IES 2024

Program Book

Shaping the Future:
Society 5.0
and beyond

2024 International Electronics Symposium

6-8 August 2024
Surabaya, Indonesia

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Program Book
2024 International Electronics Symposium (IES)

Politeknik Elektronika Negeri Surabaya - PENS
Surabaya, Indonesia, 6-8 August 2024

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Assalamualaikum Warahmatullahi Wabarakatuh

With great joy and excitement, I extend a heartfelt welcome to all of you as we gather for the landmark 26th edition of the International Electronics Symposium (IES) 2024 from 6-8 August 2024 in the enchanting paradise of Jimbaran, Bali, Indonesia. It fills me with immense pride to witness how this symposium has evolved since its inception in 1998, becoming a beacon of knowledge, innovation, and global collaboration in various realms of technology.

As the Director of Politeknik Elektronika Negeri Surabaya (PENS), I am humbled by the opportunity to host this annual event. This symposium is honored to welcome esteemed keynote and invited speakers from around the world. These luminaries, with their invaluable insights and groundbreaking research, will undoubtedly enrich our understanding of the current technology's potential to create positive impacts on society and individuals.

Beyond the exceptional speakers, IES 2024 continues to be a magnet for numerous scholars who converge to share their expertise and discoveries. This symposium serves as a melting pot of ideas, where boundaries blur, and global collaborations flourish, igniting the spark for revolutionary advancements in technology.

In keeping with our tradition of nurturing knowledge, IES 2024 presents two illuminating tracks of the conference: the International Electronics Symposium on Engineering Technology and Applications (IES-ETA) and the International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC). To deepen the symposium experience, we offer two engaging workshops: the Artificial Intelligence Workshop and the Database Security Workshop. These sessions provide a unique opportunity to delve into the practical aspects of cutting-edge technologies and develop hands-on expertise.

I want to express my sincere appreciation to the reviewers, advisory board, organizing committees, institution partners, sponsors, volunteers, and all those who have contributed to making IES 2024 a reality. Your dedication and support have been instrumental in curating this extraordinary platform for knowledge exchange and transformation.

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I do hope that this symposium will make significant contributions to advancing research, academics, and industries on both national and global scales. I believe that all participants will engage in fruitful technical discussions and find great enjoyment in the symposium.

Welcome to the 26th International Electronics Symposium (IES) 2024!

Wassalamualaikum Warahmatullahi Wabarakatuh

Aliridho Barakbah, Ph.D.
Director of Politeknik Elektronika Negeri Surabaya (PENS)

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Welcome Message from General Chair of IES 2024

Assalamualaikum Warahmatullahi Wabarakatuh

It is my pleasure to welcome you all to the 26th International Electronics Symposium (IES) 2024, held at the Platinum Hotel in Jimbaran, Bali, from August 6th to 8th.

This year's theme is "Shaping the Future: Society 5.0 and Beyond." Since 1998, IES has become a key event where technology experts gather to share knowledge and **innovation. As the chairman of this year's** symposium, I am honored to see such a diverse group of participants and speakers from around the world.

We have two main conference tracks: the International Electronics Symposium on Engineering Technology and Applications (IES-ETA) and the International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC). We are also offering two workshops: one on Artificial Intelligence and another on Database Security. These workshops are designed to provide practical, hands-on experience with the latest technologies.

I want to thank our keynote and invited speakers for their valuable contributions. I also extend my gratitude to the organizing committee, our partners, sponsors, and volunteers who have worked tirelessly to make this event possible.

I hope you all find the sessions insightful and the discussions fruitful. Let's make IES 2024 a great success together.

Thank you for being here. Enjoy the symposium!

Wassalamualaikum Warahmatullahi Wabarakatuh

Warm regards,
Akhmad Alimudin, Ph.D
IES 2024 General Chair

1. Official Language
   The official language of IES 2024 is English. All presentations including Q&A will be delivered in English.

2. Guideline for Participants
   - Conference Venue
     Platinum Hotel, Bali
     Pantai Kedonganan Street No. 91-93, Kuta, Badung - Bali 80361
   - Registration
     Time of Registration: 07.30 - 08.00 Local Time Bali (GMT + 8), Tuesday, 6 August 2024
   - Conference Kit
     Conference kit, which contains name badge, certificate, and official receipt will be provided to participants during check-in at Registration/Information Desk on Tuesday, 6 August 2024.

3. Guideline for Presenters and Session Chair/Moderator
   - The presenters and session chairs are asked to keep to the paper sequence as shown in the Final Program. By following the predefined schedule, participants can switch between sessions without missing the particular papers of interest.
   - The presentation time for each presenter is 15 minutes including Q&A. The session chairs should allow the presenter for a 12 minutes presentation and leave 3 minutes for discussions. All presenters are requested to report their attendance to the session chair 10 minutes before the session begins.
   - Notebook PC and LCD projectors will be available in every session room. Presenters are encouraged to prepare their files in MS Power Point format on a USB and copy into the PC at session room before the session begins. Our session aids will assist the presenters to copy the files. If you wish to use your own notebook PC, please open the file before your presentation.

Maps and Location for IES 2024
Lobby Floor (L FLOOR)

A. Seminar Room
    Room 1   : Titanium 7
    Room 2   : Titanium 8
    Room 3   : Titanium 9

B. Lunch Room
    Resto Hotel

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Maps and Location for IES 2024
Room Floor (R FLOOR)
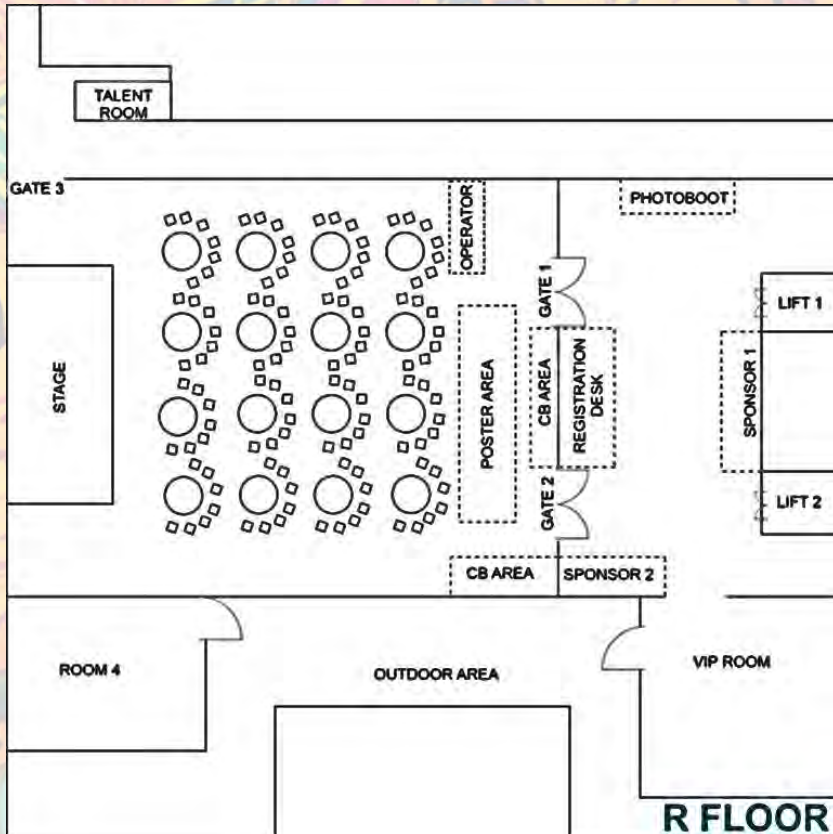
A. Opening Ceremony, Closing Ceremony, and Keynote Speech
Ballroom, Platinum Hotel Bali

B. Seminar Room
Room 4   : Titanium 10

C. Registration and Information
Front Area of Ballroom, Platinum Hotel

Technical Program

Rundown of International Electronics Symposium 2024
Date: 6-8 August 2024
Time Zone: Local Time Bali - WITA (GMT + 8)
Venue: Platinum Hotel, Bali
"Shaping the Future: Society 5.0 and beyond"

Time	Tuesday, August 6th 2024				
07.30 - 07.55	Registration				
07.55 - 08.00	Safety Induction				
08.00 - 08.45	Opening Ceremony Location: Ballroom				
08.45 - 10.00	1st day Keynote Speaker				
	1st Speaker: Prof. Naoki Uchiyama Moderator: Dr. Eng. Bambang Sumantri				
	2nd Speaker: Josefhine Chitra Moderator: Dr. Mike Yuliana				
10.00 - 10.30	Coffee Break				
10.30 - 12.30	Workshop Session				
	Room I	Room II	Room III	Room IV	Room V
	Workshop 1			Workshop 2	
12.30 - 13.30	Lunch Location: Hotel Restaurant				
13.30 - 15.15	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
15.15 - 15.30	Coffee Break				
15.30 - 16.45	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
17.45 - 20.00	Gala Dinner (Invitation Only)				

Note:
Room I   : Titanium 7
Room II : Titanium 8
Room III : Titanium 9
Room IV : Titanium 10
Room V : virtual room

Time	Wednesday, August 7th 2024				
08.30 - 09.00	Registration				
09.00 - 10.30	2nd day Keynote Speaker Location: Ballroom				
	1st Speaker: Prof. Dedid Cahya Happyanto Moderator: Dr. Ferry Astika Saputra				
	2nd Speaker: Prof. Hiroo Iwata Moderator: Moch. Zen Samsono Hadi, Ph. D.				
10.30 - 11.00	Coffee Break				
11.00 - 12.30	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
12.30 - 14.00	Lunch Location: Hotel Restaurant				
14.00 - 15.45	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
16.15 - 17.30	Closing Ceremony (Best Paper Award) Location: Ballroom				
17.30 - 18.00	Coffee Gathering				

Note:
Room I   : Titanium 7
Room II   : Titanium 8
Room III : Titanium 9
Room IV : Titanium 10
Room V   : virtual room

Time	Thursday, August 8th 2024
07.00 - 07.30	Registration at Platinum Lobby
07.30 - 09.30	Depart from Platinum to Elephant Cave
09.30 - 11.00	1st: Elephant Cave
11.00 - 12.00	Heading to Kintamani
12.00 - 14.00	2nd: Lunch at a Kintamani restaurant while enjoying Batur Lake & Mountain
14.00 - 14.30	Heading to Coffe Platation
14.30 - 15.30	3rd: Luwak Coffee Plantation tour
15.30 - 16.30	Heading to Sanggar Paripurna
16.30 - 17.30	4th: Sanggar Paripurna Balinese Dance and Culture Center
17.30 - 18.30	5th: Dinner while Enjoying Traditional Dance
18.30 - 20.00	Heading Back to Platinum Hotel

Date   :   August 6, 2024
Session   :   1
Location   :   Room 1 (Titanium 7)
Track   :   01. [IES-ETA] Power Engineering and Energy Technology
Moderator   :   Dr. Teguh Hady Ariwibowo

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571036535	Voltage Regulation Optimization of a Modified Seven-Level Packed U-Cell Inverter with Mamdani Fuzzy Logic	Trendy Bryant Jaya Gemilang, Moh. Zaenal Efendi, Novie Ayub Windarko, Faizulddin Ebrahimi and Moch Rafi Damas Abdilla (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1571036784	Thermodynamic Analysis of Battery Thermal Management System in Electric Van for Tropical Climate: A Preliminary Study	Arya Rafi Abrari and Teguh Hady Ariwibowo (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia); Nu Rhahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)
3	14.00 - 14.15	1571026701	Thermal Analysis of Vapor-phase R1234yf flow inside horizontal Helical Discrete Double Inclined Ribs Tubes	Teguh Hady Ariwibowo, Arrad Ghani Safitra and Fachry Yusuf Zakafi (Politeknik Elektronika Negeri Surabaya, Indonesia); Salsabila Adinda Imaniar and Dwi Berninda Pratiwi (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
4	14.15 - 14.30	1571036929	The Effect of Co-Rotating Twin Turbines on Mooring Line Tension in Quad-Spar Tidal Current Power Plant	Sony Junianto and Suci Rindya Kaswarie (Politeknik Elektronika Negeri Surabaya, Indonesia); Wisnu Wardhana (Institut Teknologi Sepuluh Nopember, Indonesia); Wahyu Nur Fadilah, Nu Rhahida Arini and Joke Pratilastiarso (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	14.30 - 14.45	1571026967	Series Double Flyback Converter for Power Factor Correction to Multi-Output Battery Charger Using Fuzzy Logic Controller	Salsabila Nadia Putri (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Moh. Zaenal Efendi and Rachma Prilian Eviningsih (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	14.45 - 15.00	1571039723	Procedure of Structural Analysis on Steam Turbines in Various Loads for Early Fatigue Failure Detection	Nu Rhahida Arini and Fahrunnas (Politeknik Elektronika Negeri Surabaya, Indonesia)
7	15.00 - 15.15	1571025233	Modified Grasshopper Optimization Improved Maximum Power Point Tracking in Partially Shaded Photovoltaic Conditions	Muhammad Alfin Nurhidayat (Politeknik Elektronika Negeri Surabaya & PENS, Indonesia); Moh. Zaenal Efendi and Rachma Prilian Eviningsih (Politeknik Elektronika Negeri Surabaya, Indonesia)

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Date : August 6, 2024
Session : 2
Location : Room 1 (Titanium 7)
Track : 01. [IES-ETA] Power Engineering and Energy Technology
Moderator : Dr. Teguh Hady Ariwibowo

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571025155	Maximum Power Point Tracking on Photovoltaic System Based On Fusion Firefly Algorithm And Fuzzy Logic Controller for Charging Lead Acid Battery	Rizki Amrullah Navi (Electronic Engineering Polytechnic Institute of Surabaya & PENS, Indonesia); Eka Prasetyono, Dimas Okky Anggriawan, Suhariningsih Suhariningsih and Epyk Sunarno (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	15.45 - 16.00	1571039547	IoT-Based Real-Time Energy Monitoring System for ELVIRO EV	Muhammad Rizani Rusli, Gigih Prabowo and Luki Septya Mahendra (Politeknik Elektronika Negeri Surabaya, Indonesia); Ony Qudsi (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Fadli Atma, Moh. Budiono, Era Purwanto, Arman Jaya and Indra Ferdiansyah (Politeknik Elektronika Negeri Surabaya, Indonesia); Syechu Nugraha (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia)
3	16.00 - 16.15	1571025143	Interleaved Buck Converter as Current Regulator for Lithium Ion Battery Charging with Fuzzy Logic Control	Epyk Sunarno, Suhariningsih Suhariningsih, Eka Prasetyono, Mochamad Ari Bagus Nugroho and Rachma Prilian Eviningsih (Politeknik Elektronika Negeri Surabaya, Indonesia); Royan Falaqun Nizar (Politeknik Elektronika Negeri Surabaya & PENS, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	16.15 - 16.30	1571036945	Grey Wolf Optimizer-Based Optimal Inner Loop Control and SRF-PLL for Grid Tie Inverter Under Low Frequency Oscillation	Ony Qudsi, Endro Wahjono, Gigih Prabowo, Era Purwanto, Syechu Nugraha, Muhammad Rizani Rusli and Arman Jaya (Politeknik Elektronika Negeri Surabaya, Indonesia); Fifi Hesty Sholihah (University of Portsmouth, United Kingdom (Great Britain) & Politeknik Elektronika Negeri Surabaya, Indonesia); Fadli Atma (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	16.30 - 16.45	1571036905	Evaluating the Effects of Constant Current C Rates on Li-Ion Battery State of Health and Charging Efficiency	Syechu Nugraha, Gigih Prabowo, Era Purwanto, Endro Wahjono, Ony Qudsi, Muhammad Rizani Rusli and Arman Jaya (Politeknik Elektronika Negeri Surabaya, Indonesia); Fifi Hesty Sholihah (University of Portsmouth, United Kingdom (Great Britain) & Politeknik Elektronika Negeri Surabaya, Indonesia); Arjun Saseno (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date   :   August 6, 2024
Session   :   1
Location   :   Room 2 (Titanium 8)
Track   :   05. [IES-KCIC] Knowledge Base and Engineering
Moderator   :   Dr. Idris Winarno

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571033932	The Combination Of K-Means And A* Methods For Determining The Best Route For Vegetable Sellers	Vincentius Riandaru Prasetyo, Astri Agustina Arius and Daniel Hary Prasetyo (University of Surabaya, Indonesia); Ripto Mukti Wibowo (King AbdulAziz University, Saudi Arabia); Selvia Ferdiana Kusuma (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1571019463	Implementing Crowdsourcing in Smart Government: An IT Perspective Review	Tri Bintang Dewantoro, Lukito Edi Nugroho and Adhistya Erna Permanasari (Universitas Gadjah Mada, Indonesia)
3	14.00 - 14.15	1571036805	Enterprise Architecture in E-Government Application: A Systematic Literature Review	Dewa Ketut Wira Wahyu Mahendra (Gadjah Mada University, Indonesia); Selo Sulistyo and Guntur Dharma Putra (Universitas Gadjah Mada, Indonesia)
4	14.15 - 14.30	1571024642	Creating Feedback to Maintain Motivation when Doing Home Based Exercise Using Pose Estimation: Single Subject Design	Muhammad Firdaus Maulana, Yugo Okamoto and Eri Sato-Shimokawara (Tokyo Metropolitan University, Japan)
5	14.30 - 14.45	1571039138	The Queue System Of Kemlagi Community Health Center Using Decision Tree Method Based On A Website	Agus Thoriqul Mukarrom and Budi Aswoyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Anang Budikarso (PENS, Indonesia); I Gede Puja Astawa and Faridatun Nadziroh (Politeknik Elektronika Negeri Surabaya, Indonesia); Ida Anisah (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia)

No	Time	Paper ID	Paper Title	Authors
6	14.45 - 15.00	1571039745	Setting and Monitoring System for Motors on Rear Axle using Android Automotive Operating System	Elsy Sabrina Ramadini (Politeknik Elektonika Negeri Surabaya, Indonesia); Febby Ronaldo (Politeknik Elektronika Negeri Surabaya & PT. VKTR Teknologi Mobilitas, Indonesia); Dewi Mutiara Sari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
7	15.00 - 15.15	1571036991	Mycobacterium Tuberculosis Detection on Sputum Smear Microscopic Images using Attention-Based Multi-Scale Convolutional Neural Network	Tita Karlita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Fidisa Anindya Pastika and Nana Ramadijanti (Politeknik Elektronika Negeri Surabaya, Indonesia); Ratna Kusumawati (Universitas Airlangga, Indonesia); Riyanto Sigit (Politeknik Elektronika Negeri Surabaya, Indonesia); Heny Yuniarti (Institut Teknologi Sepuluh Nopember & Politeknik Elektronika Negeri Surabaya, Indonesia)

Date   :   August 6, 2024
Session   :   2
Location   :   Room 2 (Titanium 8)
Track   :   - 05. [IES-KCIC] Knowledge Base and Engineering
               - 09. [IES-KCIC] Immersive Technology and Interactive Media
Moderator :   Dr. Idris Winarno

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571037498	Developing Web-Based Application for QR Code Digital Signatures using OpenSSL	Fariz Bagaskoro Muzakkir, Haryadi Amran Darwito and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	15.45 - 16.00	1571035742	Comprehensive Risk Evaluation Model for Data Center Security Risk Assessment	Sayed Shoaib S Hussaini (Bandung Institute of Technology & AWCC, Indonesia)
3	16.00 - 16.15	1571036186	Motion sickness comparison of 2 XR approaches: camera+screen or hologram on transparent lens (Meta Quest 3 or Microsoft HoloLens 2)	Volodymyr Bondarenko (Dresden Technical University, Germany); Mahdi Attawna and Giang T. Nguyen (Technische Universität Dresden, Germany); Frank H.P. Fitzek (Technische Universität Dresden & ComNets - Communication Networks Group, Germany)
4	16.15 - 16.30	1571039594	Interactive Augmented Reality Simulation to Stimulate Children in Learning Robotics Arm Behaviour	Hestiasari Rante, Moh. Zikky and Muhammad Fauzan Arief (Politeknik Elektronika Negeri Surabaya, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Dwi Susanto and Zakha Maisat Eka Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Youcef Mezouar (Université Clermont Auvergne, France); David Hill (LIMOS, France)
5	16.30 - 16.45	1571037243	Analyzing Bloom's Taxonomy to Interactions in Virtual Reality Application for Education	Hestiasari Rante, Muhammad Agus Zainuddin, Zacky Maulana Achmad, Khairunnisa' Sekar Ramadhanti and Cahyo Arissabarno (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : August 6, 2024
Session : 1
Location : Room 3 (Titanium 9)
Track : - 04. [IES-ETA] Robotics Technology and Control Systems
- 06. [IES-KCIC] Computational Intelligence
Moderator : Dr. Bima Sena Bayu D

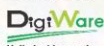| No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571037133	Fuzzy Logic Implementation to Improve the Accuracy of Ball Shoots on ERSOW's Soccer Robot	Iwan Kurnianto Wibowo, Muhamad Tri Wahyudi, Adytia Darmawan, Indra Adji Sulistijono, Febrian Tirto Wicaksono and Rahmat Sholikhin Firdaus (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1571032563	Fast Foothold Planning for Quadruped Robot Locomotion using Topological Perception	Azhar Aulia Saputra (Tokyo Metropolitan University, Japan); Masaya Shoji (ROBOTIS Co., Ltd. & Advanced Institute of Industrial Technology / Tokyo Metropolitan University, Japan); Fernando Ardilla (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Naoyuki Kubota (Tokyo Metropolitan University, Japan)
3	14.00 - 14.15	1571039737	Dynamic Analysis on Forklift AGV with Center Of Gravity Method	Mohamad Nasyir Tamara (Politeknik Elektronika Negeri Surabaya & EEPIS, Indonesia)
4	14.15 - 14.30	1571037334	Design and Implementation of an Automatic Docking System on PENSHIP Roboboat	Muhammad Fauzi, Adytia Darmawan and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	14.30 - 14.45	1571034667	Compact and Lightweight Foldable Umbrella Heatshield for CanSat-Scale Planetary Probes Lander Mission	Zulfikar Davbi Mahendra Fasya and Hendhi Hermawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Nofria Hanafi (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Muhammad Reza Pratama, Artaka Sunu Adhi Prasetya and Muhammad Fahrizal (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
6	14.45 - 15.00	1571024997	Stroke Disease Classification Using CT Scan Image with Vision Transformer Method	Alfian Prisma Yopiangga (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Nur Sakinah (Politeknik Negeri FakFak, Indonesia)
7	15.00 - 15.15	1571037046	Seat Occupancy Detection in Electric Vehicles: Unveiling Passenger Presence through Overlap Area Analysis	Alivia Haris (Politeknik Elektronika Negeri Surabaya, Indonesia); Alfan Rizaldy Pratama (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)

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Date   :   August 6, 2024
Session   :   2
Location   :   Room 3 (Titanium 9)
Track   :   06. [IES-KCIC] Computational Intelligence
Moderator :   Dr. Bima Sena Bayu D

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571025093	Prediction of Length of Stay in Hospital Using Hyperparameter Optimization in the Convolutional Neural Networks Method	Muh. Arga Swara Iskandar (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
2	15.45 - 16.00	1571037329	Performance Evaluation of YOLO-Based Deep Learning Models for Real-Time Armour Unit Detection with Image Pre-processing Method	Firmansyah Putra Pratama (Politeknik Elektronika Negeri Surabaya, Indonesia); Alfan Rizaldy Pratama (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Dewi Mutiara Sari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Bayu Sandi Marta (Politeknik Elektronika Negeri Surabaya, Indonesia); Haryo Dwito Armono (Institut Teknologi Sepuluh Nopember, Indonesia)
3	16.00 - 16.15	1571037076	Implementation of YOLO Algorithm on Raspberry Pi for Automated PCB Quality Inspection	Imaduddin Abdul Ghany and Zaqiatud Darojah (Politeknik Elektronika Negeri Surabaya, Indonesia); Nunik Hariadi Putri (Surabaya State Electronics Polytechnic, Indonesia); Adytia Darmawan and Novian Fajar Satria (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	16.15 - 16.30	1571037097	Hybrid LSTM - SVM Method for Harvesting Prediction in Densely Populated Paddy Fields	Ahmad Miqdad (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina and Aries Pratiarso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
5	16.30 - 16.45	1571039412	Estimation of Rice Field Area Using YOLO Method to Support Smart Agriculture System	Zenino Ega Maretanio and Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina and Aries Pratiarso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
6	16.45 - 17.00	1571037138	Classifying Personality Traits from Text Data: A Machine Learning Approach Using Stochastic Gradient Descent for Simplified Jungian Typology-Based Assessment Tool	Tri Hadiah Muliawati (Politeknik Elektronika Negeri Surabaya, Indonesia); Tirta Rumy Swandaru (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya - Indonesia, Indonesia); Iqbal Bimantoko (Community Health Center Balas Klumprik Surabaya, Indonesia)

Date : August 6, 2024
Session : 1
Location : Room 4 (Titanium 10)
Track : 07. [IES-KCIC] Applied-Computing Sciences
Moderator : Prof. M. Udin Harun Al Rasyid

