

8 - 10 AUGUST 2023
Patra Resort & Villas
Bali, Indonesia

IES 2023

INTERNATIONAL ELECTRONICS SYMPOSIUM

**UNLOCKING THE POTENTIAL OF IMMERSIVE TECHNOLOGY
TO LIVE A BETTER LIFE**

PROGRAM BOOK

ISBN 979-8-3503-1471-7

2023 International Electronics Symposium

8-10 August 2023
Surabaya, Indonesia

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Program Book

2023 International Electronics Symposium (IES)

Politeknik Elektronika Negeri Surabaya - PENS
Surabaya, Indonesia, 8-10 August 2023

Table of Contents

2023 International Electronics Symposium Committee.....	iv
Foreword.....	vii
Welcome Message from General Chair of IES 2023.....	ix
Guidelines IES 2023	xi
Conference Room IES 2023.....	xii
Technical Program	xiii
Keynote Speaker 1	xlviii
Keynote Speaker 2	xliv
Keynote Speaker 3	l
Keynote Speaker 4	li
Keynote Speaker 5	lii
Keynote Speaker 6	liii

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Foreword

Assalamualaikum Warahmatullahi Wabarakatuh

With great joy and excitement, I extend a heartfelt welcome to all of you as we gather for the landmark 25th edition of the International Electronics Symposium (IES) 2023 from 8-10 August 2023 in the enchanting island paradise of 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 the 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 honoured to welcome esteemed keynote and invited speakers from around the world. These luminaries, with their invaluable insights and ground-breaking research, will undoubtedly enrich our understanding of current technology's potential to create positive impacts on society and individuals.

Beyond the exceptional speakers, IES 2023 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 2023 presents two illuminating tracks of the conference: International Electronics Symposium on Engineering Technology and Applications (IES-ETA) and International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC). To deepen the symposium experience, we offer three engaging workshops: the Immersive Technology Workshop, the Artificial Intelligence Workshop, and the Wireless Communication Network Workshop. These sessions provide a unique opportunity to delve into the practical aspects of cutting-edge technologies and develop hands-on expertise.

Moreover, IES 2023 showcases an exhibition on the venue, providing participants with an enriching opportunity to witness the latest innovations and advancements in the immersive technology and electronics industry.

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 2023 a reality. Your dedication and support have been instrumental in curating this extraordinary platform for knowledge exchange and transformation.

Foreword

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 25th International Electronics Symposium (IES) 2023!

Wassalamualaikum Warahmatullahi Wabarakatuh

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

Welcome Message from General Chair of IES 2023

A warm and gracious welcome to the remarkable 25th edition of the International Electronics Symposium (IES) 2023, located in the breathtaking of Bali, Indonesia. As the General Chair, it is both an honour and a privilege to lead the celebration of 25 years of innovation, collaboration, and visionary exploration in the journey of IES. I extend my heartfelt gratitude to each of you who has contributed to this journey.



This year, we gather under the inspiring theme, "Unlocking the Potential of Immersive Technology to Live a Better Life." The power of immersive technology is undeniable. As we explore its vast potential, we are presented with unprecedented opportunities to shape the future in ways that resonate with the core of human well-being.

IES 2023 is honoured to feature a distinguished line up of keynote and invited speakers who are luminaries in their fields. Our expert keynote speakers include Prof. Dr.-Ing. Gabriel Zachmann from the University of Bremen, Prof. Dipl. Des. Julia Schnitzer from Brandenburg University of Applied Sciences, Prof. Dr. Paul Grimm from Darmstadt University of Applied Sciences, Assoc. Prof. Dr. Shiori Sasaki from Musashino University, Prof. M. Udin Harun Al Rasyid from Politeknik Elektronika Negeri Surabaya, and Prof. Wen-Chung Kao from the National Taiwan Normal University, Taiwan and as the President of IEEE Consumer Technology Society. They hail from around the globe, representing diverse perspectives and insights that collectively fuel the symposium's intellectual fervour. Their expertise enriches our knowledge, broaden our discussions, and reinforces the spirit of cross-cultural collaboration that IES champions.

I am thrilled to share that this year's conference has drawn a record number of 354 scientific papers from 15 diverse countries including USA, Sri Lanka, Bangladesh, Vietnam, Jordan, South Korea, Germany, India, Malaysia, Japan, Taiwan, Nigeria, Thailand, UK, and Palestine. This remarkable achievement underscores the global significance of IES as a platform that fosters knowledge dissemination, academic growth, and international collaboration.

