial Vehicle Imagery

Abstract - Infrastructures are omnipresent today, with some structures weakening over the years due to natural disasters and aging. Periodic structural health monitoring is essential to keep the health status of the infrastructure in check and avoid major risks and accidents. One important indicator of the infrastructure's health status is the presence of surface cracks. Meanwhile, doing manual inspection on possible cracks has multiple setbacks, such as risky climbing, time-consuming, and limited attainability. Furthermore, this method poses additional risk to the inspectors, especially in high-rise infrastructures. Thus, the adoption of unmanned aerial vehicles with a passively rotating shell allows close-proximity inspection of surface cracks in infrastructures. In this paper, we present a comparison between existing semantic segmentation models such as the UNet, LinkNet, FPN, and UNet++ trained for crack detection using shelled UAV imagery. This paper also introduces a new curated dataset, CrackUAS, which contains three types of images: (i) images of unobstructed surface cracks, (ii) images taken from the perspective of the shelled UAV that shows portions of the passively rotating shell, and (iii) synthetic images of surface cracks with shell obstruction. Experimental results of the study demonstrated that the segmentation models could learn crack segmentation from our CrackUAS dataset with state-of-the-art performance based on the precision, recall, and F1 score metrics. The results show that the U-Net and U-Net++ models are neck and neck in terms of performance. For applications where crack detection is used in real-time, the experiments show that FPN is the best choice.

Paper # 276

Object Detection as a Technological Adjunct to the Manual Counting Protocol during Surgery

Abstract - A retained foreign body is a medical error wherein surgical items are inadvertently left in the patient after surgery. In these cases, the patient requires reoperation with high risks of unprecedented death which incurs substantially high medico-legal costs. One of the risk factors observed to be associated with retained foreign bodies is the incorrect count of surgical instruments or sponges used. Modern technologies that have been developed to assist in surgical counts uses handheld scanners and radio frequency identification tags or barcodes embedded on the surgical item. This study proposes a vision-based approach to eliminate the use of handheld scanners and embedded tags on surgical items by employing computer vision with machine learning. In this new approach, the Single Shot Multibox Detector (SSD) with MobileNet is trained to detect common surgical items. The training was done in three iterations, while expanding the dataset on each iteration. Model 1 achieved the highest mean average precision of 87.12% upon evaluation on the test dataset. A surgical counter application was implemented based on the trained object detector and was evaluated on a series of videos. In terms of classification accuracy, model 2 performed better with an accuracy of 49.50%. In implementing the surgical counter application, the hybrid approach of combining object detection and object tracking significantly improved the speed by up to 200% with the fastest fps at 38.39 achieved by model 2.

Paper # 278

Vision Based Hand Tracking System Development for Non-Face-to-Face Interaction

Abstract - Human-computer interaction (HCI) focuses on the interaction between humans and computers and it exists ubiquitously in our daily lives, especially in post COVID era where non-face-to-face interaction is common. Since HCI usually uses a physical controller such as a mouse or a keyboard, it hinders National User Interface, giving a middle ground between the user and the computer. This paper presents a vision based hand tracking system development for non-face-to-face interaction, which aims to improve HCI by being able to track the hand which will act as the pen and functioning as a reusable writing surface for creating texts, drawings, and such as well as removing or erasing using the user's hand as pen, and utilizing Open Computer Vision Library (OpenCV) and Mediapipe. Using the computer's camera the hand will be tracked as the pen for creating basic drawings and handwriting. The vision-based board where the user can draw on and the pen or marker will be the user's hand. The results indicate that this system is accurate enough to be a feasible application for handwriting ad basic drawings.

Paper # 279

A Framework on the Development of an IoT Based Eye Tracking Device: A review study

Abstract - Eye tracking device is a powerful tool and has been used in different fields of study. Eye-tracking can measure the learners' visual attention during a given task to discover and understand the cognitive process of student learning. Existing equipment available in the market is expensive and costs more than \$10,000. This study reviews existing studies and proposes a framework for the development of a low-cost IoT-based eye tracking device that can measure the student's visual behavior while engaging in an online learning platform Canvas. This study can be used by developers of online learning platforms to improve the usability and training of students.

Paper # 280

The Development of a Visual Novel Role-Playing Game [VN RPG] as an Open Educational Resource [OER] for Philippine Literature Educators Administering the "Noli Me Tangere" Module

Abstract - Many scholars saw opportunities of using digital interactive video games as a learning tool during the pandemic. However, it was indeed complex for educators, especially those who teach history-driven novels to prepare lesson plans for classes not only to get the learning outcomes but also to produce high technology materials such as video games. Given the predicament, this study aims to measure the effectiveness of the developed video game genre named 'Touch Me Not' Visual Novel Role-Playing Game (VN RPG) as an Open Education Resource (OER) to educators who teach the novel, Noli Me Tangere or Touch Me Not. To accomplish the proposed objective, the understanding by design approach was analyzed through the administered survey questionnaire, pre-test, and post-test. The findings show that using the 'Touch Me Not' VN RPG to complement the standard class modules had a more significant effect on the educators' performance. Thus, it proved that using VN RPG is an effective complementary pedagogical tool in teaching history-driven classes.

Development of a Multi-Object Detection and Human Tracking System from Cooperative Dual Cameras in an Unmanned Aerial Vehicle

Abstract - Object detection and human tracking are vital for pairing computer vision to a quadrotor. One application for this is monitoring traffic by either classifying vehicles or tracking people through the crowd. This was proven true by the developed system, garnering a detection rate of 77% for various vehicles in the Philippines, and showing the ability to track people on a dual camera system albeit as a proof-of-concept only. Though this can be a potentially huge field for digital image processing, there is still a challenge of creating a fast and responsive application through wireless communication. This study presented a quantitative data when approaching a quadcopter equipped with dual camera system streamed through WiFi connection.



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