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571005620	Prototype of Monitoring and Automation Systems of the Furnace in the Fire Laboratory	Unan Y Oktiawati (Universitas Gadjah Mada, Indonesia); Muhammad Nur Fajri Alfata (Ministry of Public Works and Housing, Indonesia)
2	13.45 - 14.00	1571024700	Implementation of Dynamic Art Curation Engine in Global Art Collection Archive	Yosuke Tsuchiya (Musashino University & Ishibashi Foundation, Japan); Naoki Ishibashi (Musashino University, Japan)
3	14.00 - 14.15	1571037089	Portable Device for Supporting Fertilizer Recommendation System in Smart Agriculture	Rara Widya Paramartha Hapsari and Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
4	14.15 - 14.30	1571037280	Implementation of Face Recognition Using Deep Metric Learning for Automatic Door Openers	Muhammad Zaid Abdillah and M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Riyanto Sigit (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	14.30 - 14.45	1571039520	Implementation of Automatic Proctoring in Online Exam System	Akhmad Alimudin and Wiratmoko Yuwono (Politeknik Elektronika Negeri Surabaya, Indonesia); Widi Sarinastiti (Electronic Engineering Polytechnic Institute of Technology, Indonesia); Aliv Faizal Muhammad (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Idris Winarno and Rachmat Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia); Citra Murdaningtyas (Electronic

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No	Time	Paper ID	Paper Title	Authors
				Engineering Polytechnic Institute of Surabaya, Indonesia); Muhajirin Ida Ilyas (Politeknik Elektronika Negeri Surabaya, Indonesia & PT. Digital Entropy Venture, Indonesia); Muhammad Reza Muktasib (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	14.45 - 15.00	1571037055	Heart Disease Detection from PSAX Echocardiography View using Ultrasound Portable Based on Machine Learning Method	Jovan Josafat Jaenputra, Riyanto Sigit and Tri Harsono (Politeknik Elektronika Negeri Surabaya, Indonesia); Abraham Ahmad Ali Firdaus (Universitas Nahdlatul Ulama Surabaya, Indonesia)
7	15.00 - 15.15	1571036565	Dengue Fever Vulnerability Prediction Using Integrated Moving Average - Hierarchical Clustering	Silfiana Nur Hamida (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Arif Basofi (Politeknik Elektronika Negeri Surabaya, Indonesia)

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Date : August 6, 2024
Session : 2
Location : Room 4 (Titanium 10)
Track : 07. [IES-KCIC] Applied-Computing Sciences
Moderator : Prof. M. Udin Harun Al Rasyid

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571039630	Cutlery Detection System With Camera and Yolov5	Gita Agraini Manullang, Setiawardhana Setiawardhana and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	15.45 - 16.00	1571037166	Bidirectional Long Short-Term Memory Method for Weather Prediction in Terms of Evacuation of River Drifting Victims	Arin Kusuma Wardani (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia); Aries Pratiarso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
3	16.00 - 16.15	1571039736	A Cloud-Centric Application for Elderly Heart Disease Detection with Machine Learning and Confusion Matrix	Rafly Arief Kanza (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); Budi Utomo and Shifa Fauziah (Universitas Airlangga, Indonesia); Grezio Arifiyan (Institut Teknologi Sepuluh Nopember & Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.15 - 16.30	1571037914	Exploring Crowdsourced Data Validation Methods for Flood Mitigation: A Comprehensive Review	Widi Sarinastiti (Electronic Engineering Polytechnic Institute of Technology, Indonesia); Rengga Asmara and Ashafidz Dianta (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1571025036	Dynamic Voltage Restorer With Direct AC-AC Controller Using H-Bridge Bidirectional Switch Topology to Mitigate Voltage Sag and Swell	Pangestu Nugroho (Politeknik Elektronika Negeri Surabaya & PENS, Indonesia); Dimas Okky Anggriawan, Mochamad Ari Bagus Nugroho, Eka Prasetyono and Epyk Sunarno (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1571028054	Detection of Series AC Arc Fault Based on Continuous Wavelet Transform and Artificial Neural Network Under Voltage Variation Disturbances	Dimas Okky Anggriawan (Institut Teknologi Sepuluh Nopember); Ardyono Priyadi (ITS, Indonesia); Margo Pujiantara (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
3	11.30 - 11.45	1571027386	Design and Implementation Mountaineering Team-Based Optimization Algorithm for MPPT on Partial Shading Conditions	Rifqi Noviantono Prakoso, Moh. Zaenal Efendi and Muhammad Nizar Habibi (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.45 - 12.00	1571039582	Airfoil profile modification base on Bezier Curve and Optimization using PSO	Mochammad Arif Fatchulloh and Nu Rhahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	12.00 - 12.15	1571024999	A Thermal Investigation of heat sink with dimple in Battery Cooling for Electric Motorbike Application	Muhammad Aghist Fitrony, Teguh Hady Ariwibowo, Muhammad Rizani Rusli and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)

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Date   :   August 7, 2024
Session   :   2
Location   :   Room 1 (Titanium 7)
Track   :   03. [IES-ETA] Telecommunication Engineering Technology
Moderator :   Prof. Amang Sudarsono

No	Time	Paper ID	Paper Title	Authors
1	14.00 - 14.15	1571019952	Time-Frequency Analysis and Setting Motion Activity Detection of Volleyball Motion Signals for Set-Play Classification	Gregory Lou V. Parcon (De La Salle University, Philippines); Ronald M. Pascual (De La Salle University & FEU-East Asia College, Philippines)
2	14.15 - 14.30	1571039321	Reliability Study of TDoA-based Emission Localization in Using Simple RTL-SDRs	Titon Dutono, Nur Achmad Junaedi, Tri Budi Santoso, Rini Satiti, Paramita Wahyu Eka Lestari and Nur Audra Irsyad (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.30 - 14.45	1571037149	Performance Analysis of Terrestrial Radio Signal Receiver Using RTL-SDR GNU Radio Based on Raspberry Pi	Citra Ati Finalis and I Gede Puja Astawa (Politeknik Elektronika Negeri Surabaya, Indonesia); Budi Aswoyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Faridatun Nadziroh (Politeknik Elektronika Negeri Surabaya, Indonesia); Anang Budikarso (PENS, Indonesia); Ida Anisah (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia)
4	14.45 - 15.00	1571039693	Performance Analysis of Physical Layer Key Generation (PLKG) Scheme in Static Environment-based LoRa	Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia); Aodry Ardhana (Politeknik Elektronika Negri Surabaya, Indonesia); Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Bambang Sumantri (Politeknik Elektronika Negeri Surabaya, Indonesia)

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No	Time	Paper ID	Paper Title	Authors
5	15.00 - 15.15	1571039640	Performance Analysis of ADSB Signal Receiver SDR for Low Cost ADSB Mini Radar	Hadid Malik and I Gede Puja Astawa (Politeknik Elektronika Negeri Surabaya, Indonesia); Budi Aswoyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Anang Budikarso (PENS, Indonesia); Ida Anisah (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia); Faridatun Nadziroh (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	15.15 - 15.30	1571037339	Combining Clipping and Channel Coding for Effective PAPR Reduction in OFDM System with GNU Radio-USRP	Aliefia Ningtyas Tuti, I Gede Puja Astawa and Faridatun Nadziroh (Politeknik Elektronika Negeri Surabaya, Indonesia); Anang Budikarso (PENS, Indonesia); Budi Aswoyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Melki Mario Gulo (Politeknik Elektronika Negeri Surabaya, Indonesia)
7	15.30 - 15.45	1571036348	An Efficient Authentication System to Access Electric Vehicle Data in The Cloud Based on Identity Role-based Access Control	Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Rahardhita Sudibyo, Idris Winarno and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia)

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No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1571038270	Smart Cat Litter Box with Ammonia Gas Level Controller using IoT-Based Fuzzy Logic	Ali Suhud (Politeknik Elektronika Negeri Surabaya, Indonesia); Nofria Hanafi (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Didik Purnomo (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1571037346	Rapid Goalpost Detection through Candidate Generation and Hough Transform in Humanoid Soccer Robots	Shalahuddin Aditya Aji, Erlangga Yudi Pradana, Muhammad Amir Abdulrrozaq and Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Endra Pitowarno (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Aris Sudaryanto, AS (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.30 - 11.45	1571037132	Precise Long Passing Skill on Middle Size League Robot Soccer ERSOW Using Teammate Detection and Pivot Motion	Rohman Aditiya, Mochamad Mobed Bachtiar, Iwan Kurnianto Wibowo, Dana Yoga Setya Ikhwandi, Febrian Tirto Wicaksono and Septian Bagus Jumantoro (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.45 - 12.00	1571037342	Optimizing YOLOv8 for Real-Time Performance in Humanoid Soccer Robots with OpenVINO	Erlangga Yudi Pradana, Shalahuddin Aditya Aji and Muhammad Amir Abdulrrozaq (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember Surabaya, Indonesia); Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Endra Pitowarno (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	12.00 - 12.15	1571037172	Integrating LiDAR-Based Collision Avoidance on AMR-T for Advancing Operational Safety	Riska Amalia Nurjanah and Dedid Cahya Happyanto (Politeknik Elektronika Negeri Surabaya, Indonesia); Ardik Wijayanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)
6	12.15 - 12.30	1571037295	Integrated Footstep Planning and CoM Control for Enhanced Stability and Maneuverability in EROS Humanoid Robot	Teuku Zikri Fatahillah, Bianca Surya Nobelia and Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember Surabaya, Indonesia); Erlangga Yudi Pradana (Politeknik Elektronika Negeri Surabaya, Indonesia); Candra Kusuma Wijaya (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)

Date   :   August 7, 2024
Session   :   2
Location   :   Room 2 (Titanium 8)
Track   :   06. [IES-KCIC] Computational Intelligence
Moderator   :   Dr. Selvia Ferdiana Kusuma

No	Time	Paper ID	Paper Title	Authors
1	14.00 - 14.15	1571024973	YOLOv8-Based Segmentation and 3D Reconstruction of Alveolar Bone and Mandibular Canal in CBCT Images	Mohammad Farid Naufal (Universitas Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Chastine Fatichah (Institut Teknologi Sepuluh Nopember, Indonesia); Eha Renwi Astuti and Ramadhan Hardani Putra (Universitas Airlangga, Indonesia)
2	14.15 - 14.30	1571025044	Multi Stage Vision Transformer for Batik Classification	Novendra Setyawan (University of Muhammadiyah Malang, Indonesia); Mas Nurul Achmadiah (State Polytechnic of Malang, Indonesia); Chi-Chia Sun (National Taipei University, Taiwan); Kuo Wen-Kai (National Formosa University, Taiwan)
3	14.30 - 14.45	1571037094	Fast Person Detection Using YOLOX With AI Accelerator For Train Station Safety	Mas Nurul Achmadiah (State Polytechnic of Malang, Indonesia); Novendra Setyawan (University of Muhammadiyah Malang, Indonesia); Achmad Arif Bryantono (National Formosa University, Taiwan); Chi-Chia Sun (National Taipei University, Taiwan); Kuo Wen-Kai (National Formosa University, Taiwan)
4	14.45 - 15.00	1571025119	Whale Optimization Algorithm-Based Feature Selection for Enhanced Melanoma Diagnosis	Rahmadwati Rahmadwati and Aiman Muhamad Basymeleh (University of Brawijaya, Indonesia); Panca Mudjirahardjo (Universitas Brawijaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	15.00 - 15.15	1571037017	Design and Implementation of a Radar-Camera Fusion System for Human Detection and Its Distance Measurement	Indra Putra Mahayuda (Politeknik Elektronika Negeri Surabaya, Indonesia); Alfan Rizaldy Pratama (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
6	15.15 - 15.30	1571039324	Cloud-Based Weather Prediction for Agricultural Land Using NeuralProphet	Mefita Ayu Kusumaningtyas, Mochammad Zen Samsono Hadi and Nihayatus Sa'adah (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : August 7, 2024
Session : 1
Location : Room 3 (Titanium 9)
Track : 02. [IES-ETA] Electronics Systems and Electrics Technology
Moderator : Dr. Ferry Astika Saputra

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1571039746	Nutritional Status Monitoring System Based on Antropometric to Support Society 5.0	Alfenia Nikmah, Okkie Puspitorini, Nur Siswandari and Ari Wijayanti (Politeknik Elektronika Negeri Surabaya, Indonesia); Arifin Arifin (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
2	11.15 - 11.30	1571039596	Ninety days of observation on the metal electrodes of a salinity sensor for vannamei shrimp farming purposes	Muhamad Aldino Habibulloh (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Taufiqurrahman Taufiqurrahman and Muhammad Wafiq Kamaluddin (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.30 - 11.45	1571039624	Implementation of Chicken Eggs Fertility Detection Device Using SSD MobileNet-V2 FPNLite	Habibi Ahmadi Muslim (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Hary Oktavianto and Rusminto Tjatur Widodo (Politeknik Elektronika Negeri Surabaya, Indonesia); Elly Purwantini (Lecturer, Indonesia); Wahjoe Tjatur Sesulihatien (Keio University & Politeknik Elektronika Negri Surabaya, Japan)
4	11.45 - 12.00	1571025222	Experimental Approach for the Performance of a CanSat Module Based on Environmental Testing	I Made Nugi Edwika Ariwigangga (Politeknik Elektronika Negeri Surabaya, Indonesia); Nofria Hanafi (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Didik Purnomo (Politeknik Elektronika Negeri Surabaya, Indonesia); Hendhi Hermawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

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No	Time	Paper ID	Paper Title	Authors
5	12.00 - 12.15	1571038532	Design Of Underwater Vehicle Balance System Using Inertial Measurement Unit (IMU) Sensor	Mohamad Alwi Abdillah, Arrad Ghani Safitra and Adytia Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	12.15 - 12.30	1571030893	Radiation-hardened programmable two-phase clock generator	Minoru Watanabe (Okayama University, Japan)

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Date : August 7, 2024
Session : 2
Location : Room 3 (Titanium 9)
Track : - 02. [IES-ETA] Electronics Systems and Electrics Technology
- 03. [IES-ETA] Telecommunication Engineering Technology
Moderator : Moch. Zen Samsono Hadi, Ph.D

No	Time	Paper ID	Paper Title	Authors
1	14.00 - 14.15	1571039774	Design and Implementation of Passive Autofocus Control System for Contrast Detection in Tuberculosis Microscopy Images	Heny Yuniarti (Institut Teknologi Sepuluh Nopember & Politeknik Elektronika Negeri Surabaya, Indonesia); Chastine Fatichah (Institut Teknologi Sepuluh Nopember, Indonesia); Riyanto Sigit and Ahmad Fadel Aminata (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	14.15 - 14.30	1571037244	Accident Posture Reconstruction and Analysis of a Purposed Vehicle Event Data Recorder	I Made Aditya Rama, Putra (Politeknik Elektronika Negeri Surabaya, Indonesia); Endra Pitowarno (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Zaqiatud Darojah (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.30 - 14.45	1571039696	A Study of Mechanical Characteristics of Lubricant Oil Based on the Vehicle Mileage Using Ultrasonic Waves	Wahyu Rifki Prayoga (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Ardik Wijayanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)
4	14.45 - 15.00	1571037282	6-Lead ECG Monitoring System for Recording Cardiac Activity Using Pan-Tompkins Algorithm	Raden Septiaji Dwilakso Utomo and Mochammad Rochmad (Politeknik Elektronika Negeri Surabaya, Indonesia); Rika Rokhana (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia)

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No	Time	Paper ID	Paper Title	Authors
5	15.00 - 15.15	1571037446	Deep Learning based Channel Reciprocity Technique for Secret Key Generation	Dewi Cahyo Wulandari and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia); Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
6	15.15 - 15.30	1571037157	A Crop Recommendation System for Smart Agriculture Using Random Forest Method	Bagas Aji Tifanto, Mochammad Zen Samsono Hadi and Nihayatus Sa'adah (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date   :   August 7, 2024
Session   :   1
Location   :   Room 4 (Titanium 10)
Track   :   06. [IES-KCIC] Computational Intelligence
Moderator   :   Dr. Idris Winarno

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1571025031	Developing Early Warning Score With Structured Methodology Using Decision Trees Based On Patients' Clinical Data	Putri Ayu Nisa Az Zahra (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Selvia Ferdiana Kusuma (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1571037129	Convolutional Neural Network Implementation with MobileNetV2 Architecture for Indonesian Herbal Plants Classification in Mobile App	Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya - Indonesia, Indonesia); Nana Ramadijanti and Irfan Hanif Khoiru Rijal (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.30 - 11.45	1571039304	Comparison of LSTM, RNN, and GRU Methods in Predicting Water Quality in the Totality Integrated Smart Aquaculture System	Santi S and Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Fitrah Maharani Humaira (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.45 - 12.00	1571025193	A Comparative Study of GRU and LSTM Time-Series Forecasting for Precise River Dam Hydrodynamic Prediction	Muhammad Arya Izzulhaq (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Rusminto Tjatur Widodo and Hary Oktavianto (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	12.00 - 12.15	1571025048	Classification of Intracranial Hemorrhage Based on Ct-Scan Image with Vision Transformer (ViT) Method	Muhammad Nur Faiz (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Selvia Ferdiana Kusuma (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
6	12.15 - 12.30	1571024989	Building Early Warning Scores with Statistical-Based Structured Methods on Patient Clinical Data	Setyo Aryo Pangestu and Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Rosiyah Faradisa (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date   :   August 7, 2024
Session   :   2
Location   :   Room 4 (Titanium 10)
Track   :   - 06. [IES-KCIC] Computational Intelligence
               - 07. [IES-KCIC] Applied-Computing Sciences
Moderator :   Prof. Iwan Syarif

No	Time	Paper ID	Paper Title	Authors
1	14.00 - 14.15	1571037110	Automatic Classification of Lung Disease Based on Chest X-Ray Images Using CNN with Comparing Batch Normalization	Mega Putri Rahmawati Darta and Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia); Tita Karlita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
2	14.15 - 14.30	1571039768	A Comparative Study of Machine Learning Algorithms for Classifying Personality Type based on Carl Jung's Cognitive Function	Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya - Indonesia, Indonesia); Tirta Rumy Swandaru (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Tri Hadiah Muliawati (Politeknik Elektronika Negeri Surabaya, Indonesia); Iqbal Bimantoko (Community Health Center Balas Klumprik Surabaya, Indonesia)
3	14.30 - 14.45	1571037095	East Java Rivers Characterization Using Analytical Hierarchical Clustering on Supporting Disaster Management System	Annisa Rassya Azzahra (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Nihayatus Sa'adah (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	14.45 - 15.00	1571037209	Early Detection and Classification of Cataracts Using Smartphone Imagery Based on Support Vector Machine (SVM) and Certainly Factor Methods	Tegar Dzul Fikri and Riyanto Sigit (Politeknik Elektronika Negeri Surabaya, Indonesia); Dewi Mutiara Sari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Dyah Purwita Trianggadewi (Rumah Sakit Islam Jombang, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	15.00 - 15.15	1571038373	Distributed Aerial 3D Object Mapping Reconstruction Using Message Passing Interface	Cahyo Arissabarno, Idris Winarno and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	15.15 - 15.30	1571037098	Drowning Victims Detection and River Classification Using Deep Learning Methods	Nur Laila Novianti (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia)

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Date   :   August 6, 2024
Session   :   1
Location   :   Zoom 1 (https://tinyurl.com/ConferenceIES24)
               Meeting ID915 7995 0289
               Passwordies2024
Track   :   - 02. [IES-ETA] Electronics Systems and Electrics Technology
               - 03. [IES-ETA] Telecommunication Engineering Technology
               - 07. [IES-KCIC] Applied-Computing Sciences
Moderator :   Dr. Mike Yuliana

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571025078	Sentiment Analysis of Nuclear Power Plant and Nuclear Science in Indonesia Based on Platform X Using BERT, VADER, and TextBlob Methods	Halim Hamadi, Risqi Berliana Rahmantari, Aditia Pawaid, Naufal Avicena Taufiq and Muhammad Rizky Farhan (Polytechnic Institute of Nuclear Technology Indonesia, Indonesia); Aleksey G. Goryunov (National Research Tomsk Polytechnic University, Russia)
2	13.45 - 14.00	1571037544	Drug-Target Interactions Prediction Using Stacking Ensemble Learning Approach	Viko Pradana Prasetyo and Wiwik Anggraeni (Institut Teknologi Sepuluh Nopember, Indonesia)
3	14.00 - 14.15	1571001092	Smart Aquaponics with Automatic Sensors Cleaning for Zero Waste Integrated Farming System using Internet of Things	Zainul Abidin (Universitas Brawijaya, Indonesia); Atha Darari Putra, Akhmad Zainuri and Eka Maulana (Brawijaya University, Indonesia)
4	14.15 - 14.30	1571008806	IoT and Electronic System Solution for Failed Parcel Delivery Attempts	Christian Romar I. Teodosio and Febus Reidj G. Cruz (Mapua University, Philippines)
5	14.30 - 14.45	1571023663	Comparative Performance Evaluation of Line Coding Schemes for Uplink Transmission in Single and WDM Channels FSO-HAP Systems Across Varied Altitude and Weather Scenarios	Valerie Olive Suryono (Universitas Indonesia, Indonesia); Yus Natali (Universitas Telkom, Indonesia); Catur Apriono (Universitas Indonesia, Indonesia)

No	Time	Paper ID	Paper Title	Authors
6	14.45 - 15.00	1571025169	Web Chat-based Application with Large Language Model and Transformers from Hugging Face for Self-Learning on Storytelling Skills	Victoria Agatha and Iwan Setyawan (Satya Wacana Christian University, Indonesia)
7	15.00 - 15.15	1571025177	Utilizing long short-term memory for precipitable water vapor prediction over the southern Philippine region	Christian David C. Aquino and Ernest P Macalalad (Mapúa University, Philippines); Joseph Bryan Ibarra (Mapua Institute of Technology, Philippines)

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571039784	Dynamic Priority Approach for Unit Commitment Scheduling Solution	Fiqqih Faizah (Institut Teknologi Sepuluh Nopember, Indonesia); Rifdian Indrianto Sudjoko (Institut Teknologi Sepuluh Nopember & Politeknik Penerbangan Surabaya, Indonesia); Mat Syaiin (Politeknik Perkapalan Negeri Surabaya / Shipbuilding Institute of Polytechnic Surabaya, Indonesia); Adi Soeprijanto (Institut Teknologi Sepuluh Nopember, Indonesia)
2	15.45 - 16.00	1571033393	An Improvement GWO-P&O Algorithm Based MPPT for PV System under Partial Shading Condition	Nur Fadliah Baso (Sepuluh Nopember Institute of Technology, Indonesia); Heri Suryoatmojo and Daniar Fahmi (Institut Teknologi Sepuluh Nopember, Indonesia); Novie Ayub Windarko (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	16.00 - 16.15	1571038564	DC-Link Capacitor Design in Neutral Point Clamped Multilevel Inverter Utilizing Ripple Current Analysis and DC-DC Converter Control	Fifi Hesty Sholihah (University of Portsmouth, United Kingdom (Great Britain) & Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.15 - 16.30	1571037319	Predictive Modelling of Gas Turbine Emissions based on Generalized Regression Neural Network Method Approach	Rudy Winarto (Sepuluh Nopember Institute of Technology, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia); Wiwik Anggraeni (Institut Teknologi Sepuluh Nopember, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	16.30 - 16.45	1571025097	Path Planning for 4-Wheeled Omnidirectional Cellular Conveyor using Q-Learning Algorithm	Syamsiar Kautsar (Sepuluh Nopember Institute of Technology); Aulia Siti Aisjah (Institut Teknologi Sepuluh Nopember, Indonesia); Mat Syaiin (Politeknik Perkapalan Negeri Surabaya / Shipbuilding Institute of Polytechnic Surabaya, Indonesia); Katherin Indriawati (Institut Teknologi Sepuluh Nopember Surabaya & Faculty of Industrial Technology, Indonesia); Totok Biyanto (ITS Surabaya, Indonesia)
6	16.45 - 17.00	1571035452	The Application of Monte Carlo Simulation to Assess the Value at Risk in Cryptocurrency	Nila Astiti (BINUS Business School, Bina Nusantara University, Indonesia); Dicky Hida Syahchari (BINUS University, Indonesia)

Date   :   August 6, 2024
Session   :   1
Location   :   Zoom 2 (https://tinyurl.com/ConferenceIES24)
                Meeting ID915 7995 0289
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Track   :   - 05. [IES-KCIC] Knowledge Base and Engineering,
                - 06. [IES-KCIC] Computational Intelligence
Moderator   :   Dr. Selvia Ferdiana Kusuma