The symposium is further enriched by the presence of scholars, researchers, and professionals who have gathered here to share their expertise, ideas, and visions for a better tomorrow. The exchange of knowledge and experiences among this diverse community is the cornerstone upon which IES thrives.

Welcome Message from General Chair of IES 2023

As we delve into the symposium's offerings, I encourage each participant to explore the workshops - Immersive Technology, Artificial Intelligence, and Wireless Communication Networks - that promise to be enriching hubs of hands-on learning. Additionally, the exhibition is a testament to the transformative capabilities of technology and a showcase of innovations that bridge academia and industry.

I extend my heartfelt appreciation to our dedicated organizing committees, TPC members, institution partners, sponsors, and volunteers, for the supports and the works to orchestrate this symposium. Your dedication has paved the way for this unforgettable gathering of minds.

I am confident that the symposium will serve as a catalyst for new collaborations, breakthroughs, and innovative solutions that transcend borders. Let us seize this opportunity to unlock the potential of immersive technology and shape a better life for all.

Welcome to the 25th International Electronics Symposium (IES) 2023!

Warm regards,
Dr.-Ing. Hestiasari Rante, S.T., M.Sc.
IES 2023 General Chair

1. Official Language

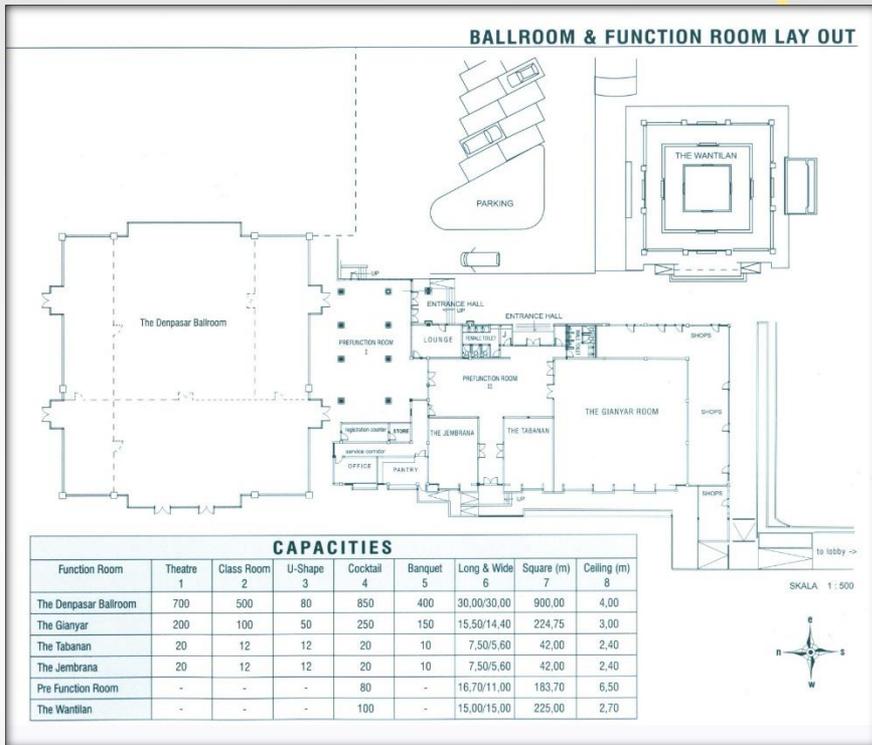
The official language of IES 2023 is English. All presentations including Q&A will be delivered in English.

2. Guideline for Participants

- Conference Venue
Patra Resort & Villas - Bali, Indonesia
Jl.Ir. H. Juanda South Kuta Beach, Tuban, Kuta, Badung Regency, Bali 80361
- Registration
Time of Registration: 07.30 - 08.30, Tuesday, 8 August 2023
- 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, 8 August 2023.

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.



A. Opening Ceremony, Closing Ceremony, and Keynote Speech
The Denpasar Ballroom, Patra Hotel

B. Seminar Room

- Room I : Jembrana
- Room II : Tabanan
- Room III : Klungkung
- Room IV : Ballroom A
- Room V : Ballroom B

C. Lunch Room

Patra Jasa Restaurant

D. Registration and Information

Pre-Function Room, Patra Hotel

Technical Program

Rundown of International Electronics Symposium 2023

Date: 8-10 August 2023

Time Zone: Local Time Jakarta (GMT + 7)

Venue: Patra Hotel, Bali

Unlocking the Potential of Immersive Technology to Live a Better Life

Time	Tuesday, 8 August 2023				
07.30 - 07.55	Registration				
07.55 - 08.00	Safety Induction				
08.00 - 08.45	Opening Ceremony				
	IES 2023 General Chair: Dr.-Ing. Hestiasari Rante				
	Director of PENS: Aliridho Barakbah, Ph.D				
	IEEE Indonesia Section: Prof. Gamantyo Hendrantoro				
08.45 - 10.35	President of IEEE Consumer Technology Society: Prof. Wen-Chung Kao				
	Keynote Speakers (Day 1)				
	Speaker: Prof. Dr.-Ing. Gabriel Zachmann Moderator: Dr. Nu Rrahida Arini				
	Speaker: Prof. Dipl. Des. Julia Schnitzer Moderator: Prof. Amang Sudarsono				
10.35 - 10.45	Speaker: Prof. M. Udin Harun Al Rasyid Moderator: Dr. Idris Winarno				
	Coffee Break				
10.45 - 12.45	Workshop Session				
	Room I	Room II	Room III	Room IV	Room V
	Workshop Immersive Technology	Workshop Wireless Communication Networking	Workshop Artificial Intelligence		
12.45 - 13.45	Lunch Location: Patra Restaurant				
13.45 - 15.00	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
15.00 - 15.15	Coffee Break				
15.15 - 17.00	Room I	Room II	Room III	Room IV	Room V
	Oral Presentations				
18.00 - 20.00	Gala Dinner Location: Patra Garden Pool				

Note:

Room I : Jembrana

Room II : Tabanan

Room III : Klungkung

Room IV : Ballroom A

Room V : Ballroom B

Time	Wednesday, 9 August 2023				
08.00 - 08.30	Registration				
08.30 - 10.30	Keynote Speakers (Day 2)				
	Speaker: Prof. Dr. Paul Grimm Moderator: Dr.-Ing. Hestiasari Rante				
	Speaker: Dr. Shiori Sasaki Moderator: Dr. Muh. Zen Samsono Hadi				
	Speaker: Prof. Wen-Chung Kao Moderator: Dr. Mike Yuliana				
10.30 - 11.00	Coffee Break				
11.00 - 12.45	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
12.45 - 13.30	Oral Presentations				
	Lunch Location: Patra Restaurant				
13.30 - 15.30	Parallel Session				
	Room I	Room II	Room III	Room IV	Room V
15.30 - 16.30	Oral Presentations				
	Closing Ceremony				
	Best Paper Awarding Closing Speech: Aliridho Barakbah, Ph.D				
16.30 - 17.00	Coffee Gathering				

Note:

Room I : Jembrana

Room IV : Ballroom A

Room II : Tabanan

Room V : Ballroom B

Room III : Klungkung

Time	Thursday, 10 August 2023
07.00 - 08.00	Registration at Patra Lobby
08.00 - 09.00	Depart from Patra to Celuk
09.00 - 10.30	1st: Balinese House and Silver Hand Craft Tour
10.30 - 11.30	Heading to Bangli
11.30 - 12.30	2nd: Penglipuran Village Tour
12.30 - 13.00	Heading to Kintamani
13.00 - 14.30	3rd: Lunch at a Kintamani restaurant while enjoying Batur Lake and Mountain
14.30 - 15.30	Heading to Ubud
14.30 - 15.30	4th: Luwak Coffee Plantation tour
15.30 - 16.10	Heading to Monkey Forest Street and Art Market
16.10 - 17.10	5th: Monkey Forest Street and Art Market
17.10 - 18.30	Back to Denpasar/Kuta
18.30 - 19.30	Dinner
19.30	Arrive at Patra