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1571036943	The Influence of Self-Service Kiosks on Customer Experience in Retail Stores	Albertus Lian Wisastra, Amaganza Engwy Ardiansyah, Berren Arisandy Hermanto and Devyano Luhukay (Bina Nusantara University, Indonesia)
2	13.45 - 14.00	1571025248	Securing the Privacy of Transactions Using Blockchain: Swap Battery Framework for Massive Subsidy Electric Motorcycle in Jakarta	Tanzi Mubaroq Santoso (National Research and Innovation Agency, Indonesia); Shelvie Nidya Neyman (IPB University, Indonesia); Didi Rosiyadi, Karina Mayasita Handoyo, Topan Try Harmanda, Fajaryan Wijananto, Aan Khunaifi, Yosi Sahreza and Muhammad Rafi Juliansyah (National Research and Innovation Agency, Indonesia)
3	14.00 - 14.15	1571039780	Comparative Analysis and Optimization of Deep Learning Models for Object Detection Using Grid Search Hyperparameter Tuning	Arasy Dafa Sulistya Kurniawan, Yoga Imanda Purnama and Ardian Bagus Wicaksono (Politeknik Elektronika Negeri Surabaya, Indonesia); Haniah Mahmudah (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia)
4	14.15 - 14.30	1571036910	Geographical Mapping and Knowledge base Indicative Cost Estimation for Direct Air Capture CO2 Utilization	Tomoyuki Tateno (Musashino University, USA); Naoki Ishibashi and Yasushi Kiyoki (Musashino University, Japan)

No	Time	Paper ID	Paper Title	Authors
5	14.30 - 14.45	1571039418	The Impact of Accountants' Perceptions of Technology Readiness and Competitive Intensity on Technology Adoption	Shindy Sulastri Br Ginting and Anderes Gui (Bina Nusantara University, Indonesia); Kevin Deniswara (Bina Nusantara University & Doctor of Research in Management, Bina Nusantara University, Indonesia)
6	14.45 - 15.00	1571037180	Resampling Effects on Imbalanced Data in Network Intrusion Classification	Fayruz Rahma (Institut Teknologi Sepuluh Nopember, Indonesia); Mahesa Cadi Rajasa (Universitas Islam Indonesia, Indonesia); Reza Fuad Rachmadi and Baskoro Adi Pratomo (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
7	15.00 - 15.15	1571024884	Plant Health and Severity Recognition System for Pechay (Brassica rapa ssp. chinensis) Using Convolutional Neural Network	Carlos Dwain L. Sorallo, Eric John M. Jabal and Jessie R. Balbin (Mapua University, Philippines)

Date   :   August 6, 2024
Session   :   2
Location   :   Zoom 2 (https://tinyurl.com/ConferenceIES24)
                Meeting ID915 7995 0289
                Passwordies2024
Track   :   - 06. [IES-KCIC] Computational Intelligence
                - 07. [IES-KCIC] Applied-Computing Sciences
                - 08. [IES-KCIC] Intelligent Multimedia Systems
Moderator   :   Dr. Selvia Ferdiana Kusuma

No	Time	Paper ID	Paper Title	Authors
1	15.30 - 15.45	1571039656	E-Commerce Website with 3D Catalog and Product Customization	Andhik Ampuh Yunanto (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Farhan Izzudin Az Zufar and Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Wanvy Arifha Saputra (Politeknik Negeri Banjarmasin, Indonesia); Siska Arifiani (Institut Teknologi Sepuluh Nopember, Indonesia)
2	15.45 - 16.00	1571024886	Herbal Medicine Plant Leaf Identification Device Using ResNet50	Andrew Al C. Aquiro, Shannen L. Arreola and Ramon Garcia (Mapua University, Philippines)
3	16.00 - 16.15	1571039625	CNN Modified Approach for Classifying Cardiomegaly Disease Based on CXR Image	Sri Heranurweni (Institut Teknologi Sepuluh Nopember Surabaya, Indonesia); Ronny Mardiyanto and Eko Mulyanto Yuniarno (Institut Teknologi Sepuluh Nopember, Indonesia); Andi Kurniawan Nugroho (University of Semarang, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
4	16.15 - 16.30	1571024685	Application of AlexNet, EfficientNetV2B0, and VGG19 with Explainable AI for Cataract and Glaucoma Image Classification	Muhammad Fauzi Fayyad (Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia); Mustakim Mustakim (Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia & Puzzle Research Data Technology, Indonesia)

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No	Time	Paper ID	Paper Title	Authors
5	16.30 - 16.45	1571036095	Evaluating the Google English Speaking and Pronunciation Practice Tool	Aliv Faizal Muhammad (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Agus Eko Cahyono (UIN Maulana Malik Ibrahim, Indonesia); Sekta Lonir Oscarini Wati Bhakti and Rahmawati Fitriana Fitri Fitriana (Politeknik Negeri Samarinda, Indonesia); Lady Silk Moonlight (Politeknik Penerbangan Surabaya, Indonesia); Teguh Arifianto (Politeknik Perkeretaapian Indonesia Madiun, Indonesia)
6	16.45 - 17.00	1571039598	Self-checking Corner of Upper Acute Respiratory Infection Disease Using Certainty Factor Method	Zulqhi Fahri Muda (Politeknik Elektronika Negeri Surabaya, Indonesia)

Prof. Naoki Uchiyama
Toyohashi University of Technology

Profile:

Naoki Uchiyama (Member, IEEE) received the associate B.E. degree from Numazu National College of Technology, Shizuoka, Japan, in 1988, and the B.E. and M.E. degrees from Shizuoka University, Shizuoka, Japan, in 1990 and 1992, respectively, and the Ph.D. degree in mechanical engineering from Tokyo Metropolitan University, Tokyo, Japan, in 1995. He was a Visiting Scholar with the University of California at Davis, from 2001 to 2002. Since 1995, he has been with the Department of Mechanical Engineering, Toyohashi University of Technology, Aichi, Japan, where he is currently a Professor. He is a member of IEEE IES, CSS, and RAS.

Further information: https://www.tut.ac.jp/english/schools/faculty/me/14

Prof. Dedid Cahya Happyanto
Politeknik Elektronika Negeri Surabaya

Profile:

Prof. Dr. Ir. Dedid Cahya Happyanto is an esteemed academic and researcher, specializing in the field of Intelligent Control & Electric Vehicle. He was conferred the title of a full professor at the Electronics Engineering Polytechnic Institute of Surabaya (PENS). **Prof. Happyanto's research** and academic pursuits are focused on the development of electric vehicle technology and its integration into smart city infrastructure. He is particularly interested in exploring the use of artificial intelligence in electric vehicles and the implementation of technologies like Internet of Things (IoT) and big data for monitoring and control purposes.

Prof. Happyanto's work is not only academically significant but also has practical implications for the future of transportation and urban living. His vision includes autonomous electric vehicles and their role in reducing pollution and enhancing the quality of life in urban areas. His research and teachings at PENS have significantly contributed to the field, marking him as a leading figure in the development of smart and sustainable transportation solutions.

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Josefhine Chitra
PT. GoTo Gojek Tokopedia

Profile:

Josefhine Chitra is Head of Public Affairs at GoTo **Group. She's been with the company for 6 years.** Previously, she worked at an environmental think-tank, World Resources Institute and a communications consultant, Maverick. She earned **her bachelor's degree in international** relations from **Parahyangan Catholic University and master's** degree in development management from London School of Economics and Political Science.

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Prof. Hiroo Iwata
Musashino University

Profile:

Hiroo Iwata started projects on virtual reality in 1986 at the University of Tsukuba. His research interests include embodied sensations such as haptics and locomotion. He exhibited his work at the Emerging Technologies venue of the SIGGRAPH every year from 1994 to 2007. He was the general chair of the World Haptics Conference 2007 as well as Asia Haptics 2014. He launched the Ph.D. Program in Empowerment Informatics at the University of Tsukuba in 2013. He was the president of the Virtual Reality Society Japan from 2016 to 2019. He retired from the University of Tsukuba in 2023, and moved to the Faculty of Data Science of Mussashino University **where he launched a new project "Data Sensorium". He won** the IEEE 2024 VGTC Virtual Reality Lifetime Achievement Award.

01. [IES-ETA]
Power Engineering and Energy Technology

A Thermal Investigation of Heat Sink with Dimple in Battery Cooling for Electric Motorbike Application

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Abstract –The research addresses environmental and climate change issues by exploring sustainable solutions in electric transportation, specifically electric motorbikes. One of the key challenges in the transition to zero-emission vehicles is the effective management of battery heat. This study examines passive Thermal management of cooling mechanisms: normal heat sink, convex dimpled heat sink, and concave-convex dimpled heat sink, using a numerical approach with computational fluid dynamics (CFD). The battery pack contains 10 LiFePO4 batteries with a heat sink fixed to one side. Air was employed as the working fluid under turbulent flow. The study finds that the battery temperature was reduced slightly using the dimples. The convex-dimpled heat sink outperforms the concave-convex-dimpled heat sink in terms of cooling performance, although the significance of the dimple variation is relatively small. This is caused by convex dimple disrupts the boundary layer and increases heat transfer, while the concave dimple creates a dead zone vortex, weakening heat transfer.

Keywords: Battery Thermal Management, Passive Cooling, Air, Heat Sink, Dimple

Dynamic Voltage Restorer With Direct AC-AC Controller Using H-Bridge Bidirectional Switch Topology to Mitigate Voltage Sag and Swell

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Abstract – Voltage sags and swells are prevalent challenges in industries. These disturbances can cause malfunctions in voltage-sensitive loads in factories, buildings, and hospitals, leading to severe process disruptions that result in significant economic and data losses. The application of Dynamic Voltage Restorer (DVR) is capable of resolving voltage sag and swell problems for sensitive loads. Many topologies and control methods have been presented for DVR. In this paper, the circuit of the proposed single phase DVR used H-bridge bidirectional switch to mitigate voltage sag and swell. The system utilizes a conventional Proportional Integral (PI) controller to adjust the PWM value, setting the required injection voltage with Kp at 27 and Ki at 6.6. This approach eliminates the need for large and expensive DClink and energy storage components. Subsequently, the full compensation ranges for voltage sags and swells are calculated. Simulation and experimental results are provided to demonstrate the effectiveness of the proposed topologies in voltage restoration, achieving a load voltage of 220 V. The proposed topology guarantee that the regulated voltage can be achieved for sensitive loads under one cycle AC signal with an average error of 0.62% in experimental tests and 0.1% in simulations.

Keywords: Bidirectional Switch, Dynamic Voltage Restorer, Series Injection Transformer.

Interleaved Buck Converter as Current Regulator for Lithium Ion Battery Charging with Fuzzy Logic Control

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Abstract – In the present era, the use of electrical energy has become a basic necessity for society in its application in various sectors. This is evident from the increasing use of electronic devices powered by batteries. One of the problems arising from battery-powered devices is the long charging time. One way to address this issue is by employing fast charging methods. Fast charging methods are characterized by the charging rate reaching up to 1C of the battery capacity. The fast-charging method used is Constant Current-Constant Voltage (CC-CV) employing two fuzzy logic controls. The first Fuzzy Logic Controller (FLC) is utilized to adjust the duty cycle value to maintain Constant Current (CC), while the second FLC is used to adjust the duty cycle value to maintain Constant Voltage (CV). The power converter utilized is the Interleaved Buck Converter (IBC). The Interleaved buck converter is chosen because it can generate current and voltage with smaller ripples compared to a regular buck converter. From the simulation results using the CC-CV method, a current of 4.83 A is obtained under CC conditions and a voltage of 16.65 V under CV conditions.

Keywords: Fast Charging, Interleaved Buck Converter, Fuzzy Logic Controller

Maximum Power Point Tracking on Photovoltaic System Based On Fusion Firefly Algorithm And Fuzzy Logic Controller for Charging Lead Acid Battery

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Abstract –This paper discusses Maximum Power Point Tracking (MPPT) on Photovoltaic (PV) systems which is applicate to charging lead acid batteries. MPPT utilized an interleaved boost converter which is that controlled with Fusion Firefly Algorithm (FFA) and Fuzzy Logic Controller (FLC) for lead acid battery charging. FFA is utilizing for MPPT because it is able to obtain Maximum Power Point (MPP) quicker and accurately than another firefly algorithm (FA). To avoid overcharging due to the charging voltage and current exceeding the maximum value of the battery once MPP is obtained, a FLC is used to limit the output converter value. To optimize the charging process, the charging mode is used a Constant Current - Constant Voltage (CC-CV) which is controlled using FLC. Based on simulation, FFA performs much better in finding MPP with less oscillation as compared to Simplified Firefly Algorithm (SFA) and Neighborhood Attraction Firefly Algorithm (NaFA). MPPT with FFAFLC can find MPP quickly and accurately with 99.9% efficiency and prevent overcharging by keeping the voltage and current from exceeding 3A - 28.8V.

Keywords: MPPT, Interleaved Boost Converter, Lead Acid Charger, Firefly Algorithm

Modified Grasshopper Optimization Improved Maximum Power Point Tracking in Partially Shaded Photovoltaic Conditions

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Abstract – The drastically increased use of fossil fuels in recent years has led to environmental pollution and increased costs of using fossil fuels. There are many advantages to using PV as an energy source such as being environmentally friendly, freely available, and abundant in nature. The electrical potential produced by photovoltaic panels typically remains at a low level and is influenced by external factors like vegetation, structures, and atmospheric conditions. The problem at hand can be resolved through the implementation of an MPPT system, which enables photovoltaic systems to generate optimal output power even when subjected to partial shading, through the utilization of optimization algorithms. One of them is the Modified Grasshopper Optimization Algorithm (MGOA). This algorithm is a modified optimization method of the Grasshopper Optimization Algorithm (GOA). Modifications are made to the random value adjustment with a range of 0.5 to 1. In addition, the attraction between grasshoppers (f) and the length of the grasshopper pull (l) adjust to the value of the resulting Target power. MGOA demonstrates superior performance in generating PV output power with reduced ripple in comparison to GOA. Simulation results show that the MGOA algorithm can produce an accuracy rate of up to 99.85%. This result demonstrates that the PV-generated power is not trapped at the Local Maximum Power Point (LMPP).

Keywords: MGOA, SEPIC Converter, Partial Shading

Thermal Analysis of Vapor-Phase R1234yf Flow Inside Horizontal Helical Discrete Double Inclined Ribs Tubes

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Abstract – In the power and refrigeration cycle, R1234yf is a refrigerant suited for replacing R134a due to its minimal ozone depletion potential and global warming potential, as well as greater efficiency and safety compared to R290. However, the use of R1234yf is still limited because the characteristics of this refrigerant have not been widely applied to heat exchangers. To determine its thermal characteristics, this research tested the vapor phase R1234yf on the tube and straight and helical DDIR tubes. Enhanced tubes and Discrete Double-Inclined Ribs (DDIR) are used to improve heat exchanger effectiveness. The refrigerant was tested at a Reynolds number of 12000 to 20000 with varying helix angles of 10, 30, and 50o. The selected rib pitches are 10 and 20 mm. Smooth and Straight DDIR tubes are used as a reference to evaluate the improvement in helical DDIR Tube performance. Flow structures show that Helical DDIR can significantly move the trajectory of the vortex core. Based on Performance Evaluation Criteria (PEC), Helical DDIR tubes perform much better than straight tubes, with a range between 1.1 and 1.6. Meanwhile, straight DDIR tubes have lower PEC performance than straight tubes in entire Reynolds numbers.

Keywords: Heat Transfer, Helical Discrete Double Inclined Ribs, Pressure Drop

Series Double Flyback Converter for Power Factor Correction to Multi-Output Battery Charger using Fuzzy Logic Controller

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Abstract –This paper proposes a configuration of converter for battery charger applications with high Power Factor Correction (PFC). This converter is the integration of two flyback converters, connected in two stages of a series circuit. The first flyback converter functions as a PFC that works in discontinuous current mode. So that the input current waveform follows the input voltage waveform. The second flyback converter using the single-input multi-output (SIMO) principle as a voltage regulator. It worked in continuous condition mode. The converter can provide a multi-output system that has two different output voltage levels, which is specified for charging emergency lamps and cell phones using a Fuzzy Logic Controller (FLC). Based on the simulation result, the series double flyback converter can maintain a constant output of 25 V with constant voltage mode using a FLC and improve the power factor from 0.518 without the PFC converter and increased to 0.966 by using PFC converter.

Keywords: Flyback Converter, Power Factor Correction, Battery Charger, Fuzzy Logic Controller

Design and Implementation Mountaineering Team-Based Optimization Algorithm for MPPT on Partial Shading Conditions

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Abstract – Renewable energy has now become the focus of the world community in overcoming the problem of shrinking supplies of non-renewable energy. In this case, solar panels are one of the energy alternatives applied to many things in society. Power generated from solar panels is influenced by external factors such as weather and shadows from plants or building. These external factors can make power generated from solar panels decreases. Therefore, a tool is needed that can assist solar panels in producing optimal power in each condition. Implementation of Maximum Power Point Tracking (MPPT) system can resolve the problem at hand. Power on solar panels can be optimized because MPPT will ensure that the power generated from solar panel always optimal even in partial shadings condition. In this research, data processing uses Mountaineering Team-Based Optimization (MTBO) algorithm for MPPT implementation. MTBO is one of the latest algorithms that take inspiration from the journey and struggle of the mountaineering team to reach the top of the mountain. This research aims to see the performance of MTBO algorithm for MPPT when compared to another algorithm namely PSO and P&O. MTBO demonstrate better performance in power generating solar panels even in partial shadings condition. Simulation results show that the MTBO algorithm produces an average tracking accuracy of 99.634 percent in 5 different patterns. This result show that the power generated from solar panels is not trapped at the Local Maximum Power Point (LMPP).

Keywords: Buck Converter, MPPT, Mountaineering Team-Based Optimization, Partial Shading, Solar Panels

Detection of Series AC Arc Fault Based on Continuous Wavelet Transform and Artificial Neural Network Under Voltage Variation Disturbances

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Abstract – Series arc fault in electrical power system can cause electrical fires. In distribution system, power quality disturbances include voltage variation disturbances often occurs. Voltage variation disturbances can lead to nonstationary waveform, which affect accuracy arc fault detection. To overcome this problem, this paper presents combination methods of continuous wavelet transform and artificial neural network for detection. Continuous wavelet transform is superior to analyze of non-stationary waveform from series arc fault under voltage variation disturbances. Continuous wavelet transform recognizes series arc fault under voltage variation disturbances by transform of signal to time-frequency domain. Artificial neural network using type of feed forward neural network with Levenberg Marquardt Algorithm for series arc fault identification by data obtained from continuous wavelet transform. Data is trained and tested by artificial neural network. Several waveform model of series arc fault under voltage variation disturbances are selected to tested include normal system, series arc fault under normal condition, series arc fault under voltage sag condition and series arc fault under voltage swell condition. The result show that the proposed algorithm has good accuracy for series arc fault detection under normal system, series arc fault, voltage sag condition and voltage swell condition with the accuracy of 99.69 %, 99.2%, 99.97% and 99.9%, respectively.

Keywords: Series arc fault, voltage variation disturbances, continuous wavelet transform, artificial neural network, detection

An Improvement GWO-P&O Algorithm Based MPPT for PV System under Partial Shading Condition

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Abstract –In a PV system, techniques are needed to maximize the output of electrical powerThe Maximum Power Point Tracking (MPPT) method is one of the methods used to locate the PV curve's maximum power coordinate point (MPP). PV system operation can experience uniform irradiation conditions (UIC) and partial shading conditions (PSC) depending on the environment. The use of conventional MPPT techniques such as P&O can work well in UIC conditions but will have difficulties when PV experiences PSC conditions. On the other hand, optimization methods such as IGWO can find GMP in PSC conditions. To overcome this problem a hybrid model of IGWO and P&O based on metaheuristic algorithms is used in this paper. Based on the simulation data and analysis that has been carried out, it can be concluded that the proposed MPPT algorithm, namely the IGWO-P&O hybrid, can increase MPPT speed and accuracy, as well as reduce oscillation power.

Keywords: photovoltaic (PV), maximum power point tracking (MPPT), partial shading condition (PSC), P&O, IGWO

Voltage Regulation Optimization of a Modified Seven-Level Packed U-Cell Inverter with Mamdani Fuzzy Logic

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Abstract –This research paper investigates the use of Mamdani fuzzy logic control (FLC) in power inverters to regulate voltage, with a focus on how well it regulates the output voltage as well as reduces total harmonic distortion (THD). This study specifically analyzes the performance of a Modified Seven-Level U-Cell (MPUC) inverter topology and compares the FLC results with the traditional proportional-integralderivative (PID) method. The simulation results indicate that the FLC method offers superior voltage regulation, maintaining the voltage at 180.5 volts with a center of gravity of 1.1280. This method achieves a higher modulation amplitude and significantly lowers THD from 19.31% to 14.97%, outperforming the PID method. Mamdani FLC demonstrates increased adaptability to input voltage variations, maintaining lower distortion levels and ensuring a cleaner output signal. Additionally, it reaches steady-state conditions more efficiently, which is critical for applications that require rapid stabilization. This research emphasizes the robustness and efficiency of FLC in controlling MPUC inverters and presents it as a promising solution for accurate and stable voltage regulation in renewable energy applications. The findings support the integration of advanced control techniques into power grids and promote more efficient and sustainable energy systems.

Keywords: Fuzzy Logic Controller, Voltage Regulation, Modified Seven-Level Packed U-Cell Inverter

Thermodynamic Analysis of Battery Thermal Management System in Electric Van for Tropical Climate: A Preliminary Study

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Abstract –This study provides further insights into the influence of ambient temperature on battery cooling. The focus is on the impact of ambient temperature on battery cooling using a steadystate approach. The system studied combines both cabin and battery cooling systems for an electric van. Observations involve the temperature difference among the inlet and outlet of the battery coolant (ΔT) influenced by ambient temperature, which varies from 22 °C to 40 °C. The discussion includes the effects of ambient temperature on the condenser, compressor, and ΔT; the impact of coolant and refrigerant flow rates on ΔT; the effect of battery discharge rate on ΔT; and the system's coefficient of performance (COP) based on ambient temperature. A small temperature difference among the system and the environment reduces the heat that can be dissipated by the system. Therefore, battery cooling in regions with tropical climates must adapt to the ambient temperature where the device operates.

Keywords: Cooling system, Lithium Ferro Phospate, Tropical Climate, R407C

Evaluating the Effects of Constant Current C Rates on Li-Ion Battery State of Health and Charging Efficiency

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Abstract – This study uses the constant current (CC) - constant voltage (CV) phases to show how Li-Ion batteries are charged. At the CC stage, the C rate capacities are 0.5C, 0.8C, 1C, and 1.4C. Increasing the C rate when charging does not guarantee that the battery's State of Health (SOH) is maintained. In addition, battery charging time is not necessarily faster. The demonstration in this paper is used to find out what the appropriate C rate capacity is so that SOH and charging time can be optimized. The results of the simulation show that when charging the battery with a C rate of 1.4C, there is an increase in internal resistance of 10mΩ compared to when the C rate is 1C. This causes charging efficiency and SOH or battery performance to decrease. In addition, a C rate of 1.4C requires a CV stage charging time of 75 s longer than a C rate of 1C.

Keywords: Battery Charger, constant current (CC) – constant voltage (CV), State of Health (SOH), Li-Ion

The Effect of Co-Rotating Twin Turbines on Mooring Line Tension in Quad-Spar Tidal Current Power Plant

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Abstract – Quad-spar tidal current power plant is a floating technology that has a mooring system. This system keeps the floating power plant in its installed position. The mooring lines are designed using a catenary system which is suitable for use in shallow to medium waters. The paper aims to analyze the mooring line tensions. It was numerically studied using computational fluid dynamics (CFD). The results are presented under conditions before and after being subjected to twinturbines rotation load. The results of this mooring system study are presented in the form of time domain and maximum line tension for each of the significant waves. When the wave comes at head seas, the mooring line tension increases by up to 74.34% because of the co-rotating twin turbines, and up to 87.83% because of the contra-rotating twin-turbines. When the wave comes at the quartering seas, the mooring line tension increases by up to 89.87% because of the co-rotating twin turbines and up to 88.64% because of the contra-rotating twin-turbines. These results can be a concern in determining the method and scheduling of mooring system maintenance when the Quad-spar twin-turbines tidal current power plant is going to operate.

Keywords: Mooring Tension, Quad-spar Power Plant, Twin Turbines, Tidal Current

Grey Wolf Optimizer-Based Optimal Inner Loop Control and SRF-PLL for Grid Tie Inverter Under Low Frequency Oscillation

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Abstract – This paper presents the optimization of inner loop control and SRF-PLL on a Grid Tie Inverter (GTI). GTI requires a PLL to be able to synchronize with the grid. Synchronous Reference Frame PLL (SRF-PLL) is an effective method used to synchronize GTI with the grid. Meanwhile, to control current, the GTI requires inner loop control. Both control systems must have a good response when disturbances occur that can cause low frequency oscillations. The high complexity makes setting up the inner loop control system and SRF-PLL difficult. So this paper proposes simultaneous optimization of the inner loop control and SRF-PLL to get a good response from the GTI when fluctuations occur in the system. Grey Wolf Optimizer (GWO) is used to set parameters in the inner loop control of GTI with SRF-PLL. The oscillation damping of the control system is formulated as an objective function. Transient response and steady state error are used as limits in optimization carried out when low frequency oscillations occur due to disturbances in the system. The optimal parameters obtained have been verified on a series of GTI simulators with results confirming that this method can optimize the response of the inner loop control and SRF-PLL on the Grid Tie Inverter (GTI) simultaneously.

Keywords: GTI, Inner loop control, SRF-PLL, GWO, low frequency oscillations.

DC-Link Capacitor Design in Neutral Point Clamped Multilevel Inverter Utilizing Ripple Current Analysis and DC-DC Converter Control

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Abstract – The DC-Link capacitor, an essential part in power converters, stabilizes voltage levels by reducing ripple effects, ensuring a constant output voltage despite high-frequency switching and transient load changes. This research focuses on designing a DC-Link capacitor for a 3-level, 3-phase neutral point clamped multilevel inverter (NPC-MLI). The design process involves calculating the current ripple and analyzing the RMS current in the capacitor. A well-designed DC-Link capacitor must account for ripple voltage and load variations. The proposed design includes cascaded control on the DC-DC converter, comprising both voltage and current controllers. This ensures the output current operates in continuous conduction mode (CCM), maintaining a continuous current flow to the DC-Link capacitor and reducing ripple voltage under load variations. MATLAB/Simulink simulations demonstrate this design's efficacy in a range of scenarios, highlighting the capacitor's role in maintaining the reliability and efficiency of power converters in renewable energy systems.

Keywords: dc-link, capacitor, ripple, CCM, multilevel inverter

IoT-Based Real-Time Energy Monitoring System for ELVIRO EV

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Abstract – The Shell Eco-marathon (SEM) and the Kompetisi Mobil Hemat Energi (KMHE) are prestigious competitions that challenge engineering students to design, test, and operate vehicles with maximum energy efficiency. As agents of change, students are encouraged to actively address the global energy crisis, particularly in Indonesia. The team from Politeknik Elektronika Negeri Surabaya (PENS), known as the Chapens team, saw the value of these competitions as an opportunity for learning. They made the decision to join in order to apply project-based learning principles to their ELVIRO electric vehicle (EV) prototype concept. Optimizing driving behavior and developing effective driving strategies are crucial for improving energy efficiency. Significant advancements in Internet of Things (IoT) technology facilitate the interconnection of various devices, playing a vital role in addressing issues in electric vehicles (EVs). The Chapens team has developed an IoT-based real-time energy monitoring system for the ELVIRO EV, enabling real-time monitoring and data analysis to optimize driving strategies. This system provides significant advantages in EV management during competitions by allowing drivers and team members to access energy and vehicle parameters from any location. The system includes a lithium-ion battery, a BLDC motor controlled by a motor controller unit (MCU), and sensors for precise current and voltage measurements for energy calculation. The ESP32 microcontroller communicates with the MCU and sends the collected data to the cloud for real-time monitoring. Tested at KMHE 2023, the ELVIRO EV with this system achieved high accuracy in energy measurement and proved to help formulate driving strategies to improve energy efficiency. Insights from the Chapens team's implementation provide a valuable case study for future advancements in this field.

Keywords: Kompetisi Mobil Hemat Energi, Internet of Things, energy efficiency, real-time monitoring.

Airfoil profile modifications based on Bezier Curve and Optimization using PSO

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Abstract – This research focuses on optimizing the profile of wind turbine blades to improve performance by increasing the ratio of the Coefficient Lift (CL) to the Coefficient Drag (CD). Utilizing Particle Swarm Optimization (PSO) and Computational Fluid Dynamics (CFD), specifically through OpenFOAM and ParaView software, the aerodynamic efficiency of various airfoil geometries is evaluated. Initial simulations involved a two-dimensional airfoil design using Bezier Curves to establish geometric parameters. ADflow solver is used for CFD analysis, supporting turbulence models. The optimization process is twofold: first, increasing the CL/CD ratio, followed by minimizing the CD value. Among the 16 airfoil variations generated through Bezier curves, the best performance was sought to become the basis for further PSO optimization. CFD simulation results to analyze the significant improvement in aerodynamic performance with airfoil optimization.

Keywords: optimization, computational fluid dynamics, Particle Swarm Optimization, Coefficient Lift, Coefficient Drag, airfoil.

Procedure of Structural Analysis on Steam Turbines in Various Loads for Early Fatigue Failure Detection

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Abstract – A steam turbine is a key component in steam power plants that converts the thermal energy of steam produced by the steam generator. The energy of steam rotates the turbine shaft, which is coupled with an electrical generator to produce electricity. With dynamic loading applied, analyzing a steam turbine is necessary to maintain its optimal condition for longterm use. One method that can be utilized to assess its condition is structural analysis using numerical methods with the ANSYS Structural application. This method allows the evaluation of the turbine's structural condition under dynamic loads and predicts the stress distribution and deformation of the steam turbine. The method employed is the Finite Element Method (FEM), integrated into the ANSYS application. Several studies have used this method to analyze the effects of external forces on modified equipment, indicating that this method can also be used to analyze the improvement of developed tools. The simulation results show differences between measurement and simulation outcomes due to varying conditions of the equipment and the determination of boundary conditions in the simulation. The simulation also indicates an increase in deflection and stress in the steam turbine as the load variations increase. The aim of this research is to evaluate the structural integrity of steam turbine bearings under various dynamic loads using the FEM integrated with ANSYS software. The study seeks to obtain maximum and minimum stress and deformation values at each turbine bearing focus under different loads, compare these values to understand how load variations impact the turbine's structural integrity, and provide insights for improving the design and maintenance of steam turbines. Quantitatively, the maximum deformation and stress increase with higher loads, with values ranging from 0.9251 MPa to 198.08 MPa for stress and 37778 mm to 44119 mm for deformation, highlighting the critical need for load management to prevent structural failure.

Keywords: Structure, Dynamic load, Stress distribution, Deflection, Finite element method, ANSYS, Steam turbine Introduction

Dynamic Priority Approach for Unit Commitment Scheduling Solution

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Abstract – This paper introduces a dynamic priority approach (DPA) for solving unit commitment (UC) problems. The DPA is a novel technique introduced in this paper that is a development and simplification of the conventional priority list (PL) using the cumulative summation form of generating unit capacity. The conventional PL technique maximizes the previous unit's capacity before adding the next one until the entire load is accommodated. According to the maximization focus of the unit capacity, the ramp rate is ignored so that the generation cost result sometimes cannot reach the optimal value. In this research, the proposed method is resolved in 2 main stages: the UC and economic dispatch (ED) stages. Prior to the main stage calculation, the technique begins with two initializations: initial available unit determination, considering the unit status in the last scheduling period, and the unit priority criteria factor calculation, considering fuel cost, start-up cost, maximum generation limit, and ramp rate as the criteria factors. The UC stage consists of several phases, starting with the determination of unit availability status, prioritization of the available units based on the criteria factors, cumulative calculation of the unit's maximum generation capacity according to the sorted available units, determination of base units based on the cumulative value index that can satisfy the load demand, and the base unit's evaluation to re-evaluate the unit availability. These base units are the committed units that are optimized for load dispatching in the ED stage using particle swarm optimization (PSO). The ramp rate constraint was deliberated at both stages, as one of the priority criterion factors in UC and the boundary constraint in ED, expecting to minimize the overall generation cost. The performance of the proposed method was verified using a ten-unit test system whose results were compared with the previous related studies. The obtained results show that the proposed method provides effective and efficient scheduling results.

Keywords: unit commitment, dynamic priority, DPA, PSO, priority list, ramp rate.

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Electronics Systems and Electrics Technology

Smart Aquaponics with Automatic Sensors Cleaning for Zero Waste Integrated Farming System using Internet of Things

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Abstract – Integrated Farming System (IFS) is an agricultural system that integrates agricultural, crop, livestock and fish sub-sector activities. The linkages between sub-sector activities support zero waste concept. As a part of IFS, aquaponics is defined as a cooperation between plants and fish. In order to optimize the aquaponics, a smart aquaponics system is proposed. This system is equipped with Internet of Things (IoT) real-time monitoring system for air temperature, air humidity, water temperature, water level, water pH, and water Total Dissolve Solid (TDS). Furthermore, an automation system was also added for scheduled feeding, pump and aerator settings, water sampling, and sensors cleaning. The aquaponics system can work very well and the automatic sensors cleaning allows the TDS and pH sensors to get more accurate data and have more possibility of longer lifetime.

Keywords: automatic sensors cleaning, integrated farming system, internet of things, smart aquaponics, zero waste

IoT and Electronic System Solution for Failed Parcel Delivery Attempts

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Abstract – E-commerce in the Philippines grew from $6.78 billion in 2017 to $17 billion in 2021 in revenue and is projected to reach $38 billion by 2027. Despite the promising future of ecommerce in the Philippines, several problems exist in the logistics sector, especially in the last mile delivery (LMD) logistics, notably failed delivery attempts due to the parcel recipient's absence at the receiving address. Parcel lockers are considered a solution to failed parcel deliveries. However, existing smart lockers and commercially available parcel drop boxes (PDBs) cannot cater for parcel deliveries paid via Cashon- Delivery (COD). This paper proposes an IoT and electronic system that can cater to parcel deliveries paid via a cashless or COD method to solve failed parcel deliveries effectively. The PDB has a security feature that detects incorrect parcels placed by the courier via its parcel detection and parcel verification functions. The system success rates (SSR) of the proposed system's cashless and COD parcel delivery are 80% and 94%, respectively. The security of the parcel detection and parcel verification functions SSR is 90% SSR. The proposed system's total power consumption is 0.193216404 kWh.

Keywords: IoT, parcel drop box, failed parcel deliveries, lastmile delivery, cash-on-delivery

Experimental Approach for the Performance of a CanSat Module Based on Environmental Testing

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Abstract – The qualification process of a spacecraft generally requires environmental testing for ensuring the CanSat will survive in the expected environment. Experimental approach is conducted due to guarantee a successful mission under extreme space thermal and vibration conditions. This research focused on the experimental approach for the performance of a CanSat module. An experimental approach was conducted based on environmental testing using thermal, vacuum, and vibration testing. The CanSat experiments showed that the CanSat can passed through environmental testing identified from the work performance of CanSat module to carry out mission during and after testing. The result of environmental testing has indicated that the CanSat module and structure can work for two hours in temperature around 60oC. In addition, CanSat module could measure maximum pressure up to 20 inHg. Furthermore, CanSat could survive from vibration up to 90 amplitudes.

Keywords: CanSat, thermal test, vacuum test, vibration test

Radiation-hardened programmable two-phase clock generator

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Abstract – Recently, a radiation hardened field programmable gate array (RHFPGA) that uses a triple modular redundant design and a two-phase clock distribution has been developed. By introducing the triple modular redundant design and two-phase clock distribution, the RHFPGA could achieve 730 Mrad total-ionizing-dose tolerance which is about 730 times higher than that of typically available radiationhardened VLSIs. However, the RHFPGA with the triple modular redundant design and the two-phase clock distribution requires six clock signals totally. In addition, the clock skew margin must be adjusted depending on the total-ionizing-dose so that it requires a clock-skew adjustable function. Therefore, this paper presents a proposal of a new radiation-hardened two-phase clock generator with a programmable function for the clock skew margin. A new RHFPGA chip including the new radiation-hardened two-phase clock generator with a programmable function for the clock skew margin has been fabricated and real radiation test has been done by using a Cobalt 60 gamma radiation source. The radiation tolerance of the VLSI chip was at least over 400 Mrad.

Keywords:

Accident Posture Reconstruction and Analysis of A Purposed Vehicle Event Data Recorder

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Abstract – This paper introduces an advanced Event Data Recorder (EDR) designed for comprehensive accident reconstruction, which is a significant development in the field of vehicular safety. The study's focus on utilizing an EDR equipped with an inertial measurement sensor to capture and record a vehicle's directional movements, as well as its ability to log coordinates to pinpoint the exact location at the time of an accident, demonstrates a thorough and meticulous approach to data collection. One key innovation highlighted in this research is the development of an application that visualizes and analyzes the collected data, enabling a clear and detailed reconstruction of events. This application not only enhances post-accident analysis but also provides valuable insights for preventative measures and technological advancements in vehicular safety. The EDR's capability to gather extensive data serves as a foundation for creating a robust dataset that can be leveraged for further research and various applications, such as improving vehicle safety systems, enhancing accident analysis methods, and contributing to the development of autonomous driving technologies.

Keywords: Reconstruction, feature, accident, analysis, vehicle, development.

6-Lead ECG Monitoring System for Recording Cardiac Activity Using Pan-Tompkins Algorithm

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Abstract – Cardiovascular disease refers to various conditions that affect both the heart and blood vessels. Cardiovascular disease is currently the primary factor leading to mortality in the Non-Communicable Disease category. So it is necessary to take preventive measures in the form of early detection of cardiovascular disease and monitoring of patients who are being treated. In this situation, early detection and monitoring can only be done virtually. So a portable 6-Lead ECG device based on wireless communication is needed to fulfill the needs of the telemedicine process. This research uses the ADS1293 sensor module to monitor the electrical activity of the heart to meet the needs of the telemedicine process. The ECG acquisition device can process Lead I, Lead II, and the patient's heart rate value using a modified Pan-Tompkins processing algorithm and augmented Leads obtained by a calculation process. The results show that the design of the ECG acquisition device produces a 6-Lead ECG chart with an average heart rate measurement absolute percentage error (MAPE) of 0.51% compared to the ECG calibration device in the reading range of 40 - 220 BPM. The results are sent to an external device in the form of data using the MQTT protocol through communication between devices in the IoT (Internet of Things). This allows doctors to access their patients' physical data capture results online.

Keywords: Cardiovascular Disease, Electrocardiogram (ECG), 6-Lead, Heart Rate, Portable, Wireless.

Design Of Underwater Vehicle Balance System Using Inertial Measurement Unit (IMU) Sensor

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Abstract – Underwater vehicles play an important role in various maritime applications, such as ocean exploration, underwater inspection and oceanographic data capture. The ability of the vehicle to move and manoeuvre with precision underwater is critical to mission success. However, the dynamic underwater environment, with strong currents and waves, can cause significant disturbances to the movement of the probe. This paper proposes an underwater vehicle balance control model using IMU (Inertial Measurement Unit) sensor and PID controller with Ziegels-Nicols tuning method. This control model consists of motor speed controller, position controller, and orientation angle controller. The IMU orientation and angle results are used as the reference of each motor in determining the PWM value in maintaining the position. Simulation and experimental results show that the proposed control model is able to maintain the balance and orientation of the vehicle effectively in various underwater environmental conditions. The vehicle can reach the underwater data collection survey point with high precision, even under strong current and wave conditions.

Keywords: Underwater Vehicle, PID, Ziegels-Nicols, Inertial Measurement Unit (IMU), Balancing.

Ninety Days of Observation on The Metal Electrodes of a Salinity Sensor for Vannamei Shrimp Farming Purposes

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Abstract – Indonesia is one of the world's largest shrimp producers. As much as 70% of the farmland is still cultivated using traditional concepts, most of which are small-scale farmers with weak economies. Therefore, an affordable water quality sensor for shrimp farming is an absolute necessity for these farmers. This study deals with building a salinity sensor which is one of the water quality parameters. The salinity sensor was constructed using iron as electrodes, which were then used in 3 types of circuit model i.e.: voltage divider, capacitive and Wheatstone using water with 3 different salinity levels. Observations were done for 90 days as the harvest time of Vanamei shrimp. The objective was to identify the best circuit model for accurate salinity measurement using iron electrodes. Among the configurations tested, the voltage divider model gave the most consistent and precise sensing with a highest F-value of 13.25102 and the lowest P-value of 9.78E-05. These findings highlight that iron electrodes, when used with proper circuit design, offer a cost-effective and practical solution for DIY salinity sensors and improving the sustainability of shrimp farming especially farmers with weak economies.

Keywords: aquaculture, salinity, iron, electrode.

Implementation of Chicken Eggs Fertility Detection Device Using SSD MobileNet-V2 FPNLite

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Abstract – In the production of vaccines targeting antibiotic-resistant viruses, fertilized eggs are frequently used to develop antibodies. It is important to continuously check the egg fertility to reduce the wastage of valuable antibody samples. This paper presents a system for detecting fertile and infertile eggs using image processing and deep learning technology based on egg images. The system holds 6 eggs with illumination under each egg and using a camera placed 17 cm above the eggs. The system employs the SSD MobileNet-V2 FPNLite model with an input image size of 320x320 pixels to detect the location of the eggs and to classify them. The training result yields a classification loss of 0.031, a localization loss of 0.0038, and a total loss of 0.085. The system, which operates on a Raspberry Pi 5 with 4 GiB of RAM, achieves 10.69 FPS. The testing result without noise gives a classification accuracy of 100% while the system produces a classification accuracy under the threshold, which is 50%, for the eggs under pepper noise with a noise level above 0.05.

Keywords: deep learning, egg classification, egg detection, SSD MobileNet-V2, Raspberry Pi.

A Study of Mechanical Characteristics of Lubricant Oil Based on the Vehicle Mileage Using Ultrasonic Waves

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Abstract – Currently, lubricating oil change warning systems in vehicle engines still rely on conventional methods that lack the accuracy to reflect whether the lubricating oil is still usable or needs to be replaced. One approach to overcome this problem is to conduct a non-destructive test using ultrasonic waves. The 4 MHz electrical signal will be converted into mechanical signal by ultrasonic probe and transmitted through the object, i.e. lubricating engine oil SAE 0W-20 Motor Oil from Mitsubishi Motor. The echo signal from the interface between oil-substrate are then received back by the ultrasonic probe, converted into electrical signal. By processing this signal, mechanical properties, i.e., the speed of sound and acoustic impedance can be calculated to obtain its density. The result of density measured from ultrasonic wave is then compared to conventional measurement as reference, using pycnometer. These comparisons show an average percentage error of 0.53% for training data and 0.22% for testing data. Based on this measurement, a polynomial model is created to predict mileage based on the density of the oil. This model successfully predicts the mileage of vehicle based on the density of the engine oil and shows an average percentage error of 10.43%.

Keywords: density, lubricating oil, ultrasonic wave, acoustic impedance.

Nutritional Status Monitoring System Based on Antropometric to Support Society 5.0

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Abstract – The advancement of science today has a major impact on human life. With the presence of the society 5.0 era, it is easier for people to fulfill their needs through electronic media. The utilization of information technology in this era makes it easier for people to get health services. Monitoring development from an early age is very important to prevent malnutrition in toddlers. Monitoring the growth of toddlers is carried out at the posyandu with anthropometric measurements so that it can determine nutritional status and how to prevent it. The lack of facilities and infrastructure in the posyandu is a problem that must be addressed immediately so that activities in the posyandu can run well. This research proposes the use of an easy website for monitoring the growth of toddlers. The website provides a nutritional status classification feature for toddlers using the naïve bayes method that has been adjusted to anthropometric standards. The anthropometric standards used to determine nutritional status are derived from the Peraturan Menteri Kesehatan Republik Indonesia No. 2 of 2020. In addition, the features available on this website are very complete, including adding and editing blita data, toddler growth charts, filling in the SDIDTK format, information on nutritional adequacy rates that must be met, and PMT menu recommendations that can be used as a reference for toddler food menus. The naïve bayes method is a method that has a simple classification technique but has a high level of accuracy. By knowing the nutritional status of toddlers every month, posyandu cadres can prevent poor growth experienced by toddlers. The results of the implementation of the naïve bayes method for the classification of toddler nutrition show good results, namely accuracy of 85%, precision of 84% and recall of 81%.

Keywords: Society 5.0, Growth of Toddler, Naïve Bayes Method

Design and Implementation of Passive Autofocus Control System for Contrast Detection in Tuberculosis Microscopy Images

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Abstract – Examination of Mycobacterium tuberculosis is plausibly done on a bright-field microscope. Since the work of focusing and moving the specimen slide are done manually, we present an automated solution for both. The research is done to a bright-field binocular microscope with a camera hooked to a computer for feedback as well as a recording device. The actuation is done through a microcontroller connected to two servomotors that control the focus and the stage horizontal positioning. The autofocus is employing a passive autofocus method of RMS contrast detection, coupled with a modified rule-based focus search. The result given is a 91.30% of the system finding the focus and a successfully done movement to capture different fields of view.

Keywords: control system, autofocus, microscope, tuberculosis

03. [IES-ETA]
Telecommunication Engineering Technology

Time-Frequency Analysis and Setting Motion Activity Detection of Volleyball Motion Signals for Set-Play Classification

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Abstract – Human Activity Recognition has found application in several domains including training and sports. Various digital signal processing techniques have been applied to sensor signals for improved performance of models in recognizing and classifying sports activities. Recent studies in sports, particularly in volleyball focused on a player's spiking motion. This study focuses on a volleyball player's setting motion by applying time-frequency analysis in setting motion signals and applying digital signal processing techniques in developing a setting motion activity detection as a preprocessing technique. Three deep learning models using edge impulse, ANN, and LSTM were designed for set-play classification yielding 95.11%, 96.23%, and 91.67% accuracy respectively.

Keywords: signal processing, neural network, motion data, volleyball

Comparative Performance Evaluation of Line Coding Schemes for Uplink Transmission in Single and WDM Channels FSO-HAP Systems Across Varied Altitude and Weather Scenarios

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Abstract – The demand for fast, reliable, and adaptable communication solutions has led to increased interest in wireless technologies. Free-Space Optical (FSO) communication systems with the integration of FSO with High Altitude Platforms (HAPs) presents unique opportunities for enhancing connectivity. However, challenges arise in optimizing system performance amidst varying altitude and weather conditions. This paper conducts a thorough comparative evaluation of line coding schemes for uplink transmission in FSO-HAP systems across diverse scenarios using OptiSystem. Results indicate NRZ as the top performer, excelling in both single-channel and Wavelength Division Multiplexing (WDM) setups due to its simplicity and spectral efficiency. RZ demonstrates optimal performance, particularly in WDM systems spanning up to 50km, while NRZ and RZ emerge as preferred options for longdistance optical communication. The Q-Factor for single channels recorded 39.067 for RZ and 59.926 for NRZ. Meanwhile, the average Q-Factor for WDM channels is 14.667 for RZ and 7.245 for NRZ. Caution is warranted in HAPs deployment, as current capabilities may be insufficient, particularly under adverse weather conditions.

Keywords: FSO, WDM, HAPs, Line Coding

EMI Reducing Inverted F Slot on Reference Plane of Mixed Signal Design

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Abstract – In mixed-signal design, slots on reference planes are the most preferred choice to isolate return currents of sensitive analog and noisy digital signals. However, the discontinuity caused by these slots in the return current path leads to unwanted radiation, which causes electromagnetic interference (EMI) issues. Hence, in this context, we propose coupled inverted F slot structure to be used in place of the conventional slot structure, which alleviates the return current path discontinuity and provides a low impedance path for return current. This, as a result, reduces unwanted radiation. The proposed inverted F structure is suitable for rigorous parametric analysis by its versatile geometry, allowing the designer to tune the structure size to minimize the radiation at the desired frequency. Furthermore, the simulations of the inverted F slot structure, performed on a 75x45mm RO4003 Rogers PCB in the frequency range of 1- 5GHz, show a maximum improvement of 55dB with inverted F slot and 32dB with inverted F split, which outperforms the state-of-the-art slot/split structures.

Keywords: Printed circuit board (PCB), internet of things (IoT), mixed-signal design, return current path discontinuity, electromagnetic interference (EMI), electromagnetic compatibility (EMC).

An Efficient Authentication System to Access Electric Vehicle Data in The Cloud Based on Identity Role-based Access Control

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Abstract – Security is one of the main considerations in choosing file storage media. Cloud server is one of storage mediums that provides virtual resources to users through third party and it can be accessed through the Internet connection. Cloud computing has several advantages, such as ease to access, ease to control, user-friendly to operate, and flexible capacity. However, these advantages cause potential security problems such as data breach attack. Therefore, a strong security system becomes important to overcome the losses caused by these security problems. A solution to increase the security level is utilizing cryptography algorithms. Due to the discovery of several loopholes in the traditional cryptosystems, the concept of using Computational Deoxyribonucleic Acid (DNA) cryptosystem was identified as a possible more complex cryptosystem to solve. Meanwhile, Rolebased Access Control (RBAC) provides efficient and strong ways to manage authorization of the system resources based on user authentication. By cooperating with Identity-based Cryptography (IBC) and DNA cryptosystem, we propose an efficient authentication system to securely access electric vehicle (EV) data stored in the cloud server based on identity-based RBAC.

Keywords: DNA-based cryptosystem; identity-based RBAC; identity-based cryptography; EV data; cloud security

Performance Analysis of Terrestrial Radio Signal Receiver Using RTL-SDR GNU Radio Based on Raspberry Pi

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Abstract – This research focuses on analyzing the performance of Register Transfer Logic – Software Defined Radio (RTL-SDR) as a terrestrial radio signal receiver using a Raspberry Pi microcontroller. Where the architecture of this Software Defined Radio functions as a hardware-oriented communication tool that can be managed by the software. The system design on the receiver begins by configuring the Raspberry Pi as a receiving computer that is installed with GNU Radio software as a signal processor received by RTL-SDR hardware. The signal will be received in the FM Radio spectrum at very high frequency (VHF). The results will be displayed in the spectrum Graphical User Interface (GUI) showing the value of power receiver. And a constellation diagram showing the results of Phase Shift Keying (PSK) modulation and its modulation development. Tests demonstrate that the radio station obtained 44 channels with an average power receiver of -20,24 dBm. Meanwhile, testing was also conducted using USRP with signal generation on the 92 MHz frequency channel. The condition where free space loss with a test distance of 1 to 8 meters resulted average power receiver of - 14,188 dBm. In tests given a walls and roofs of buildings obstacles obtain a center value of power receiver of -24,72 dBm for all radio frequencies.