Date : Tuesday, 8 August 2023
Session : 1 (13.45 - 15.00)
Location : Room I (Jembrana)
Track : ETA - Power Engineering and Energy Technology
Moderator : Dr. Nu Rrahida Arini, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	13.45 - 14.00	1570912948	Numerical Study of Wheel Aerator Paddle Profile Effect on Fluid Flow Characteristics and Aeration Performance Prediction	Nu Rrahida Arini, Muhammad Ubbadah Al Ala', Widya Raudah Kusuma and Muhammad Asroril Mubarak (Politeknik Elektronika Negeri Surabaya, Indonesia); Marvin Barivure Sigalo (University of Exeter, United Kingdom)
2	14.00 - 14.15	1570913384	Independent Voltage Mode Control for 3-Level Buck Converter	June-Bong Jeong and Chan-Gyu Kim (Kookmin University, Korea (South)); Ka-San Ha, Won Myung Woo, Moon-Young Kim and Jeong-Il Kang (Samsung Electronics Company Ltd., Korea (South)); Sang-Kyoo Han (Kookmin University, Korea (South))
3	14.15 - 14.30	1570913784	Numerical Analysis of Modified Savonius Wind Turbine Blade with Overlap Ratio Variations	Aninda Fajrria Puji Pangestu and Nu Rrahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia); Dendy Satrio (Institut Teknologi Sepuluh Nopember, Indonesia)
4	14.30 - 14.45	1570913789	Optimization of Horizontal Axis Tidal Turbines Farming Configuration Using Particle Swarm Optimization (PSO) Algorithm	Muhammad Asroril Mubarak and Nu Rrahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia); Dendy Satrio (Institut Teknologi Sepuluh Nopember, Indonesia)

Date : Tuesday, 8 August 2023
Session : 1 (13.45 - 15.00)
Location : Room II (Tabanan)
Track : ETA - Robotics Technology and Control Systems
Moderator : Dr. Eng. Bima Sena Bayu Dewantara, S.ST., M.T.

No	Time	Paper ID	Paper Title	Authors
1	13.45 - 14.00	1570913569	Spline Trajectory for Three Wheels Swerve Drive Mobile Robot Platform	Prishandy Hamami Amrulloh (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Ardik Wijayanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Mawaddah Sekar Rahmawati and Himmawan Sabda Maulana (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
2	14.00 - 14.15	1570913587	Navigation System Development on ATRACBOT using F-SFM	Mochamad Farhan Eka Widarto, Bayu Sandi Marta, Bima Sena Bayu Dewantara and Setiawardhana Setiawardhana (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.15 - 14.30	1570913604	ERISA Humanoid Robot Balance System Using 2D Axis Parameters (Pitch and Roll)	Deby Gunawan, Novian Fajar Satria and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Dwi Kurnia Basuki (Tokyo Metropolitan University, Indonesia & Politeknik Elektronika Negeri Surabaya, Indonesia); Rachmat Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	14.30 - 14.45	1570913726	Lidar-based Human Detection for a Mobile	Alif Wicaksana Ramadhan, Bima Sena Bayu Dewantara,

			Robot in Social Environment using Deep Learning	Setiawardhana Setiawardhana and Fursan Akzada (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	14.45 - 15.00	1570913791	Balancing Control at ERISA Robot using the GY-952 Sensor to Walk on Surfaces That Have Unequal Heights	Sherina Bella Adelia (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Novian Fajar Satria (Politeknik Elektronika Negeri Surabaya, Indonesia); Ardik Wijayanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Dwi Kurnia Basuki (Tokyo Metropolitan University, Indonesia & Politeknik Elektronika Negeri Surabaya, Indonesia); Rachmat Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Tuesday, 8 August 2023
Session : 1 (13.45 - 15.00)
Location : Room III (Klungkung)
Track : KCIC - Knowledge Base and Engineering
Moderator : Sritrusta Sukaridhoto, S.T., Ph.D