Keywords: Terrestrial signal, Software Defined Radio, USRP, Raspberry Pi, RTL–SDR, GNU Radio

A Crop Recommendation System for Smart Agriculture Using Random Forest Method

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Abstract – Soil is the main factor in growing crops on agricultural land. By choosing the right type of plant for planting seeds will affect to farmer's harvest result. However, the current problem are farmers lack of knowledge regarding selecting plant seeds that are suitable for the existing land. Thus, crop failure often occurs due to the wrong choice of plant seeds in the existing soil conditions. Therefore, in this research, a crop recommendation system was carried out on agricultural land using the random forest method. This method function to find and improve the accuracy results of data classification and will obtain predictions for the final classification. By utilizing ESP32 which is integrated with a 7-in-1 soil sensor to measure the parameters sought and also adding a machine learning algorithm. As the result, the random forest method produces an accuracy of 96% improved using Bayesian optimization by searching for the best hyperparameters This method utilizes Wi-Fi and LoRa for communication.

Keywords: Soil, Random Forest, Sensor 7-in-1 soil

Combining Clipping and Channel Coding for Effective PAPR Reduction in OFDM System with GNU Radio-USRP

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Abstract – The high value of Peak to Average Power Ratio (PAPR) is one of the problems in modulation schemes such as Orthogonal Frequency Division Multiplexing (OFDM). It will trigger negative impacts such as being susceptible to non-linear distortion and increasing the bit error rate resulting in degraded signal quality. This research uses innovative methods of clipping and channel coding to reduce the PAPR value in the performance of Digital Video Broadcasting - Terrestrial (DVB Terrestrial) systems. The main focus of this research is OFDM, with evaluation of various performance metrics such as PAPR value, Complementary Cumulative Distribution Function (CCDF), Bit Error Rate (BER) and 64-QAM constellation diagram. This research involves a comprehensive analysis of clipping and channel coding methods, integrated with DVB Terrestrial systems, and implemented using Software-Defined Radio (SDR). As a versatile transceiver, SDR is comprised of two components: GNU Radio for software and Universal Software Radio Peripheral (USRP, herein referred to as USRP N2920) for hardware. The purpose of this work is to construct a transmitter and receiver for Digital Video Broadcasting Terrestrial/Satellite (DVB-T/T2/S/S2) using the 64 QAM modulation technology. The video is then broadcast in real-time on GNU Radio and USRP. The results of this simulation and research are presented in the form of analysis of the resulting PAPR value, OFDM DVB-T frequency spectrum, OFDM DVB T constellation diagram, and bit error rate (BER) value.

Keywords: PAPR, DVB-T, GNU Radio, Clipping

Deep Learning based Channel Reciprocity Technique for Secret Key Generation

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Abstract – Wireless technology is a development of modern technology where data exchange and communication can be carried out without cables, which cannot be separated from daily activities. But behind the convenience of this wireless technology, there is a problem or threat in the form of tapping and data theft. So in this paper, a key generation system will be created which is expected to be used for a security system for wireless technology. In this paper, the technology used is LoRa. However, the key generation rate on LoRa is often low due to environmental factors. One way to overcome this problem is by conditioning the value of the high RSSI correlation coefficient. In this paper, we propose, a key generation system that was created to increase Channel Reciprocity based on the Deep Learning pre-process method and the Uniform Quantization method to obtain a high correlation coefficient value. From the experimental results, it can be seen that RSSI correlation values were successfully increased using the deep learning method that has been designed in all scenarios and the secret key is successfully generated. The most number of keys obtained is 18, with each key having a length of 128 bits.

Keywords: RSSI, Secret Key Generation, Deep Learning, Channel Reciprocity, LoRa

Reliability Study of TDoA-based Emission Localization in Using Simple RTL-SDRs

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Abstract – In the production of vaccines targeting antibiotic-resistant viruses, fertilized eggs are frequently used to develop antibodies. It is important to continuously check the egg fertility to reduce the wastage of valuable antibody samples. This paper presents a system for detecting fertile and infertile eggs using image processing and deep learning technology based on egg images. The system holds 6 eggs with illumination under each egg and using a camera placed 17 cm above the eggs. The system employs the SSD MobileNet-V2 FPNLite model with an input image size of 320x320 pixels to detect the location of the eggs and to classify them. The training result yields a classification loss of 0.031, a localization loss of 0.0038, and a total loss of 0.085. The system, which operates on a Raspberry Pi 5 with 4 GiB of RAM, achieves 10.69 FPS. The testing result without noise gives a classification accuracy of 100% while the system produces a classification accuracy under the threshold, which is 50%, for the eggs under pepper noise with a noise level above 0.05.

Keywords: TDoA, RTL-SDR, timestamp, Spectrum Monitoring

Performance Analysis of ADSB Signal Receiver SDR for Low Cost ADSB Mini Radar

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Abstract – Airplanes are a type of transportation that is often used worldwide and have busy flight schedules. An Automatic Dependent Surveillance-Broadcast (ADSB) radar is needed to regulate traffic and monitor flight path movements. ADSB is an observation technology used to transmit aircraft information. Procuring the construction of ADSB radars and Air Traffic Control (ATC) towers at airports takes a long time and is very expensive. The Register Transfer Logic-Software Defined Radio (RTL-SDR) tool aims to reduce operational costs and shorten the time required to build ADSB radars and ATC towers. This tool also provides more mobility because it can be used and accessed anywhere without being built in a specific location. This research discusses the SDR performance analysis of ADSB signal receivers using Raspberry-based RTL-SDR. This analysis uses two SDR antennas as ADSB signal receivers and is carried out in different places. The message bit information that has been received will be processed and displayed using dump1090 and Piaware software. The expected result is an antenna that can receive ADSB signals with a more comprehensive and optimal range as an alternative to ADSB mini radar.

Keywords: Signal ADSB, RTL-SDR, Antenna receiver, ATC tower, ADSB radar

Performance Analysis of Physical Layer Key Generation (PLKG) Scheme in Static Environment-based LoRa

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Abstract – Since the emergence of Internet of Things (IoT) technology on the surface a few years ago, this IoT technology has been advancing. It has attracted the attention of cybercriminals. One of the cybercrime targets is the security of key management systems and their distribution schemes. This paper offers a solution to this issue by using a physical layer key generation (PLKG) scheme which utilizes the received signal strength indicator (RSSI) from a Long Range (LoRa) device as a key extraction source. The proposed scheme utilizes several methods. Polynomial fitting is used for the initial fitting process, 2-Ary quantization for conversion of RSSI to multibit, BCH to correct the difference in bits obtained between the two authorized users, privacy amplification for increased randomness, and AES-128 for encryption of sent messages. The expected outcome of this paper is that the scheme developed can generate keys with high approximate entropy and fulfills randomness requirements so that there is no need to distribute keys between authorized users. Testing the success of the scheme will be carried out in indoor and outdoor environments with static user positions. The test results show that the keys generated in all scenarios meet the randomness requirements with approximate entropy values above 0.01.

Keywords: IoT, LoRa, PLKG, RSSI, approximate entropy.

04. [IES-ETA]
Robotics Technology and Control Systems

Fast Foothold Planning for Quadruped Robot Locomotion using Topological Perception

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Abstract – Recent advancements in legged robot locomotion systems have led to significant improvements in their agility and overall performance. However, for these systems to effectively handle sudden obstacles, especially in foothold areas, real-time integration of external information is crucial. In this paper, we introduce a rapid integration approach between perception and action in legged robot locomotion to address such unexpected external obstacles. We utilize depth sensors to capture external data in the form of pointclouds. We have developed a fast surface perception model based on topological information, employing dynamic sparsity through the growing neural gas algorithm. This model addresses several key challenges in 3D point cloud extraction: 1) Extracting object features from a smaller portion of data. 2) Controlling granularity in unsupervised learning using a topological structure. 3) Controlling granularity with only 3D positional point cloud information. To evaluate the effectiveness of our proposed method, we conducted a series of progressive experiments. Initially, we compared the performance of our topological perception model with similar approaches. Subsequently, we carried out qualitative and quantitative experiments using a real, low-cost quadruped robot.

Keywords: Topological Perception, Growing Neural Gas, Robot Locomotion.

Compact and Lightweight Foldable Umbrella Heatshield for CanSat-Scale Planetary Probes Lander Mission

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Abstract – A planetary probe must fulfill specific mass and space constraints to achieve its desired altitude. A thruster rocket also has constraints for its payload. To succeed, some mechanisms are foldable, inspired by origami, and some employ one component for another mechanism or function. In planetary probe lander missions, heatshield systems are needed to make sure built-in components aren't burnt by the friction between the atmosphere and payload body. The heatshield's placement at the bottom of the payload has advantages for other mechanisms, such as the upright and release mechanisms. First, the leadscrew mechanism is designed to translate rotating forces into vertical forces to control heatshield opening. Controllable heatshield holes enable the employment of heatshield as a locking mechanism when in stowed position and a release mechanism after reaching the appropriate altitude. While falling, the heatshield works as an aerobraking mechanism to control the payload's drop rate. Once landed, the heatshield works as an upright mechanism, and the leadscrew enables small DC motors to upright 45-degree slope payloads. The proposed mechanism was evaluated on the CanSat scale, with a resulting stability MAE of 34.48 and 62.17 for tilts X and Y, respectively. The targeted descent rate of 20 m/s or less is likewise accomplished by the heatshield.

Keywords: Heatshield, Planetary Probes, Lander mission, Compact, Lightweight.

Precise Long Passing Skill on Middle Size League Robot Soccer ERSOW Using Teammate Detection and Pivot Motion

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Abstract – The ERSOW robot, a competitor in robot soccer leagues, struggles with its current long-distance passing technique. This method, reliant on robot localization to feed robot orientation adjustments, suffers from accumulating odometry errors and unintended deviations in the ball's trajectory. This research proposes a novel approach to optimize the ERSOW robot's long-distance passing skills, addressing these limitations. The proposed solution incorporates two key elements: ball pivoting movements and a vision system. Ball pivoting maneuvers enable the robot to maintain control of the ball's position during orientation adjustments, minimizing deviations caused by robot movement. Additionally, the integration of a vision system allows the robot to continuously track the receiving teammate's location in real-time. This realtime information enables adjustments to the passing trajectory, mitigating the negative effects of odometry errors. The effectiveness of the proposed approach was evaluated through experimentation. The results demonstrate a success rate of 100% for kickoff passes with an average completion time of 1.21 seconds at a distance of 400 cm and 95.83% for corner passes with an average completion time of 2.44 seconds at a distance of 600 cm. This suggests that 600 cm is the optimal passing distance for achieving successful long passes.

Keywords: Robot Soccer, Ball Passing, Localization, Teammate Detection, Moving Average, Motion Control.

Fuzzy Logic Implementation to Improve the Accuracy of Ball Shoots on ERSOW's Soccer Robot

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Abstract – This research aims to improve the quality of kicks on the ERSOW robot and bring the team closer to success in national and international wheeled soccer competitions. The focus is to increase the accuracy of kicks to pass to fellow teams or kick towards the goal. Adding a voltage sensor to the capacitor charging process allows this closed-loop system to be controlled more precisely. Furthermore, the PWM value given will be adjusted to the expected kick power and the capacitor's contents. A fuzzy logic controller will be used to control the entire kicking system. The fuzzy logic controller input is the angle of the ball kick and the distance the ball falls. This results in the force of the kick, the ball passing through the opponent, and the ball going to the appropriate point. The result is a robot kick with maximum PWM requires an average current of 52.5 A and a peak power of up to 19306.7 Watts. With this maximum kick, it takes 9 seconds for the capacitor to be fully charged at a voltage of 450 V. Based on the results of ball kick testing using the Fuzzy Logic Controller method (FLC) obtained a very minimal error with an average of 0.06 m for the kick drop point and also 0.11 degrees for the kick angle.

Keywords: Robot soccer, RoboCup, ERSOW, Fuzzy Logic Controller

Integrating LiDAR-Based Collision Avoidance on AMR-T for Advancing Operational Safety

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Abstract – Automatic Mobile Robot Transporter (AMR-T) represents a vital component in modern factory operations, offering enhanced efficiency and productivity. However, the deployment of AMR-T systems necessitates robust protection mechanisms to ensure safe navigation within dynamic environments. This study addresses the development of a protection system employing LiDAR sensors and fuzzy logic to enable obstacle detection and avoidance for AMR-T. LiDAR sensors are utilized to gather spatial data, enabling real-time analysis of the surrounding environment. Leveraging fuzzy logic, the system autonomously generates intelligent navigation decisions amidst uncertain or ambiguous conditions. The project encompasses comprehensive stages, including requirements analysis, system design, implementation, and rigorous testing. Key considerations such as system reliability, response, and detection accuracy are paramount throughout the development process. To maximize system performance, secondary sensors including inductive proximity sensors and limit switches were added. Results show high accuracy with an average error of 0.56%, effectiveness of inductive proximity sensors up to 14 mm, and reliability of limit switches for operational safety. The fuzzy logic approach successfully interprets collision threats and generates appropriate avoidance actions. This system enhances operational efficiency and safety, reduces the risk of product damage, and advances automation technology in the manufacturing industry. The anticipated outcomes aim to elevate operational efficiency and safety within factory settings, while also contributing to the advancement of automation technology across the manufacturing industry.

Keywords: Automatic Mobile Robotic Transporter (AMR-T), collision avoidance system, LiDAR sensor, fuzzy logic, obstacle detection.

Integrated Footstep Planning and CoM Control for Enhanced Stability and Maneuverability in EROS Humanoid Robot

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Abstract – This paper presents the implementation of a footstep planner and Center of Mass (CoM) control on the EROS (EEPIS Robot Soccer) humanoid robot utilizing a multibody system model. The objective is to enhance the robot's stability and maneuverability during dynamic walking. The footstep planner algorithm is designed to generate optimal step sequences based on the robot's kinematic constraints and environmental conditions. Concurrently, the CoM control strategy ensures balanced movement by dynamically adjusting the robot's posture and distribution of mass. The multibody system model provides a comprehensive framework for simulating the complex interactions between the robot's joints and links. Experimental results demonstrate improvements in the EROS robot's walking performance especially in odometry measurement and robot stability, highlighting the importance of integrating footstep planning with CoM control. This study contributes to advancing humanoid robotics by addressing the challenges of stability and locomotion control.

Keywords: Humanoid Robot, Footstep Planning, Center of Mass (CoM) Control, Multibody System Model

Design and Implementation of an Automatic Docking System on PENSHIP Roboboat

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Abstract – This paper presents the design and implementation of an automatic docking system for the PENSHIP ROBOBOAT, an Autonomous Surface Vehicle (ASV). The main focus of this research is to develop an efficient and accurate automatic docking system using ultrasonic and GPS sensors, supported by Gazebo simulation with ROS2-Humble, heading control, and waypoint navigation. The Raspberry Pi microcontroller serves as a mini-PC to process sensor data. The system employs ultrasonic sensors for distance measurement during docking and GPS sensors for position identification, ensuring precise navigation to the designated docking location. The Gazebo simulation tests the system's accuracy in achieving automatic docking positions, utilizing PID control for heading control and waypoint navigation based on target longitude and latitude. The test results show that the system achieved an average error of 0.26 metres with the optimised PID value. This research contributes to the development of automatic docking technology for ASVs and offers a foundation for future advancements in automated maritime technology.

Keywords: ASV, Automatic Docking System, Gazebo Simulation, Heading Control, Waypoint Navigation, PID Control

Optimizing YOLOv8 for Real-Time Performance in Humanoid Soccer Robots with OpenVINO

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Abstract – Humanoid soccer robots have become an exciting area of research and competition, showcasing advances in artificial intelligence and robotics. These robots require fast and accurate vision systems to detect balls, goalposts, field markings and obstacles, thus ensuring effective navigation on the field. Real-time object detection is critical for various domains, including humanoid robots, autonomous vehicles, and video surveillance. Among object detection frameworks, YOLOv8 (You Only Look Once) is famous for its balance between speed and accuracy. This research aims to optimize the performance of YOLOv8 using OpenVINO, a toolkit designed to accelerate deep learning models on Intel hardware. We conducted experiments using a dataset of more than 12,000 images categorized into 5 classes: goal, orange ball, T line, L line and X line on the field using a NUC1017FNH mini pc to evaluate the improvement in frames per second (FPS) and accuracy. Our results show that OpenVINO almost doubles the inference speed of YOLOv8 while maintaining accuracy. This optimization improves the humanoid robot vision system, ensuring robust performance in real-time scenarios.

Keywords: Humanoid Soccer Robots, YOLOv8, OpenVINO, Object Detection, Inference Speed, Deep Learning Optimization

Rapid Goalpost Detection through Candidate Generation and Hough Transform in Humanoid Soccer Robots

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Abstract – In the competitive sphere of humanoid soccer robotics, real-time and accurate identification of goalposts plays a crucial role in various key functions like aiming the ball to score goals, locating robots, devising strategies and navigating obstacles efficiently. The shift from yellow to white goals in major competitions, such as RoboCup, has posed a notable challenge in visual perception that affects the performance of our humanoid soccer robot named EROS (EEPIS Robot Soccer). The main issue at hand is that robots struggle to perceive and engage with their surroundings, especially aggravated by the constraints of deep learning methods. Although highly accurate, these techniques are not practical due to their computational requirements, which are unsuitable for the limited processing power available in humanoid soccer robots. Tackling this challenge is vital for enabling robots to operate autonomously in dynamic and competitive environments where changes like lighting conditions and background variations further complicate goal detection. In this paper, we introduce a novel goalpost detection system that leverages image processing techniques, including image morphology, filtration, generation of goalpost candidates, and the Hough transform. This approach aims to balance accuracy and computational power, providing a sustainable solution under the constraints of humanoid robotics. The implemented system enhances the EROS humanoid robot's goal detection capabilities, ensuring improved performance under diverse conditions while maintaining computational efficiency, marking a step forward in the development of more adaptable and resource-efficient robotic vision systems.

Keywords: Goalpost Detection, Visual Perception, Humanoid Soccer Robot, Hough Transform, Image Processing, Computational Efficiency.

Smart Cat Litter Box with Ammonia Gas Level Controller using IoT-Based Fuzzy Logic

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Abstract – This research aims to design a smart cat litter box capable of automatically cleaning waste and reducing odours through features such as sand filtering, fragrance spraying, and sand refilling. The TGS2602 gas sensor and the HX711 load cell weight sensor is used to measure the weight of the sand and the ammonia (NH3) gas content, respectively, which are then used as inputs for fuzzy logic to determine the processes of sand filtering, fragrance spraying, and notification. Gas sensor testing showed the detection of waste odours in the range of 10 ppm – 30 ppm, while weight sensor testing detected changes in sand weight due to waste addition in the range of 40 grams – 130 grams. Both sensor data were classified into three categories each as fuzzy variables. The decisions generated by the fuzzy logic were consistent with the predetermined rules, with an error percentage below 2%. Notification alerts via Telegram are triggered when abnormal conditions are detected, specifically when the sand weight exceeds 90 grams and the ammonia gas concentration exceeds 15 ppm. The cleaning process, which involves filtering, can reduce the amount of waste by 79.5% and decrease ammonia gas levels by 48.2%, while the spraying process reduces ammonia gas levels by 37.14%. With this smart cat litter box, the issues of accumulated waste and odours in the litter box can be effectively reduced.

Keywords: Litter Box, Fuzzy Logic, Mamdani, Ammonia, Odour

Dynamic Analysis on Forklift AGV With Center of Gravity Method

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Abstract – This research discusses how dynamic analysis can help reduce the risk of work accidents in forklift operations. With the center of gravity method, we can find out the displacement of the center of gravity on the forklift. Every forklift works, starting from lifting weights, moving forward until turning right or left. Then the forklift has a pyramid of stability, or the space limit of the center of gravity, to determine the stability condition of the forklift. By deriving the equation, we can know the acceleration limit of the forklift when moving forward and turning. When the forklift moves forward, with maximum load 1600 Kg and minimum lifting height, the AGV forklift we developed can have an acceleration of 3,94 m/s^2. Whereas when the maximum height of acceleration that can be used to remain in a stable condition is only 0,35 m/s^2.

Keywords: Dynamic Analysis, Automated Guided Vehicle Forklifts, Center Of Gravity, Pyramid Stability, Mechanical System, Pallet Stacker

05. [IES-KCIC]
Knowledge Base and Engineering

Implementing Crowdsourcing in Smart Government: An IT Perspective Review

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Abstract – This study explores the critical role of crowdsourcing platforms in facilitating citizen participation and policy development within the smart government framework. Through a systematic literature review encompassing publications from 2019 to 2024, we reveal that design principles such as user-friendliness, inclusivity, and the utilization of advanced data processing technologies significantly contribute to improved policy quality and public engagement. This research presents findings that illustrate how crowdsourcing can strengthen democratic processes by encouraging broader and more responsive citizen participation in policymaking. Highlighting the importance of standardized methodologies and governance mechanisms, this study provides practical guidance for policymakers and IT developers to design and implement more effective crowdsourcing initiatives. Our findings affirm the transformative potential of crowdsourcing in enhancing government-citizen interactions and advancing governance quality in the digital age.

Keywords: Crowdsourcing, Citizen Participation, Policy Making, Smart Government, Systematic Literature Review

Creating Feedback to Maintain Motivation when Doing Home Based Exercise Using Pose Estimation: Single Subject Design

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Abstract – Muscle weakness can hinder body functions, but regular strength training allows us to overcome this obstacle. However, maintaining motivation for home exercise can be challenging, yet achievable goals, a supportive environment, and constructive feedback can enhance the motivation. This study develops a support system that provides feedback on a user's exercise performance and evaluates the effect of such feedback on a user's motivation. In this study, we examined the effect of providing feedback to the subject during home exercise, i.e., squats, on his motivation to continue exercising. For 10 exercise sessions within 10 days, we implemented an A-B research design with two distinct periods, referred to as Baseline A and Intervention B. During the Baseline A period, the subject performed squats without receiving any feedback on his performance. His health and motivation levels were assessed before and after each exercise session. During the Intervention B period, the subject received feedback after each set of movements. After completing all the training and intervention sessions, the subject was asked to complete a questionnaire regarding the feedback he received. During this period, we used pose estimation to analyze the exercise performance based on the subject's pose. The analyzed results were displayed through a web interface accompanied by instructions on the correct pose to perform squats. The overall results of this study showed an improvement in the subject's performance and increased motivation in performing squats during the Intervention B period. The improvement showed a positive correlation with the feedback provided by the system and the sense of accomplishment experienced by the subject.

Keywords: Home Based Exercise, Pose Estimation, Maintain Motivation, Creating Feedback, Single Subject

Securing the Privacy of Transactions Using Blockchain: Swap Battery Framework for Massive Subsidy Electric Motorcycle in Jakarta

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Abstract – The ecosystem of electric vehicles is developing very rapidly in Indonesia, especially in Jakarta, with the government's policy support for relatively massive electric vehicle subsidies. Especially with the electric motor, there are large transactions, so compared directly with the after-sales service, especially the battery replacement infrastructure, Battery replacement and payments use third parties as payment gateways, so that information is shared between the parties. However, short payment processes create concerns about user privacy and the exploitation of payment data. This can be used by data thieves who hack centralized data and sell the data on the black market. This study aims to propose a decentralized battery replacement transaction framework using blockchain. Utilizing interconnected blocks and cryptography, this scheme can ensure data authenticity and guarantee user anonymity in payments. The address wallet is used as an anonymous entity for each person without revealing the owner's personal data.

Keywords: blockchain, swap battery, payment, framework.

The Combination Of K-Means And A* Methods For Determining The Best Route For Vegetable Sellers

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Abstract – Mobile vegetable sellers, as part of the informal sector, play a vital role in providing employment opportunities for workers who cannot be absorbed by the formal sector. They also serve as the primary providers of daily vegetable and food needs in urban environments. While conducting their trade, these vendors tend to scatter around residential areas or villages to interact with consumers in need of their services. From interviews with four mobile vegetable vendors, they revealed that the timings and sales routes are done randomly, without agreements among fellow vendors, leading to uneven distribution. Therefore, this study develops an application that integrates the K-Means and A* methods to determine the optimal routes for mobile vegetable vendors in Palangkaraya, Central Kalimantan. The K-Means method is used to divide selling zones based on customer location data entered in the system. The optimal number of clusters used in the K-Means method is determined by calculating the elbow method based on customer location points. After the clustering process, the A* method is employed to find the optimal routes based on location points that are in the same cluster/zone as the results of the KMeans method. Testing and evaluation indicate that the system provides results consistent with manual calculations, and respondents express that the application is beneficial, informative, and easy to use.

Keywords: best route, k-means, A* method, travelling salesman problem.

Comprehensive Risk Evaluation Model for Data Center Security Risk Assessment

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Abstract – Data centers play a crucial role in modern organizations by storing and processing large volumes of sensitive information. However, the evolving threat landscape and the increasing sophistication of cyberattacks pose significant security challenges to data centers. To ensure the integrity and availability of critical data, this research endeavors to address this pressing need by proposing a cuttingedge Comprehensive Risk Evaluation Model (CREM). By systematically assessing and mitigating the various dimensions of risk associated with data centers, CREM aims to redefines risk assessment through its dynamic, iterative framework, where ongoing recursive loops constantly find threats, examine events, and assess vulnerabilities. The study involves a comprehensive literature review, basic related concepts, methodology and development of risk evaluation model architecture that addresses the identified gaps. The model incorporates modules for threat source identification, threat event analysis, risk assessment, vulnerability scanning, risk impact analysis, threat level identification and whole control evaluation process. This research aims to enhance security practices, enabling proactive risk identification and mitigation. The findings contribute to the field of data center security and offer practical guidelines for improving security posture.

Keywords: Data Center, Risk Evaluation Model, Risk Assessment, Risk Identification, Risk Analysis, Risk Evaluation.

Enterprise Architecture in E-Government Application: A Systematic Literature Review

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Abstract – ——Electronic government (E-government) initiatives have enabled government agencies to deliver public services and information efficiently and effectively. Designing and sustaining an e-government application using an Enterprise Architecture (EA) approach is necessary to align government applications with government objectives while avoiding unwanted system failures. Although several review papers discuss EA, they have all focused on nongovernmental organizations. This literature review aims to identify and analyze current EA practices in government agencies using 32 primary studies, following Kitchenham's guidelines. The VOS viewer application was used to develop research questions based on the Population, Intervention, Comparison, Outcome, Context (PICOC) criteria. The findings of this literature review demonstrate that government agencies mostly implement EA in the design of e-government applications, integration between EA and other standards, and phases of the implementation of EA as architectural solutions to government agency issues. The local governments, which are the government agencies that mostly implement EA in designing e-government applications, have used The Open Group Architecture Framework (TOGAF) as a guideline for integrating cloud and big data standards in the business, information, application, and technology phases to address data integration issues.

Keywords: enterprise architecture, IT system, TOGAF, design, e-government.

Geographical Mapping and Knowledgebase Indicative Cost Estimation for Direct Air Capture CO$_2$ Utilization

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Abstract –The intensification of concerns about climate change has led to a growing interest in the development of advanced technologies with the potential to reduce CO$_2$ emissions. One such technology is direct air capture (DAC), an innovative negative CO$_2$ emission technology in its early stages of commercialization. Through DAC, CO$_2$ concentrations in the atmosphere can be effectively reduced, and the captured CO$_2$ can be utilized to create products such as construction materials and synthetic fuels. Currently, there is no method or tool available to assess the viability of carbon capture and utilization (CCU) projects accurately. Therefore, we propose the development of an easy-to-use tool and method that will ensure a certain degree of accuracy for early-stage investment decisions for CCU projects. This research presents a knowledge-based indication method with a system for making the most suitable location recommendations for DAC and cost simulations to support decisions for CCU from a micro-local perspective and promote and accelerate application and scalability. Proof of concept for the systems was successfully completed by verifying their functionality using sampled real data from the concrete and greenhouse cultivation industries applied to the Tokyo region. As a subsequent stage in the project, the database will be acquired and aggregated with global coverage

Keywords: CO$_2$ Direct Air Capture (DAC), Carbon capture and utilization (CCU.

The Influence of Self-Service Kiosks on Customer Experience in Retail Stores

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Abstract – The retail business continues to develop due to consumers demanding faster and easier transactions. In order to meet these demands, retail businesses are adopting cuttingedge technology, such as Self-Service Technology (SST), which allows customers to serve themselves without employee involvement. Self-service kiosks (SSK), which are the result of SST adoption in the retail industry, can improve the quality of customer shopping. Thus, retail businesses implement SSK in the hope of improving customer experience. However, implementing SSK technology is not without challenges, so it is important for retail businesses to find out how necessary SSK is for business. This research focuses on the impact of SSK on customer experience using the Delone & Mclean model. The research results show that the SSK system, information and service quality influence customer satisfaction. Thus, high SSK quality has a positive effect on customer experience in retail stores.

Keywords: SSK, Customer Experience, Retail Store, Delone & Mclean, Self-Service Technology.

Mycobacterium Tuberculosis Detection on Sputum Smear Microscopic Images Using Attention-Based Multi-Scale Convolutional Neural Network

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Abstract – Tuberculosis (TB) remains a significant global health issue caused by the bacterium Mycobacterium tuberculosis. In 2021, the World Health Organization (WHO) reported approximately 10.6 million TB cases and 1.6 million deaths due to the disease. Diagnosing TB involves various methods, including the Mantoux test, Interferon Gamma Release Assays, sputum smear microscopy, and chest X-rays. Among these, sputum smear microscopy is commonly used by laboratory technicians to identify TB, involving the ZiehlNeelsen staining technique to detect red-colored bacteria in sputum samples. However, visual detection using the naked eye has limitations, such as time consumption and reliance on technician expertise, leading to potential inaccuracies and fatigue. This research proposes an automated detection system using deep learning to improve the efficiency and accuracy of TB diagnosis from sputum samples. The system aims to reduce the time required for diagnosis and assist technicians in making accurate decisions regarding TB infection. The proposed model employs Attention-based Multiscale CNN algorithms to automatically detect the presence of Mycobacterium tuberculosis in stained sputum samples. The model was tested and achieved an accuracy of 97.56%, demonstrating its effectiveness as a reliable tool for TB diagnosis. By implementing this system, laboratory technicians can benefit from more accurate and faster diagnosis, improving patient outcomes and addressing the challenges associated with manual detection. This research highlights the potential of deep learning technology in enhancing TB diagnostic processes.

Keywords: Tuberculosis, Deep Learning, Attention Based, Multiscale CNN.

Predictive Modelling of Gas Turbine Emissions based on Generalized Regression Neural Network Method Approach

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Abstract – Gas turbines are essential in various industries but are sources of pollutants such as NO, CO, SO_2, and particulate matter. For several process sectors, Predictive Emissions Monitoring Systems (PEMS) have shown to be a practical substitute for CEMS. By integrating PEMS, the emission prediction technique could be streamlined and a more cost-effective solution that complies to regulations. This study employs the General Regression Neural Network (GRNN) method to predict gas turbine emissions, utilizing a setup with 16 input parameters. The network architecture includes a hidden layer with 32 neurons using ReLU activation and a single output neuron with linear activation, trained over 100 epochs with the Adam optimization algorithm. This configuration aims to improve predictive accuracy and reliability by leveraging GRNN's robust pattern recognition capabilities and the efficient optimization of Adam's method. The model demonstrates excellent performance for predicting CO_2, O_2, SO_2, and NO, based on metrics such as MSE, MAE, MAPE, and R^2, indicating accurate predictions and a good model fit. However, carbon monoxide (CO) predictions show higher error metrics (MSE and MAE), suggesting greater variability in the predictions.

Keywords: Adam, Emission, GRNN, PEMS, ReLU.

Developing Web-Based Application for QR Code Digital Signatures using OpenSSL

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Abstract – Despite advancements in technology, many workrelated activities still require signature verification. Digital signature technology offers a suitable solution that can be implemented through information technology. This research presents the development of a digital signature application utilizing hash functions using SHA-256 to generate digital signature tokens while OpenSSL is used to create valid digital signatures that start with generating a key pair. The application features automatic conversion of the generated tokens into QR codes, simplifying the verification process. It is developed using custom core system classes within the CodeIgniter framework. The implementation of these custom core system classes has yielded positive results. This application is designed to facilitate the secure and efficient authorization of document signing. Testing revealed that digital signature generation took under 0.0210 seconds, while file uploads varied from 0.0655 to 0.0851 seconds for file sizes ranging from 100 KB to 1000 KB. Additionally, user authentication testing ensured prompt delivery of OTPs via email and robust resistance to Man-in-theMiddle attacks, demonstrating secure transmission of login data over HTTPS. The analysis affirmed signature integrity, authenticity, and QR code verification efficiency, ensuring secure and efficient document signing authorization.

Keywords: digital signature, hash, QR code, RSA algorithm, SHA-256, OpenSSL.

The Queue System of Kemlagi Community Health Center Using Decision Tree Method Based On a Website

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Abstract – An efficient and organized queuing system is crucial in healthcare services at community health centers (puskesmas). However, puskesmas often face challenges in managing patient queues effectively. This study proposes the development of the Kemlagi Health Center Queue System based on a website to enhance queue efficiency and user experience. Through the website, users can register, select a clinic, obtain a queue number, and view the estimated waiting time. The system also provides notifications via text messages or push notifications when their queue number is about to be called. The Decision Tree method with the C4.5 algorithm is used to predict clinic referrals based on patient data and complaints. This system is expected to optimize queue management, reduce waiting times, and improve user satisfaction. This research contributes to the development of innovative technological solutions for health center services and strengthens the application of machine learning in queue systems.

Keywords: Queuing Health center, Decision tree, C4.5, Data mining.

Setting and Monitoring System for Motors on Rear Axle using Android Automotive Operating System

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Abstract – Electric vehicle consist of various parts, one of which is powertrain. Powertrain consist of many components one of which is motor and the motor itself needs monitoring to prevent problems. In this research, In-Vehicle Infotainment (IVI) system is used to monitor and set driving mode on motor. This research utilizes Android Automotive OS for developing IVI and develop an application based on Android Automotive OS to monitor motor RPM and set driving modes. In addition, in this research also used differential drive on the Differential Control Unit (DCU) to simulate the rear axle. The system employs an STM32F407 as the DCU and a Raspberry Pi as the Centralized Control Unit (CCU), using Control Area Network (CAN) communication. Test results demonstrated that the developed application successfully displays RPM values calculated by the DCU and sets the driving mode on the motorbike. The Ackermann implementation was tested, confirming differential motor speeds during turns. Driving mode effects on motor response were evaluated, showing that sport mode had a more aggressive response compared to normal and eco modes, and driving mode influenced the motor's maximum current usage. Additionally, the research measured the processing times for each step: the response from the PXN devices to the motor, data transmission to Android Automotive OS (AAOS) and its display in the app, and transmitting driving mode data to the DCU. The results confirmed efficient communication and processing across all components.

Keywords: Android Automotive Operating System, Rear Axle, Differential Drive, Controller Area Network.

06. [IES-KCIC]
Computational Intelligence
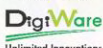
Application of AlexNet, EfficientNetV2B0, and VGG19 with Explainable AI for Cataract and Glaucoma Image Classification

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Abstract – The rapid integration of Artificial Intelligence (AI) has significantly improved healthcare outcomes, especially in ophthalmology. However, Deep learning algorithms are often called to as 'black-box' models, making interpreting decision processes difficult. The Explainable AI approach helps understand AI model predictions by explaining the decisionmaking process based on features. The Research objective is to find the best model for classifying eye disease images through experiments using AlexNet, EfficientNetV2, and VGG19 architectures. The selected best model will be analyzed using Grad-CAM, enhancing transparency and interpretability in healthcare AI models. This study employs multi-class classification using AlexNet, EfficientNetV2B0, and VGG19 architectures to classify cataract, glaucoma, and normal fundus. Different holdout-validation techniques (70:30, 80:20, 90:10) and optimization strategies (Adam, AdamW, RMSProp, SGDM) are studied for effective disease classification. The experimental results found that the best-performing model, EfficientNetV2B0 with holdout 90:10 and RMSProp optimizer, outperformed other models in accurately classifying fundus images. The model demonstrated strong performance with high recall, precision, f1-score of 0.8969, 0.8970, 0.8969, and an accuracy rate of 89.77%. Grad-CAM analysis also identified unique features of each eye disease class, for example, cataracts. AI model is capable of detecting cataract characteristics through the level of opacity in the eye lens, underscoring its robust classification capabilities in eye disease diagnosis.

Keywords: cataract, deep learning, glaucoma, grad-cam, XAI.

Plant Health and Severity Recognition System for Pechay (Brassica rapa ssp. chinensis) Using Convolutional Neural Network

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Abstract – Pechay, known as Bok Choy, is essential in Filipino cuisine, producing over 47,500 metric tons in 2020. Health monitoring is recommended to enhance pechay yield and quality for easier application of mitigation methods upon health declines. This study developed a system to help local farmers or hydroponics enthusiasts identify pechay leaf symptoms, allowing timely interventions. Health monitoring involves visual inspections for symptoms like leaf yellowing (chlorosis), browning, or blacking (necrosis). A REST API-based client (Raspberry Pi) and server (laptop) system automates this process. The model outputs the (1) health condition and (2) severity of the Pechay. It employs a multioutput convolutional neural network (CNN) model trained with a self-collected dataset from a hydroponic setup. The model reached 89% and 88% accuracy for plant health and severity detection, respectively. The system, tested on over 100 pechay samples, achieved an 82% accuracy rate. Chi-squared testing showed no significant difference between the system's assessments and actual plant health conditions.

Keywords: Pechay, hydroponics, plant health, convolutional neural network, Raspberry Pi.

Herbal Medicine Plant Leaf Identification Device Using ResNet50

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Abstract – Plant leaf identification is a challenging task that botanists face. Manual identification is a reliable method for identifying plants. However, this is challenging to the public, and there is a lack of botanists, as plant identification requires deep knowledge and an extensive field. Hence, alternative plant identification methods like digital image processing and recognition techniques are explored. The study's main objective is to create a device that can identify 20 herbal medicinal plants through their leaves. A portable device was developed that also features a Graphical User Interface (GUI) that allows the user to navigate through the program and display the identification results. This study utilized ResNet50, a Convolutional Neural Network (CNN) that can also reject leaf samples not included in the 20 herbal medicinal plants. It achieved 95.17% accuracy in the controlled testing and performed well in uncontrolled testing. The device's performance was also tested to identify naturally damaged leaves and similar-looking plants.

Keywords: ResNet50, leaf identification, Raspberry Pi, Herbal medicinal plants.

YOLOv8-Based Segmentation and 3D Reconstruction of Alveolar Bone and Mandibular Canal in CBCT Images

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Abstract –Dental implant planning stands as a critical aspect of modern dentistry, with the segmentation of the Alveolar Bone (AB) and Mandibular Canal (MC) in Cone Beam Computed Tomography (CBCT) images serving as foundational steps in this process. However, current research faces a significant gap which is a lack of studies focusing on segmenting the AB and MC from CBCT slices that accurately follow the curve of the lower jaw. This is particularly crucial as segmentation in these slices is essential for precise dental implant planning. Current AB and MC segmentation research only addresses segmentation from coronal or axial slices in CBCT images. Notably, the current research also fails to address the crucial aspect of reconstructing the segmented slices into a comprehensive 3D view, which could significantly enhance the visualization of the segmentation data for dental implant planning. This study introduces a new approach utilizing YOLOv8 to segment AB and MC in CBCT slices that accurately conform to the lower jaw curve. Additionally, this study transforms the segmented slices into a unified 3D view by stacking each slice and employing linear interpolation to enhance the smoothness of the result. Our results indicate that Yolov8m yields the highest Dice Similarity Coefficient (DSC) of 90.15% and mAP of 99.5%, while YOLOv8l yields the highest Intersection over Union (IoU) of 85.98% for segmenting the AB and MC.

Keywords: Mandibular Canal, Alveolar Bone, Segmentation, CBCT, Yolov8.

Building Early Warning Scores with StatisticalBased Structured Methods on Patient Clinical Data

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Abstract –In order to facilitate the healing process and prevent mortality, hospital medical staff must provide appropriate and timely medical treatment. One method by which hospital personnel can reduce mortality rates is to accurately access the condition of patients upon their arrival at the hospital, thereby enabling the provision of appropriate medical treatment. Consequently, the utilization of a structured and statistically-based methodology will result in the automatic generation of EWS tables, which will assist in the identification of potential health hazards within the clinical data of patients. The dataset that was used in this study comprise of approximately 1000 records of patient vital signs, that were sourced from a combination of public dataset from Kaggle and real clinical data from MIMIC III. those data then put through comprehensive data preprocessing to ensure the data that will be used do not have any missing null values. The aforementioned data will then be utilized to generate an automated EWS Table through the application of statistically based structured techniques on patient clinical data. This technique will employ the percentile method to assist in the identification of potential health risks. This technique will facilitate the identification and comparison of various risk variables in each patient. The efficacy of the generated Early Warning Score (EWS) table was evaluated by comparing it to an existing EWS table developed by the Royal College of Physicians, known as NEWS. The results of this comparison demonstrated an accuracy rate of seventy-one percent.

Keywords: Early Warning Scores (EWS), Clinical Data, Scoring System, Statistics

Stroke Disease Classification UsingCTScanImagewith Vision Transformer Method

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Abstract –Stroke is a serious global health issue with significant impacts on mortality and disability, particularly in developing countries like Indonesia. The prevalence of stroke is increasing over time, highlighting the need for improved access to quality healthcare services, disease prevention, and investments in medical personnel and healthcare infrastructure. One way to mitigate the impact of stroke is through CT scan examinations of the brain to determine the type of stroke a patient has, ensuring appropriate and efficient treatment. These examinations produce images that need to be analyzed by medical professionals, and this system can assist in the early classification of stroke types in patients. The process involves converting the patient's CT scan images into JPG format and performing preprocessing to enhance the images. Next, image segmentation is conducted to help the classification system quickly identify the parts of the image with important information. A Vision Transformer base 16 with a pretrained model is used to create the stroke classification model. This model achieved an accuracy rate of 91% on test data after optimizing the parameters using the grid search method. The parameters included a batch size of 32, 20 epochs, 128 layers, and a learning rate of 0.0001.

Keywords: Stroke, Classification, Vision Transformer, Hyperparameters

Developing Early Warning Score with Structured Methodology Using Decision Trees Based on Patients' Clinical Data

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Abstract –A rapid and appropriate medical intervention by healthcare professionals in hospitals expedites the healing process and prevents patient mortality. According to data from the Institute of Medicine (IOM), there is a high incidence of safety incidents and patient deaths due to inadequate medical care in hospitals in the United States and Indonesia. The shortage of skilled medical personnel, especially specialist doctors, poses a serious challenge, with Indonesia facing a shortfall of 30,000 specialist doctors, based on the report of the Ministry of Health. Therefore, this study aims to implement a structured methodology based on the Decision Tree Early Warning Score (DTEWS) to automatically generate an Early Warning Score (EWS) table using patients' clinical data. This study also aims to evaluate the DTEWS methodology performance using imbalanced data. The result showed a good performance with the average score of AUC ROC, accuracy,

precision, recall, and F1 of the models were 0.697, 0.696, 0.705, 0.689, and 0.695, respectively. The scores are reasonable for health purposes. The structured methodology in the DTEWS method has also succeeded in guiding the processes step by step to generate the EWS table identical to the data used. Hopefully, this study will be a consideration in choosing the Early Warning Score system generation method and enhance healthcare service quality.

Keywords: Early Warning Score (EWS), Medical Emergency Team, Clinical Data, Scoring System, Machine Learning

Multi-Stage Vision Transformer for Batik Classification

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Abstract –Batik is a distinctive design that represents specific traits and is a cultural legacy acknowledged by UNESCO. The identification of new batik patterns and the differentiation between pattern combinations are becoming challenging. Several studies have been conducted using the deep learning model, predominantly the Convolution Neural Network (CNN). However, CNN's ability to extract local dependencies is limited, requiring a large number of parameters and a complex architecture to accurately recognize Batik patterns that contain both local and global feature context. This study describes the creation of a Multi Stage Vision Transformer (MSViT) for the purpose of classifying Batik Patterns. The construction of the Vision Transformer involves the use of a multi-stage down-sampling technique, where convolution is utilized as a down-sampling module in each stage. The goal of down-sampling is to enhance the Vision Transformer's capability to capture both local and global dependencies in the Batik feature map. The Vanilla Attention module is employed as a spatial token mixer to identify the spatial correlation among pixels. The effectiveness of the Multi Stage Transformer in classifying Batik patterns has been demonstrated through multiple tests utilizing the Batik 300 and Batik Nitik 960 datasets. The Vision Transformer's performance surpasses that of state-of-the-art CNN while requiring less compute and fewer parameters.

Keywords: Batik, Classification, Deep Learning, Transformer, Vision Transformer

Classification of Intracranial Hemorrhage Based on Ct-Scan Image with Vision Transformer (Vit) Method

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Abstract –Head injury is the leading cause of mortality and morbidity in the world and is one of the causes of brain hemorrhage known as Intracranial Hemorrhage (ICH). One way to diagnose ICH is to take images of the patient's brain or CT-Scan. The results of the CT-Scan diagnosis will be analyzed by experts. So far, CT-Scan analysis is still done manually, therefore in this Paper, Vision Transformer (ViT) modeling is carried out as an expert tool to classify ICH based on CT-Scan. ViT uses basic transformation instead of Convolutional Neural Network (CNN) in processing images. In the ViT model training data, the data is processed by dividing it into patches which later each patch is learned with a transformation model. This model training reaching up to 80,03% training validation accuracy with 81,20% testing validation accuracy with good result of image classifiying that 5 of 6 trials are valid with high considered probability with more than 90% on average.

Keywords: Intracranial Hemorrhage (ICH), Image Classification, Vision Transformers

Prediction of Length of Stay in Hospital Using Hyperparameter Optimization in the Convolutional Neural Networks Method

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Abstract –Length of Stay (LOS) is a crucial indicator in healthcare, reflecting the efficiency of the service provided to patients in hospitals. This study aims to develop a LOS prediction system using Convolutional Neural Networks (CNN) with hyperparameter optimization based on a dataset from the Kaggle website. Through hyperparameter optimization, the accuracy of LOS prediction was significantly improved. The optimized CNN achieved an R2 score of 86.65%, a MAE of 2.2547, and an RMSE of 4.5943. Accurate prediction results can assist hospital resource management and improve healthcare service efficiency for hospitalized patients. Thus, this research contributes to improving the quality and effectiveness of healthcare in hospitals.

Keywords: Length of Stay, Machine Learning, Convolutional Neural Networks, Hyperparameter Optimization

Path Planning for 4-Wheeled Omnidirectional Cellular Conveyor using Q-Learning Algorithm

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Abstract –The manufacturing industry has implemented various technologies, such as robot arms, AGVs (Automated Guided Vehicles), and conveyors, to enhance the efficiency of material flow. Conveyors facilitate the transportation of objects over long distances. The fixed belt conveyor is the most commonly used type of conveyor across various industries. The fixed belt conveyor follows a predetermined path to distribute items. Nevertheless, during its development, the material distribution process requires various paths. Therefore, the development of flexible conveyors was necessary to meet the requirements of various delivery routes. The most recent innovation in flexible conveyors is the conveyor with omnidirectional wheel drive. This study involved developing a path-planning algorithm utilizing classic Q-Learning (CQL), Double Q-Learning (DQL), and Action Restrictions Q-Learning (ARQL) to calculate the optimal path on a four-wheeled omnidirectional conveyor. The results show that the ARQL algorithm generates the optimal trajectory, achieving a processing time of less than 100 milliseconds.

Keywords: Q-Learning, Omnidirectional Drive, Flexible Conveyor, Path Planning

Whale Optimization Algorithm-Based Feature Selection for Enhanced Melanoma Diagnosis

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Abstract –The biggest challenge in melanoma is distinguishing between benign and malignant skin diseases with various problems related to time and patient health to differentiate lesions in patients. To reduce these problems, an image classification system is required using several feature extraction methods on images, namely Gray Level Cooccurrence Matrix, contour features, and HSV image features. In this study, feature selection was also carried out using a metaheuristic algorithm, namely the Whale Optimization Algorithm (WOA), as feature optimization in the next stage, which is the classification stage using the Multilayer Perceptron Neural Network method. However, the results of testing the Multilayer Perceptron Neural Network on these feature extractions showed very good performance, especially in the case of HSV feature extraction and Gray Level Cooccurrence Matrix (GLCM). In addition, the feature selection also showed the same results from the same feature extraction with a relatively faster classification time.

Keywords: Melanoma, Feature Extraction, Feature Selection, Whale Optimization Algorithm, Classification

A Comparative Study of GRU and LSTM Time-Series Forecasting for Precise River Dam Hydrodynamic Prediction

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Abstract –Hydrodynamic forecasting plays a critical role in managing water resources and mitigating flood risks, particularly in urban areas. This study explores the application of machine learning and deep learning techniques to capture complex temporal patterns, focusing on water level, water inflow, and water outflow predictions. Utilizing the PMD-FFD dataset, we conducted empirical analyses to evaluate the performance of various models. Specifically, we evaluated 10 different model architectures, comprising 5 configurations each for LSTM and GRU, to identify the most effective setups for each parameter. Our study reveals insights, including the superiority of certain models for specific forecasting tasks. For instance, the GRU_2 model emerged as the most effective for water level forecasting with $R2 = 0.998$, while LSTM_2 exhibited superior performance for water inflow forecasting with $R2 = 0.991$. Moreover, our investigation into multi-step forecasting uncovered valuable findings. LSTM_5 demonstrated unexpected efficacy in multi-step predictions for most water parameters, with the highest MRE of 0.010, indicating its potential for capturing long-term temporal dependencies.

Keywords: Forecasting, Hydrodynamic, LSTM, GRU, RNN, Time-Series, Regression, Uni-Variate, Multi-Step.

The Application of Monte Carlo Simulation to Assess the Value at Risk in Cryptocurrency

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Abstract –This study aims to calculate the Value at Risk (VaR) in the cryptocurrency assets portfolio using the Monte Carlo simulation method. Analysts mostly use value at risk to measure the potential loss from many financial assets. This study analyzed four cryptocurrencies, Bitcoin (BTC), Ethereum (ETH), BNB (BNB), and Solana (SOL), from March 1, 2020, to March 31, 2024. The analysis results provide an overview of the expected performance, standard deviation, VaR, and Monte Carlo simulation results. According to the VaR analysis, SOL is the riskiest asset, while Bitcoin is the least risky asset. Investors should consider VaR before investing in any asset. Investors should also consider this information and their risk profile before making an investment decision.

Keywords: Assets Portfolio, Cryptocurrency, Monte Carlo, Simulation, Value at Risk

Design and Implementation of a Radar-Camera Fusion System for Human Detection and Its Distance Measurement

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Abstract –Human distance detection is essential for improving safety and efficiency in applications such as autonomous vehicles, surveillance, and human-robot interaction. Integrating radar and camera data through sensor fusion significantly improves detection accuracy and reliability while reducing the inherent limitations of each sensor type. This research presents the design of a radar-camera fusion system that reads and processes data from both sources. Instance segmentation is used to identify objects for camera data, while radar data is projected to pixel coordinates through coordinate transformation, allowing the two data sets to be fused into the same space. This fusion results in more complete object information. The developed system achieved 100% object detection accuracy in the experimental scenario and demonstrated 93.4% distance measurement accuracy, with average longitudinal and latitudinal errors of 37.1 cm and 17.5 cm, respectively.

Keywords: Human Distance Detection, Sensor Fusion, Radar-Camera System, Instance Segmentation, Coordinate Transformation

Seat Occupancy Detection in Electric Vehicles: Unveiling Passenger Presence through Overlap Area Analysis

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Abstract –The high number of bus passengers often leads to situations where some passengers are unable to secure a seat, resulting in the inconvenience of standing for the whole ride or wasting time waiting at the bus stop. To address this issue, this paper aims to develop a system capable of detecting bus seat occupancy, differentiating between occupied and unoccupied seats by passengers to inform potential passengers if seats are available before they take the next bus and help the government monitor its citizen and improve its public transportation services. The system uses a YOLO algorithm to perform object detection, enabling it to detect passengers, and an overlap percentage formula between passenger and seat bounding box to determine if the detected passenger is occupying the seat. The system provides real-time video output with texts indicating the total number of current passengers, total boarded passengers, also occupied and unoccupied seats. The system achieves accuracy of 95% for the front seat section and 92% for the back seat section.

Keywords: YOLO, Human Detection, Bounding Box, Seat Occupancy.

Implementation of YOLOv8 Algorithm on Raspberry Pi for Automated PCB Quality Inspection

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Abstract –This study develops an automated quality inspection system based on machine learning using the You Only Look Once version 8 (YOLOv8) object detection algorithm and deploys it on a Raspberry Pi for the quality inspection of Printed Circuit Boards (PCBs). PCBs are crucial components in modern electronics, such as smartphones, computers, and other devices. This research reports on testing the YOLOv8 algorithm for PCB quality inspection. Experiments applied YOLOv8 to a PCB testing dataset on a Raspberry Pi, demonstrating the system's efficiency and reliability. The test results show the system's ability to detect defects such as Pad Misalignment, Open Circuit, Solder Bridging, and Misplacement, with varying level of accuracy. Accuracy for Good Assembly (GA), Solder Bridging (SB), Open Circuit (OC), and Misplacement (MP) classes ranged from 70% to 95%, 73% to 84%, 67% to 72%, and 67% to 98%, respectively. These results indicate that this system effectively enhances the efficiency and accuracy of PCB quality inspection when implemented on a Raspberry Pi, potentially improving the overall quality of electronic products.

Keywords: Quality Inspection, Printed Circuit Board, YOLOv8, Raspberry Pi

Fast Person Detection Using YOLOX With AI Accelerator For Train Station Safety

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Abstract –Recently, Image processing has advanced Faster and applied in many fields, including health, industry, and transportation. In the transportation sector, object detection is widely used to improve security, for example, in traffic security and passenger crossings at train stations. Some accidents occur in the train crossing area at the station, like passengers uncarefully when passing through the yellow line. So further security needs to be developed. Additional technology is required to reduce the number of accidents. This paper focuses on passenger detection applications at train stations using YOLOX and Edge AI Accelerator hardware. the performance of the AI accelerator will be compared with Jetson Orin Nano. The experimental results show that the Hailo-8 AI hardware accelerator has higher accuracy than Jetson Orin Nano (improvement of over 12%) and has lower latency than Jetson Orin Nano (reduced 20 ms).

Keywords: Fast Person Detection, YOLOX, Train Station Safety, Object detection, Classification

Hybrid LSTM and SVM Method Rice Yield Prediction in Densely Populated Areas

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Abstract – Due to population growth, empty land and agricultural land are decreasing. This is referred to as land conversion, which often occurs today as land conversion for housing development. Therefore, the agricultural sector is expected to fulfill the needs amidst the decreasing land conditions. Yield prediction can be one of the solutions to help the Agriculture Office in estimating how much yield, especially in rice crops. The methods used to predict rice yields are LSTM (Long Short Term Memory) and SVM (Support Vector Machine) combined with residual prediction. Both methods are expected to predict rice yield accurately. To train and test the proposed model, data on rice field area, harvest area, rainfall, and rice production from the previous period are required. The data used in this study comes from 2018 to 2022. The prediction results of this study have a MAPE value of 1.84%.

Keywords: Yield Prediction, Paddy Production, LSTM-SVM, Residual Prediction, Time Series Data

Automatic Classification of Lung Disease Based on Chest X-Ray Images using CNN with Comparing Batch Normalization

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Abstract – In the discussion of the 2021 health profile compiled by the Indonesian Ministry of Health, seven infectious diseases are also dangerous. Of these seven diseases, three of them attack the lungs, namely Tuberculosis (TBC), Pneumonia, and Coronavirus disease (COVID-19) [1]. Although these three diseases have one thing in common, namely attacking the lungs, they have differences in symptoms, prevention, and treatment. One way to recognize these three diseases is to use a chest x-ray which is then directly interpreted by medical personnel. Examining X-ray images still has shortcomings, namely that some medical practitioners, such as lung specialists, still rely on visual observation in reading X-ray results, so the results are very subjective [2]. It would be more effective if technology was applied to classify X-rays so that it could provide a diagnosis quickly, namely the application of Deep Learning methods using Convolutional Neural Networks (CNNs) algorithms to process X-ray results. This paper proposes to answer the problem classification of lung disease based on chest X-ray Images using CNN with comparing batch normalization. This research aims to 1) Produce an accurate deep learning-based classification system for normal lung, pneumonia, tuberculosis, and COVID-19 using Chest X-rays to assist medical personnel in providing a diagnosis; 2) Reduce the possibility of diagnostic errors which can have fatal consequences due to inappropriate patient treatment; 3) Produce a User Interface that is easily accessible to doctors as a tool to detect pneumonia, tuberculosis, Covid-19. From the results of the research carried out, it was found that the best model was produced from the K-Fold ResNet architecture experiment with a training accuracy of 94%, prediction accuracy of 86%, recall of 87%, precision of 88%, and F1 score of 87%. So, it can be concluded that this system can help in classifying Chest X-ray images.

Keywords: Convolutional Neural Networks, Pneumonia, Covid-19, Tuberculosis

Convolutional Neural Network Implementation with MobileNetV2 Architecture for Indonesian Herbal Plants Classification in Mobile App

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Abstract – Indonesia is a country with an extraordinary diversity of flora. Many of these species are categorized as herbal plants. Herbal plants has been utilized by the Indonesian people as traditional medicine for a long time. Identifying this many herbal plants can be difficult because of its unique characteristics and some may have confusing similarities. Convolutional Neural Network (CNN) are useful to help analyze and classify images. This paper propose a CNN implementation with MobileNetV2 architecture for Indonesian plants classification in mobile app. This study compare several architecture with different parameter, preprocessing, optimizer, and some addition of layer like Rescaling, L2 Regularization, and Dropout. The model that gets the best result and performance is the one that resized to 256 x 256 pixels in preprocessing, 0.01 L2 Regularization, 0.5 Dropout and Adam as optimizer. This model gets 95.91% accuracy, 0.963 precision, 0.959 recall, and 0.958 F1-Score. By implementing this model in a mobile app, ensure it can be used anywhere without internet connectivity, as the model can run directly on the user's mobile device without using too many resources. The app tested using three difference devices with practical performance of less than 300 ms.

Keywords: Convolutional Neural Network, MobileNetV2, Indonesian Herbal Plants, Mobile App

Classifying Personality Traits from Text Data: A Machine Learning Approach Using Stochastic Gradient Descent for Simplified Jungian Typology-Based Assessment Tool

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Abstract – Nowadays, machine-learning approaches have attracted much interest from researchers in various fields, including psychology. Several researchers developed machine learning models to classify personalities based on a person's behavior in online communities. However, not all researchers involve psychologists in the model development to ensure the reliability of their models. This can trigger bias due to a lack of understanding in psychology. Generally, people will be asked to answer a personality assessment tool to classify their personality type. Commonly it consists of many questions that may cause a person to lose focus in the answering process. In this research, researchers collaborate with psychologists to develop a machine-learning model based on the simplified personality assessment tool of Jungian typology. Researchers used the Stochastic Gradient Descent algorithm to classify personality based on respondents' answers to the simplified personality assessment tool of Jungian typology. The model evaluation results using the f1-score show that the model developed can classify personality types in the Attitude and Cognitive dimensions with performance reaching 79.05% and 73.99%.

Keywords: Personality, Machine Learning, Text Classification, Stochastic Gradient Descent, Jungian Typology

Resampling Effects on Imbalanced Data in Network Intrusion Classification

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Abstract – The rapid expansion of network connections has significantly increased network traffic activity, introducing new cybersecurity challenges and heightened vulnerability to cyber attacks. To address these challenges, researchers have leveraged intelligent techniques such as machine learning (ML) to enhance attack detection accuracy in network traffic. However, ML models often face a data imbalance issue in their training sets. This imbalance, typically due to the uneven distribution of attack classes, hampers the classification performance of ML models in network intrusion detection. To mitigate class imbalance, various resampling techniques can be employed. This study evaluates several resampling techniques, including Random Oversampling, SMOTE, ADASYN, Random Undersampling, Tomek Links, and SMOTE-Tomek. Using the UNSW-NB15 dataset, we trained and tested ML models, including Decision Tree, Random Forest, Gradient Boosting, XGBoost, and 1D-CNN algorithms. Our analysis demonstrates that resampling techniques significantly impact the performance of machine learning models. The Tomek Links technique applied to the 1D-CNN model achieved the highest performance, with an accuracy of 75.27%, a precision of 87.58%, and an F1-score of 76.22%. Notably, the best recall score of 67.57% was obtained from the 1D-CNN model without resampling. These findings provide valuable insights for researchers and engineers, aiding in selecting appropriate resampling techniques for developing robust detection models for network traffic attacks.

Keywords: imbalance data, network intrusion detection, resampling techniques

Performance Evaluation of YOLO-Based Deep Learning Models for Real-Time Armour Unit Detection with Image Pre-processing Method

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Abstract – Breakwater construction in Indonesia still relies on divers to direct the placement of rock armour units, which is risky and time-constrained. This research aims to replace the diver's task with a deep learning-based vision system using YOLO-based deep learning models. The system utilizes image pre-processing technology by applying histogram equalization (HE) techniques to improve image quality before the detection process. This research evaluates the performance of the YOLO based deep learning models in detecting armour units in realtime with a focus on various environmental conditions, which are clear and murky water. The analysis reveals clear water consistently supports higher average frame rates (FPS) compared to murky water, maintaining efficient frame processing across all models. In murky water, histogram equalization significantly enhances detection accuracy from 60% to 80% for YOLOv4-tiny and YOLOv7-tiny, demonstrating its effectiveness in challenging conditions. Notably, accuracy remains at 100% for all models in clear water, underscoring their robust performance under optimal visibility conditions.

Keywords: breakwater, armour units, deep learning, image pre-processing, real-time detection

Comparison of LSTM, RNN, and GRU Methods in Predicting Water Quality in the Totality Integrated Smart Aquaculture System

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Abstract – Shrimp farming in aquaculture holds significant global market potential. However, shrimp export growth in Indonesia, especially in West Nusa Tenggara (NTB) Province, declined in 2021 due to suboptimal aquaculture management and poor pond water quality. Pond water quality, involving parameters like temperature, pH, salinity, and dissolved oxygen (DO), is critical for successful shrimp farming. Therefore, an integrated automated system using the Internet of Things (IoT) is proposed to regularly collect and monitor water quality data. This study compares the effectiveness of Long Short-Term Memory (LSTM), Recurrent Neural Networks (RNN), and Gated Recurrent Unit (GRU) methods in predicting pond water quality parameters using data from 2021. The data is gathered through IoT-based devices and stored in a database, accessible via a web page with real-time graphs. The performance metrics of LSTM, RNN, and GRU models show that the GRU model outperforms the others across all evaluated criteria, including Mean Squared Error (MSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Validation Accuracy (VAL). GRU achieves the lowest MSE (0.056058), MAE (0.149909), and MAPE (14.99%), as well as the highest validation accuracy (85.01%). This indicates that GRU provides the most accurate and reliable predictions. Integrating these prediction models into a web platform enables quick identification of issues and timely interventions, which can enhance the health and productivity of shrimp ponds. This project is expected to improve the efficiency and sustainability of the shrimp aquaculture sector in Indonesia by leveraging advanced predictive modeling techniques.

Keywords: time series analysis, LSTM, RNN, GRU, water quality prediction.

Cloud-Based Weather Forecasting for Agricultural Land Using NeuralProphet

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Abstract – Agricultural land is an area devoted to agricultural activities. Indonesia is the third largest rice producer in the world. Indonesia is crossed by the equator so that it has 2 seasons, namely dry and rainy, where both seasons greatly affect agricultural activities. If it ignore weather changes, farmers can experience considerable losses from rice harvests because the amount of water greatly affects the growth of rice. With this, this research created a weather detection system tool on agricultural land using the NeuralProphet model to help farmers in determining planting time, fertilizing, or watering plants. The NeuralProphet model produces the best Root Mean Squared Error (RMSE) and Mean Squared Error (MSE) for predicting rainfall in the next 6 hours with a dataset from BMKG of 0.07 & 0.06. The RMSE and MSE values after integrating the NeuralProphet model with Internet of Things (IoT) devices are 0.71 & 0.47. The RSquared accuracy value obtained by classifying rain from the rainfall prediction results for 6 hours is 0.94 and the RSquared accuracy obtained after the NeuralProphet model is integrated with the IoT device is 0.78.

Keywords: Weather Prediction, Agriculture Land, NeuralProphet, IoT

Estimation of Rice Field Area Using YOLO Method to Support Smart Agriculture System

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Abstract – The agricultural system is an important sector in the world economy that is responsible for providing food for the growing population around the world, especially in Indonesia, which is an agricultural country, which makes the agricultural sector an important sector in supporting food needs. According to BPS (Central Bureau of Statistics) data from the last three years, Indonesia has experienced fluctuations in terms of harvest area. This is caused by several factors, including the lack of maximum utilization of agricultural land, limited human resources, and challenges in the use of advanced technology. Therefore, an innovation is needed to help farmers maximize the area of agricultural land. So in this research, drones are used to conduct mapping from various heights to optimize the measurement of land area and the use of the YOLOv8 (You Only Look Once, Version 8) method to detect rice fields in order to calculate the area of agricultural land. The result is that the YOLOv8n deep learning model produces an accuracy rate of 0.765, which will detect rice fields planted with rice plants. And the measurement of the original land area results in image sample 1 show that the use of YOLOv8n only detects land around 613.61 m^2, with an error rate of 38%. Then, image sample 2 shows that the use of YOLOv8n only detects land around 387.75 m^2, with an error rate of 56%.

Keywords: Rice Paddy, YOLOv8, Deep Learning, Mapping, Drone

The Impact of Accountants' Perceptions of Technology Readiness and Competitive Intensity on Technology Adoption

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Abstract – This research investigates the impacts of accountants' perceptions of ease of use towards technology readiness and the intensity of competition influenced by artificial intelligence in boosting industrial innovation and infrastructure development. Artificial intelligence technologies in the digital age have significantly impacted how accountants apply, understand, and interpret data. Following the Technology Acceptance Model (TAM) framework, this paper critically explores the ease of use of the technology and perceived benefits as well as the competitive pressure factors in adopting artificial intelligence technology, leading to the formulation of hypotheses. This quantitative survey research used an online questionnaire to gather data; however, its target population of participants was unspecified, yet in the JABODETABEK region. This study seeks to explain accountants' reactions toward the use of artificial intelligence technology and the level of adoption based on the given perception to understand the impact of intensifying competition within the accounting profession. Based on this, this study's findings will improve knowledge of the relationship between the accountants' perceptions and the implementation of AI technology in accountancy, leading to the development of accountancy as a discipline in the digital age.

Keywords: Ease of Use, Artificial Intelligence, Technology Adoption, Industry, Infrastructure

CNN Modified Approach for Classifying Cardiomegaly Disease Based on CXR Image

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Abstract – This research focuses on developing and evaluating a modified Convolutional Neural Network (CNN) model to classify cardiomegaly based on chest x-ray (CXR) images. This research is motivated by the high number of people suffering from heart disease and one of them is the prevalence of cardiomegaly in Indonesia, which is a significant public health problem. The main aim of this study was to improve the accuracy of cardiomegaly classification and compare the results with other existing methods. The CNN modification method used is the addition of a convolution layer to add features to the cardiomegaly x-ray image which are almost the same as the normal heart x-ray image. The methodology used includes several main steps, starting with pre-processing of CXR images using a custom pipeline that includes techniques such as data resizing, labeling and normalization. The processed data set is then divided into training and testing sets, and data augmentation is performed for both sets. The proposed deep learning models, including Modified CNN, Xception, and Inception ResNetV2, are built and trained using the RMSprop optimizer to observe their impact on model performance. The results show that the modified CNN model provides the best performance with an accuracy of 72.64%, higher than previous research using the Inception V3 and SVM models. Performance evaluation is carried out using metrics such as accuracy, precision, recall, and F1 value. The conclusion of this research is that the modified CNN model can significantly improve the accuracy of cardiomegaly classification, thereby making an important contribution to the development of more effective cardiomegaly detection methods. This study also highlights the importance of using deep learning techniques in medical image analysis for more accurate disease diagnosis.

Keywords: Cardiomegaly, Convolutional Neural Network (CNN), Chest X-ray images (CXR), Classification accuracy, Performance evaluation

A Comparative Study of Machine Learning Algorithms for Classifying Personality Type based on Carl Jung's Cognitive Function

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Abstract – According to Carl Jung, every human being has a personality preference from each dichotomy dimension of cognitive function to live life. Cognitive function is mental attitudes and actions that always coexist with humans. This theory is the basis for developing personality assessment instruments, such as the Myers-Briggs Type Indicator (MBTI). On the other hand, Machine Learning (ML) approach is often used in psychology to classify personality types automatically. However, selecting the most suitable algorithm and developing the instruments for data collection is not an easy task. This paper aims to conduct experiments choose the most appropriate algorithm for classifying personality types based on Carl Jung's theory of cognitive function. In collaboration with a psychologist, we adapt Carl Jung's theory of cognitive function into a text-based personality assessment instrument consisting of several items. The experimental results show that the Stochastic Gradient Descent algorithm with hyperparameter tuning consistently yields good performance in carrying out cognitive function personality type classification tasks.

Keywords: Cognitive Function, Personality Type, Machine Learning, Psychology

Comparative Analysis and Optimization of Deep Learning Models for Object Detection Using Grid Search Hyperparameter Tuning

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Abstract –Deep learning is a subfield of machine learning, has significantly advanced computer vision technologies, including image processing, object classification, and object detection. In object detection, the variety of models available, each with different characteristics, necessitates through comparison to identify the most suitable one for a given project. Grid search is an optimization technique, is commonly used to fine-tuned deep learning models for accurate results. This study compares three deep learning models, including YOLOv8, MobileNet V2, and MobileNet V2 FPNLite for object detection in various environments, optimizing each model with specific hyperparameters. The analysis reveals that YOLOv8 with Optimizer SGD and Batch Size 16 achieves an accuracy of 0.966, precision of 0.953, recall of 0.891, F1-Score of 0.92. MobileNetV2 with Optimizer SGD, Batch Size 8 with an accuracy of 0.939, a precision of 0.706, a recall of 0.544, a F1-Score of 0.6, and MobileNetV2 FPNLite with Optimizer SGD, Batch Size 8 with an accuracy of 0.974, a precision of 0.872, a recall of 0.876, a F1-Score of 0.868. The results indicate that, under the optimized hyperparamaters, these models perform best for their respective configuration.

Keywords: deep learning, object detection, grid search, hyperparameter tuning

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Prototype of Monitoring and Automation Systems of the Furnace in the Fire Laboratory

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Abstract –Fire safety regulations mandate that building components must possess a specified level of fire resistance. Assessing this requires conducting fire tests in specialized laboratories. In Indonesia, the Ministry of Public Works and Housing operates the country's sole fire testing facility, which, though aged and manually operated, plays a crucial role. To enhance testing accuracy, there is a pressing need for an automated monitoring and control system. Previously, we designed a system automatically record temperature data, calculate averages, and display results graphically. In this study, we developed a control system to adjust furnace temperatures using servo-motors. A scaled-down furnace, constructed from aerated lightweight concrete and steel framing, incorporates gas for combustion. The system integrates an Arduino Mega processor and other electronics to process and analyze data. Communication between Arduino IDE and Microsoft Visual Studio facilitates real-time data display and storage in Excel (.xls) format. This setup successfully records temperature measurements from thermocouples, displays them graphically over time, and adjusts furnace temperatures in accordance with established standards.

Keywords: Fire furnace, fire resistance rating, a monitoring system, control system, interface

Implementation of Dynamic Art Curation Engine in Global Art Collection Archive

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Abstract –This paper proposes an implementation method of a Dynamic Art Curation Engine within the Global Art Collection Archive. The manner in which information retrieval is handled in an integrated art archive is crucial, as it directly influences the dynamism and creativity of the art viewing experience. The Dynamic Art Curation Engine is an artwork retrieval system that leverages the pre-trained machine learning models of diverse art interpretations by museums and curators, providing a dynamic art experience by presenting artworks classified according to these interpretations. The curation engine is composed of four primary components: 1) a pretrained curation model developed from specific art interpretation; 2) curation model metadata generated by applying the curation model to artworks stored in the Integrated Art Archive; 3) dictionary metadata, which addresses data heterogeneity across museum collections; and 4) a relevance calculator that assesses relationships between artworks based upon their metadata. As a prototype, we developed a Dynamic Art Curation Engine that incorporates a pre-trained model based on the catalogs of three exhibitions and integrated it into the Global Art Collection Archive, which houses over one million art pieces from four museums. Our experiments addressed two main objectives: the curation of works by multiple artists based on specific exhibition categories, and the curation of works from arbitrary images. The results of these experiments confirm the effectiveness of the proposed method, thereby demonstrating its feasibility.

Keywords: Dynamic Art Curation, Integrated Art Archive, Dynamic Art Experience, Open Data Artworks

Sentiment Analysis of Nuclear Power Plant and Nuclear Science in Indonesia Based on Platform X Using BERT, VADER, and TextBlob Methods

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Abstract –Nuclear is considered to be an environmentally friendly source of electricity. In addition to being environmentally friendly, nuclear power is also considered to be able to generate large amounts of electricity. This makes nuclear energy a good consideration as a supplier of electricity in Indonesia. However, some people still have a negative view of nuclear power itself. The discourse on the development of Nuclear Power Plant (NPP) has become a hot topic of discussion, and has even been included in legislation Number 17 2007 concerning the National Long-Term Development Plan. Public responses to this law are divided into two groups: those who are pro or agree with the construction of Nuclear Power Plant (NPP), and those who are disagree with the construction of NPP. This shift in public opinion has led to a decline in the construction of new nuclear power plants around the world. This study conducted a sentiment analysis of netizens' opinions on platform X about nuclear power and NPP that are planned to be built in Indonesia from 2019 to 2024. The results of the study show that for both keywords "Nuklir" and "PLTN" and got results of 659 posts for "Nuklir" and 585 posts about PLTN. The results of sentiment analysis for these two keywords are the first BERT method which produces negative sentiment of 87.4% for "Nuklir" and 63.7% for "PLTN". The second is Vader method produces neutral sentiment with a value of 81.36% for "Nuklir" and 89.37% for "PLTN". The final method, the TextBlob method, also produces neutral sentiment with a value of 94.9% for "Nuklir" and 88.2% for "PLTN".

Keywords: Sentiment Analysis; PLTN; Nuklir; BERT; VADER; TextBlob;

Web Chat-based Application with Large Language Model and Transformers from Hugging Face for Self-Learning on Storytelling Skills

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Abstract –The ability of storytelling greatly affects a person's success. These abilities are usually taught by parents at home or teachers at school. With the development of Artificial Intelligent technology, it is now possible to automatically generate stories using Large Language Model (LLM) which can understand and create language like humans. In this paper, the authors propose a self-learning system in storytelling by utilizing and combining four models from Hugging Face Hub. The proposed system is a web chat-based application so that users can communicate with LLM where LLM has received an image input from the users. The four models are as follows. Falcon 7B Instruct model as LLM that gets caption information from BLIP Image Captioning Large model. Its responses in the form of text can be read by the users and can be heard through audio synthesized by the MMS TTS Eng model. The user can also see the detected objects in the image which is detected by DETR ResNet 50 model. Our experiments show that the proposed system is sufficient to produce a good story and fit the context of the image, with an average user score of 89.76.

Keywords: Large Language Model, Storytelling, Hugging Face

Utilizing Long Short-Term Memory for Precipitable Water Vapor Prediction over the Southern Philippine Region

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Abstract –This paper uses a Long Short-Term Memory (LSTM) model to forecast and impute Precipitable Water Vapor (PWV). Signal delays from two GNSS stations, PCEB in Mactan Cebu and PDAV in Davao, were used to train the forecasting model. Through its relations with precipitation, PWV is taken to be a significant meteorological parameter for understanding weather and global climate. As such, studying PWV is a necessary pursuit to improve the performance of current climate models. However, despite its role in helping meteorologists better understand weather, PWV data may often be unavailable, incomplete, or have low temporal resolution. Hence, the ability of LSTM to process sequence-based inputs proves itself to be a worthy candidate for predicting PWV data. The methodology comprises of data gathering and processing, model training, performance evaluation, and PWV forecasting and imputation. Results have shown that the one-step forecasting performance of all the models generated have relatively tiny differences. Moreover, the imputation results showed that the Time-PressureRelative Humidity-PWV (median RMSE = 11.29) and the Temperature-Pressure-Relative Humidity-PWV model (median RMSE = 9.75) performed the best for the PCEB and PDAV stations, respectively. In conclusion, the study was able to determine the impact of including surface parameters such as temperature, pressure, and relative humidity. It also successfully forecasted and imputed PWV using an LSTM framework with a lead time of up to 100 hours.

Keywords: Forecasting, LSTM, PWV, Philippines

Evaluating the Google English Speaking and Pronunciation Practice Tool

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Abstract –This study evaluates the effectiveness and user experience of Google's AI-powered English pronunciation and speaking practice tool. Using a mixed-methods approach with 115 vocational college students, data was collected through surveys and interviews. Findings reveal positive perceptions of the tool's instructional guidance and convenience, but also challenges related to speech recognition accuracy, limited conversation themes, device compatibility, and feedback mechanisms. Recommendations include improving speech recognition, providing more diverse conversation topics, enhancing feedback, and improving overall usability. This study contributes to understanding the potential and limitations of AIpowered language learning tools.

Keywords: Google Speaking Practice, Speech Recognition, Learning English, Pronunciation, AI-Generated Speech Synthesis

Dengue Fever Vulnerability Prediction Using Integrated Moving Average - Hierarchical Clustering

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Abstract –Dengue Fever (DF) is a disease that continues to increase and is detrimental to public health in various areas of Kediri Regency. Implementation of practical interventions to treat dengue fever involves determining the places and times that are most susceptible to the disease. Therefore, prediction methods are very important to determine whether a location is likely to continue to experience dengue fever transmission. This paper recommends that Integrated Moving Average and Hierarchical Clustering (IMAHC) analysis be used to average historical data regarding the number of victims DF, population, death, rainfall, and public facilities. The results of the moving average process were then classified to identify the level of DB vulnerability in Kediri Regency villages using the IMAHC method with the support of moving visualization. This research provides several specific and significant contributions. First, the use of the IMAHC method with Euclidean distance is proven to provide the best predictions with RMSE (Root Mean Square Error). The results of the analysis show that the RMSE with single linkage for the number of DB sufferers is 0.06979, the RMSE with centroid linkage for the number of deaths is 0.06997, the RMSE with average linkage for the number of public facilities is 0.06953, and the RMSE with complete linkage for rainfall is 0.07166. Higher RMSE values indicate that these factors may have a more variable impact on susceptibility to dengue fever. The average variant obtained using the average linkage method is 0.1410, the lowest among the single, average, and complete linkage methods. These findings are significant because they provide a new approach that can help authorities plan and implement more effective public health interventions. By understanding the factors that influence dengue fever susceptibility in each village, interventions can be optimized to reduce the impact of this disease. This research proves that the IMAHC method using Euclidean distance provides fairly good RMSE results for predicting dengue fever in Kediri Regency.

Keywords: Dengue Fever, Moving Average, Hierarchical Clustering and Kediri Regency.

Heart Disease Detection from PSAX Echocardiography View using Ultrasound Portable Based on Machine Learning Method

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Abstract –Heart disease is one of the highest causes of death in Indonesia and even the world. Based on data from the World Health Organization (WHO) in 2021, 17.8 million people died or one third each year due to heart and blood vessel disease. Delayed treatment of heart disease is the main trigger of death by heart disease. In Indonesia itself, health services for heart disease are still relatively low where patients need to do heart examinations in large hospitals that have special rooms for heart examinations. With echocardiographic examination using sound waves (ultrasound), many parameters such as hemodynamics, heart mass, and myocardial deformation can be measured. Nowadays, portable ultrasound heart examination devices are available to allow doctors to perform heart examinations flexibly and effectively. This tool will capture data in the form of video of the patient's heart condition and then perform image preprocessing stages with median filter high boost filter, morphology, thresholding, and canny filter. Segmentation stage with region filter, collinear filter, and triangle equation. Tracking stage with Optical flow Lucas-Kanade method. Feature extraction stage using trigonometry equation, and the classification stage using Support Vector Machine (SVM) with above 80% of testing accuracy

Keywords: ultrasound portable; echocardiography; medical image processing

Portable Device for Supporting Fertilizer Recommendation System in Smart Agriculture

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Abstract –A major factor in the success of the agricultural sector is productivity, which can be increased through proper fertilizer application. As a matter of fact, in conventional agricultural practices, fertilizers are often applied in a generalized manner without considering differences in soil conditions and crop needs. This causes problems such as environmental pollution due to fertilizer misuse. The aim of this research is to overcome farmers' difficulties in determining the appropriate type and amount of fertilizer, using a portable system based on the Internet of Things (IoT). The system is equipped with sensors to monitor temperature, humidity, conductivity, pH, soil nitrogen, phosphorus, and potassium levels, with measurement location points indicated via Global Positioning System (GPS). The collected data is delivered to a cloud server for analysis and classification process. The Decision Tree method is applied to provide the recommendation for appropriate fertilizers. The soil conditions could be monitored through a website completed with fertilizer recommendation that can be accessed from all devices. The experiment result shows that the system has the capability to detect 7 parameters produced by sensors in different soil conditions precisely with an average standard deviation of 0.06 to 0.7, the average delay in sending data using LoRa is 207.25 µs, the average error distance for GPS location of land measurements is 4.2 meters, and the accuracy of the decision tree model using real time data is 90%.

Keywords: Internet of Things, Fertilizer, Portable Device, Recommendation System, Decision Tree.

East Java Rivers Characterization Using Analytical Hierarchical Clustering on Supporting Disaster Management System

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Abstract –Floods are disasters that can be caused by nature or human actions. Floods come from the rivers that overflow due to the discharge exceeding the capacity of the river itself. As a result, the overflow of water will lead to the surrounding land. To avoid flooding, a flood mitigation system should be made. River characterization will be one solution of the early flood detection models. To characterize the rivers, we propose the AHC (Analytical Hierarchical Clustering) method which processes river parameters including river length, width, depth, and river water flow. The model will cluster the dataset according to the hazard level of the river. This research uses east Java rivers features provided by Ministry of Public Works and Housing of Surabaya City. The experiment result shows that the greater the number of clusters involved will cause a decrease in the accuracy of the system. The best accuracy rate is obtained as 70% when the data is divided into 2 clusters.

Keywords: river characterization, analytical hierarchical clustering, SAR team, disaster management system

Drowning Victims Detection and River Classification Using Deep Learning Methods

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Abstract –River activities can be considered as high-risk activities, such as the possibility of drowning. Unfortunately, based on several incidents, victims are often found already in a lifeless state. Therefore, the search process for drowning victims must be carried out immediately to minimize the risk. By knowing the conditions and situation of the river, the SAR (Search and Rescue) team can evacuate victims more easily. Meanwhile, to minimize the incidence of long drifting victims being found, it is necessary to design a tool that can be used to detect the existence of the victims. We propose a monitoring system to detect drowning victims floating in the river using You Only Live Once version 5 (YOLOv5) method. The information of river conditions, such as water discharge, land slope and rainfall are processed and classified on Raspberry Pi using Artificial Neural Network (ANN). The experiment results show that YOLOv5 model on the Raspberry Pi using image testing data obtains an accuracy of 96.95%, while the accuracy of ANN model that has been deployed on the Raspberry Pi based on testing data is 95%.

Keywords: Victim Detection, River Classification, Deep Learning, YOLOv5, ANN.

Bidirectional Long Short-Term Memory Method for Weather Prediction in Terms of Evacuation of River Drifting Victims

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Abstract –Indonesia, as a strategic archipelago, is vulnerable to natural disasters such as floods and heavy rains. SAR team, Indonesia's Search and Rescue (SAR) team, is a disaster management agency tasked with evacuating disaster victims, requiring considerable human resources and time to ensure smooth operations. Often, the SAR team must stop the evacuation process abruptly due to extreme weather conditions. To avoid such unwanted actions, a weather prediction model is needed that can help the evacuation process of victims drifting in the river using the Bidirectional Long Short-Term Memory (Bi-LSTM) method. In this research, we present a model that can predict weather conditions in river drifting disaster areas based on a dataset containing weather environment parameters (rainfall, temperature, humidity, air pressure, wind direction, and wind speed). Predictions were made by training hourly data for 3 years (2020-2022) totaling 26304 data points from BMKG Perak Meteorological Station. After partitioning, 21043 data points were used as training data, while 5260 data points were used as test data. The optimal model with the scenario of BiLSTM units on layer 1 is 128 with a batch size of 32 and a learning rate of 0.0001, according to the outcomes of the model training test. The model produces an R-squared (R2) score of 92% and an RMSE value of 0.19 by using a time span of 3 hours to predict weather conditions up to 8 hours in advance.

Keywords: Weather Condition Prediction, SAR Team, Drifting Victims, Bidirectional Long Short-Term Memory

Early Detection and Classification of Cataracts Using Smartphone Imagery Based on Support Vector Machine (SVM) and Certainly Factor Methods

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Abstract – Cataracts are one of the leading causes of blindness worldwide. Current technological advancements, especially in Artificial Intelligence (AI), offer the potential to develop products that facilitate the detection of cataracts. The implementation of AI in portable handheld devices is a significant technological development. Therefore, this research aims to create a system for early detection and classification of cataract disease using AI with smartphone images. The focus of the research will be on developing better detection and classification methods, which will work in tandem with the preprocessing of input images. The approach involves using Machine Learning to detect physical symptoms and an expert system based on the certainty factor to identify patient symptoms. The detection of eye cloudiness is divided into three stages: image preprocessing using pixel refilling, pupil segmentation using the Circle Hough Transform, and cataract detection using Support Vector Machine (SVM). The use of the SVM method allows for faster and more accurate detection with a smaller dataset required to build the system. The expert system method will be developed with the assistance of ophthalmologists, aiming to mimic the diagnostic process of experts through confidence values. The accuracy of the system using cross-validation methods is 90.15% with a standard deviation of 5.48%.

Keywords: Cataract Detection, Artificial Intelligence, machine Learning, Circle Hough Tranfrom, Support Vector Machine, Expert System.

Implementation of Face Recognition Using Deep Metric Learning for Automatic Door Openers

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Abstract – The ever-increasing crime rate has fundamentally changed perceptions of home and office door security. In Indonesia, door security largely relies on traditional technologies such as keys and passcodes which although effective, are prone to issues like lost cards or forgotten passcodes. To address these challenges, this study investigates the adoption of facial recognition technology and IoT (Internet of Things). This technology leverages the Siamese neural network methodology, which consists of multiple identical sub- networks with uniform settings and weights, ensuring robust parameter adaptation across all components. This collective operational strategy enables the Siamese network to learn efficiently even with limited input data. The facial recognition results in the database will be used to open doors with the IoT system. This study was conducted using 500 facial images of students from the Surabaya State Electronics Polytechnic and achieved an impressive 88% accuracy rate in testing. By exploring facial recognition technology, this study aims to improve door security by overcoming the limitations of conventional methods, offering a promising alternative for a more secure and efficient access control system.

Keywords: Face recognition, Internet of Things, Siamese Neural Network, and home door security.

Drug-Target Interactions Prediction Using Stacking Ensemble Learning Approach

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Abstract – The process of drug discovery in various domains, one of which is drug-target interactions (proteins) or drug- target interactions (DTI), requires a long time and large costs to obtain experimental results and be approved globally. To expedite this process and reduce costs, computational methods like machine learning and deep learning are employed. However, these methods have limitations, including large data requirements, computational expenses, and susceptibility to overfitting. Addressing these challenges, Stacking Ensemble Learning (SEL) emerges as a promising solution. This study aims to apply the SEL approach to DTI prediction. The proposed model incorporates two optimizations: data oversampling with Synthetic Minority Oversampling Technique (SMOTE) for balancing and parameter tuning to refine the base learner within the stacking ensemble model. Evaluation results highlight the stacking model as the most effective, achieving an accuracy of 99.047%. This research underscores the efficacy of the ensemble stacking method in enhancing prediction accuracy.

Keywords: Accuracy, Drug-Target Interaction, Prediction, SMOTE, Stacking Ensemble Learning.

Exploring Crowdsourced Data Validation Methods for Flood Mitigation: A Comprehensive Review

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Abstract –In a three-phase inverter system, Space Vector Pulse Width Modulation (SVPWM) is a PWM technique that has advantages over other PWM techniques. In digital implementations such as in the PSIM simulation software, users often experience difficulties because of the limitations of the type of software and libraries used. In this article, the digital implementation of the SVPWM technique is described in detail with the simplified C-block PSIM utilization. Modeling is carried out based on coherent theory so as to produce satisfactory results and in accordance with theories that can be properly validated. The results of this digital implementation can be used by anyone to model SVPWM without limitation on the type of software and library components of the PSIM used.

Keywords: Space Vector PWM, Simplified C-Block, PSIM, Digital Implementation.

Distributed Aerial 3D Object Mapping Reconstruction Using Message Passing Interface

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Abstract – Aerial reconstruction of 3D object mapping involves utilizing drones or Unmanned Aerial Vehicles (UAVs) equipped with cameras to capture images for high-resolution 3D model reconstruction of various objects and terrains. This technique is applicable across various fields, such as Urban Planning, Vehicle Navigation, Environmental Studies, Civil Engineering, and Cultural Heritage Conservation. Drones capture hundreds of overlapping aerial photos, which are then processed to generate photorealistic 3D representations of topographic surfaces using photogrammetry software. However, the reconstruction process is time-consuming and computationally intensive, especially when processing large datasets. This research addresses these challenges by employing parallel computing using the Message Passing Interface (MPI) to distribute the computational workload across multiple nodes. By utilizing MPI, the computational tasks are efficiently divided among four nodes, significantly reducing processing time and alleviating the burden on individual CPUs. The study demonstrates that parallel computing with MPI reduces the reconstruction time from 74 minutes to 27 minutes, achieving a speedup of 2.74 times. This research demonstrates a novel application of MPI to the domain of aerial 3D reconstruction, achieving a specific and substantial reduction in processing time. Additionally, it provides insights into future enhancements, such as parallel texture reconstruction and automation of translation processes.

Keywords: Message Passing Interface, Parallel Computing, MPI, 3D Reconstruction, Aerial 3D Object Mapping.

Implementation of Automatic Proctoring in Online Exam System

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Abstract – Online education has made it difficult to maintain exam integrity, so there is an increasing need for sophisticated proctoring solutions. This paper introduces a websocket based automatic proctoring system for enhancing the real-time moni- toring of browser behaviour to prohibit cheating. It monitors tab and window visibility, URL access, keystroke capture along with the other unusual behaviors in real-time; suspicious activities are logged for later investigations while alerts are immediately sent to proctors. Our solution effectively strikes at most common methods to cheat: using unauthorized tabs, browser extensions or messaging applications; running in virtual machines (although the effectiveness of that approach remains possible as evidenced by monitor sharing); and manipulating timers. This results demonstrate the efficacy of this system through a comprehensive testing, providing insight on how WebSocket-enabled monitoring is capable to uphold academic integrity.

Keywords: Automatic Proctoring, WebSocket Technology, Online Exam Integrity.

Cutlery Detection System With Camera and Yolov5

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Abstract – The culinary business industry, such as restaurants, heavily relies on consumer experience. One aspect that can affect consumer experience is the service provided by the restaurant in supplying complete dining equipment. Misunderstandings may occur due to the lack of complete dining and drinking utensils in restaurants, leading to complaints from customers or guests. However, manually checking the completeness of dining equipment can be time-consuming and can easily lead to human error. Therefore, it is necessary to develop a system that capable to detect the completeness of dining equipment on restaurant tables. To address this, this research uses cameras and machine learning to build a system that can automatically recognize dining equipment on the dining table. The machine learning model used in this research is YOLOv5. In YOLOv5, two processes occur such as training and testing. The training process is carried out on an annotated dataset to produce a trained model. Then this model is tested in the testing process to evaluate its performance using a separate dataset different from the training dataset. The model run on Google Colab showed an accuracy rate of 90% during training and 93.75% during testing.

Keywords: Object Detection, Camera, Machine Learning, Yolov5.

A Cloud-Centric Application for Elderly Heart Disease Detection with Machine Learning and Confusion Matrix

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Abstract – Elderly individuals often face limited mobility and remote locations, which can hinder their access to specialist healthcare and result in missed diagnoses and poorer health outcomes. This paper addresses this issue by proposing a novel, cloud-centric application for Remote Patient Monitoring (RPM). The goal of this application is to enable elderly patients to track their vital signs from home using Internet of Things (IoT) sensors, leveraging machine learning for analysis. A high-performing Random Forest model is employed to analyze the data, detecting early signs of cardiovascular disease with an accuracy of 82.6%. Doctors can remotely monitor patient health data, which is integrated with electronic health records, facilitating timely follow-up care and personalized treatment recommendations. The method presents a user-centric approach that combines remote self-diagnosis with advanced technology to improve healthcare accessibility for the elderly. The current iteration focuses on heart disease detection, but future developments could expand the application to a broader range of health parameters. It is essential to note that this application serves as a complementary tool to professional medical advice, not a replacement. Clear communication about these limitations within the app is crucial. This research highlights the importance of doctor supervision and professional evaluation in conjunction with self-monitoring through the application.

Keywords: Elderly, Heart disease, Machine learning, Cloud centric, Remote patient monitoring.

08. [IES-KCIC]
Intelligent Multimedia Systems

Self-checking Corner of Upper Acute Respiratory Infection Disease Using Certainty Factor Method

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Abstract – The Covid-19 pandemic has changed people's habits, especially students. Students prefer health consultations through telemedicine applications, which in 2020 recorded a surge of up to 600%. Telemedicine applications require costs incurred and inefficient time to conduct consultations. Seeing this, it is necessary to have a health-checking application at an institution, especially a campus, which is free of charge, without direct contact and has valid information, and is supported by artificial intelligence. The solution offered in this research provides a Self-Checking Corner application called Self-Heal as a pre-diagnosis of upper Acute Respiratory Infection (ARI) using the expert system method, Certainty Factor. This paper proposes the creation of an application based on the certainty factor method with valid data from experts. It optimizes the categorization and weighting of scalars, so it can be used for pre- diagnosis before the user consults a doctor. The use of data on symptoms, diseases, and rule tables is obtained from experts, namely doctors so that data validation is more accurate. The accuracy of the initial diagnosis of Acute Respiratory Infection (ARI) disease is close to 80% when the doctor diagnoses directly from 3 trials conducted. The application can be as an application for pre-diagnosis of upper respiratory tract diseases that save time and without cost.

Keywords: Covid-19, Telemedicine, Acute Respiratory Infection, Self-Check Corner, Certainty Factor.

E-Commerce Website with 3D Catalog and Product Customization

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Abstract – As technology continues to advance, e-commerce platforms have become increasingly popular for various shopping needs. This paper presents a case study on PT. Kekean Primanda Indonesia, an e-commerce website focused on sustainable fashion with Batik, Weaving, and Embroidery. The objective of this study was to develop a website that incorporates a 3D catalog and product customization feature to enhance the customer experience and promote PT. Kekean's unique products. The methodology employed in this study involved the waterfall development method, a structured approach consisting of sequential phases such as requirements gathering, design, development, testing, and deployment. Additionally, the Delone-McLean model was utilized to assess the effectiveness of the implemented website in terms of system quality, information quality, service quality, user satisfaction, and impact on the user and organization. The results of the study demonstrated the effectiveness of 3D visual object technology in e-commerce or e- marketplace environments. The addition of visual 3D objects as a promotional feature significantly enhanced the customer experience, as evidenced by the 79.4% "Good" rating in testing. Overall, the development of the website with a 3D catalog and product customization feature for PT. Kekean Primanda Indonesia showcases the potential of technology in enhancing e-commerce experiences. By leveraging the waterfall development method and the Delone-McLean model, this study provides valuable insights into the successful implementation and evaluation of such technological advancements in the e-commerce sector. The findings contribute to the existing body of knowledge and offer practical implications for businesses aiming to optimize their online presence and engage customers effectively.

Keywords: E-Commerce Website, 3D Catalog, Product Customization.
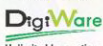
09. [IES-KCIC]
Immersive Technology and Interactive Media

Motion sickness comparison of 2 XR approaches: camera+screen or hologram on transparent lens (Meta Quest 3 or Microsoft HoloLens 2)

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Abstract – With the growth of technical capabilities of virtual reality headsets, more headsets are receiving XR mode using cameras to display the surrounding world (Apple Vision Pro, Meta Quest 3, VIVE XR Elite). These headsets are positioned as a full-fledged alternative to headsets with hologram on transparent lens, such as Microsoft Hololens 2. Meanwhile, one of the reasons holding back the rapid rise in popularity of XR is the motion sickness that occurs when using VR/XR headsets. In this study, we experimented to determine which of the two approaches (camera+screen or hologram on transparent lens) has less motion sickness and which solution can be considered more promising for XR exploration in the future. As a result, our research shows that hologram on transparent lens has much less motion sickness in the current stage of technical progress. Still, its issues need to be solved to provide a non-motion sickness experience to the user.

Keywords: Extended Reality, Motion Sickness, Augmented Reality, Virtual Reality, Digital Twin.

Analyzing Bloom's Taxonomy to Interactions in Virtual Reality Application for Education

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Abstract – Virtual Reality (VR) technology enables users to engage with a three-dimensional, computer-simulated environment that mimics the real world. This immersive technology allows users to fully interact with 3D content as if they were present in that environment. VR has the potential for development in numerous areas, including medical education. Integrating VR into education, particularly in the medical field, can align with Bloom's Taxonomy to create more effective and meaningful interactions. Consequently, interaction design in VR applications for medical education can be optimized to improve student learning outcomes according to Bloom's Taxonomy principles. This research leverages an immersive interactive experience that enables users to actively engage in simulations and practical tasks. By incorporating the principles of Bloom's Taxonomy, the system enhances learning engagement and motivation, ensuring users can recall, apply, analyze, and evaluate information in depth. The purpose of analyzing VR interactions is to evaluate whether the interactions used in the VR Childbirth Surgery application have been implemented correctly through the lens of Bloom's Taxonomy. The interactions analyzed are Grab, Touch, and Click in the VR Childbirth Surgery application, based on journals, applications, and demo videos reviewed. The Click interaction is straightforward and user-friendly, the Grab interaction enhances realism and engagement but requires precise implementation and advanced hardware, and the Touch interaction provides high immersion but is dependent on the capabilities of the VR hardware.

Keywords: Bloom's Taxonomy, Interaction, Virtual Reality, Oculus, Education.

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Interactive Augmented Reality Simulation for Children Stimulus in Learning Robotics Arm Behavior

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Abstract – The development of a digital twin requires an accurate mechanical model that is as perfect as possible for both the virtual and real objects. Both aspects must work together in synchronization and operate in real-time. Here, we developed the virtual model of the arm robotic model which designed as similar as DOBOT Magician Lite with four joint movement; there are base, shoulder, arm, and hand. We also built four virtual sliders as the movement controls for each joint on its robotic arm. Thus, we examine it with gamification to put some items (here were provided as some food models) into the designated place where its item should be placed. We got an appropriate movement and placement of those items. Improving children's robotics education is the main objective of the initiative. One anticipated result would be better learning outcomes for the pupils who took part. Therefore, this concept will become excellent experience to introduce some robotic movement to the children. Whether we provide the virtual robotic arm with augmented reality, making it appear as if it exists in its surroundings like a real object, or we control each arm with a simple concept, the goal is to achieve seamless integration and functionality. Thus, students could enhance their learning experiences by using this program. It could feature interactive 3D robot models, educational games, and simulations, making the study of robotics engaging and accessible. On the next development, we will connect this AR (Augmented Reality) into cloud service and trigger every single control into the real robotic arm, in order that the control of AR will not just effect to the virtual object, but also will prompt the movement of real arm robotics of DOBOT Magician Lite module (which will be provided as module of the real robotic arm).

Keywords: Robotic arm, virtual simulation, augmented reality, children learning module