No	Time	Paper ID	Paper Title	Authors
1	13.45 - 14.00	1570913651	Optimizing User-PC Computing System with Multicore CPU Utilization through Parallel Computing Jobs Distribution	Prismahardi Aji Riyantoko (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Nobuo Funabiki, Xudong Zhou and Minoru Kuribayashi (Okayama University, Japan); Lynn Htet Aung (Okayama University, Japan), Dwi Arman Prasetya (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia);
2	14.00 - 14.15	1570918505	Implementation of Design Patterns on Unity Components to Increase Reusability and Game Speed Development	Andhik Ampuh Yunanto, Sabila Jamal, Umi Sa'adah, Adam Shidqul Aziz, Desy Intan Permatasari, Nailussa'ada and Fadilah Fahrul Hardiansyah (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.15 - 14.30	1570918609	Selection of Priority Aspects from User Experience Design (UED/UXD) to Develop the Bakamla Messenger Application Using the Analytic Hierarchy Process (AHP) Method	Hozairi Hozairi (Universitas Islam Madura, Indonesia); Buhari Buhari (Islamic University of Madura, Indonesia); Syariful Alim (Bhayangkara Surabaya University, Indonesia); Fajar Baskoro (Institut Teknologi Sepuluh Nopember); Furqon Wahyudi and Rofiuddin Rofiuddin Action (Universitas Islam Madura, Indonesia)
4	14.30 - 14.45	1570919205	Knowledge Management Readiness In The Airport Industry: The Case of Juanda International Airport, Indonesia	Avies Pitagoras Mukhtar (Sepuluh Nopember Institute of Technology & Ministry of Communications and Informatics, Indonesia); Reza Fuad Rachmadi and Prasetiyono Hari Mukti (Institut Teknologi Sepuluh Nopember, Indonesia)

5	14.45 - 15.00	1570922215	Database Matching Service for Stable Marriage Problem	Akhmad Alimudin (Politeknik Elektronika Negeri Surabaya, Indonesia); Yoshiteru Ishida (Toyohashi University of Technology, Japan)
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Date : Tuesday, 8 August 2023
Session : 1 (13.45 - 15.00)
Location : Room IV (Ballroom A)
Track : KCIC - Computational Intelligence
Moderator : Dr. Eng. Agus Indra Gunawan, S.T., M.Sc.

No	Time	Paper ID	Paper Title	Authors
1	13.45 - 14.00	1570909382	Generating Background Music from Vocal Sound with Low-End Hardware using AutoEncoder and GRU	Julian Saputra and Agi Prasetiadi (Institut Teknologi Telkom Purwokerto, Indonesia); Iqsyahiro Kresna A (Panjaitan 128 & IT Telkom Purwokerto, Indonesia)
2	14.00 - 14.15	1570912896	High Dimensional Vectors based on Discrete Cosine Transform in Generating Background Music from Vocal Sound	Agi Prasetiadi and Julian Saputra (Institut Teknologi Telkom Purwokerto, Indonesia); Iqsyahiro Kresna A (Panjaitan 128 & IT Telkom Purwokerto, Indonesia); Imada Ramadhanti (Institut Teknologi Telkom Purwokerto, Indonesia)
3	14.15 - 14.30	1570913708	3D Object Pose Estimation using Local Features Based for Industrial Appliance	Alfan Rizaldy Pratama and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dewi Mutiara Sari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
4	14.30 - 14.45	1570913750	Identification of Acute Myeloid Leukemia (AML) Subtypes: M1, M2, M3 on White Blood Cells Using Microscopic Images	Soniya Jasmine Azzahra, Riyanto Sigit and Heny Yuniarti (Politeknik Elektronika Negeri Surabaya, Indonesia); Yetti Hernaningsih (Dr Soetomo General Academic Hospital, Indonesia); Ade Imannurohma (Politeknik Elektronika Negeri Surabaya, Indonesia)

5	14.45 - 15.00	1570919307	A Novel Approach to Visual Search in E-commerce Fashion Using Siamese Neural Network and Multi-Scale CNN	Laila Marufah (Politeknik Elektronika Negeri Surabaya, Indonesia); Tita Karlita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Umi Saadah (Politeknik Elektronika Negeri Surabaya, Indonesia); Willy Achmat Fauzi (PT. Sinergi Dimensi Informatika, Indonesia)
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Date : Tuesday, 8 August 2023
Session : 1 (13.45 - 15.00)
Location : Room V (Ballroom B)
Track : KCIC - Immersive Technology and Interactive Media
Moderator : Dr. Muhammad Agus Zainuddin, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	13.45 - 14.00	1570909610	Improving Driver Loyalty through using Gamification Approach	Callista Ivana Mogie, Sfenrianto, Ricky, Gunawan Wang and Anderes Gui (Bina Nusantara University, Indonesia); Azlee bin Zabidi (Universiti Malaysia Pahang, Malaysia)
2	14.00 - 14.15	1570913601	Immersive Spaces for Creativity: Smart Working Environments	Andreas Fuchs, Sven Appel and Paul Grimm (Darmstadt University of Applied Sciences, Germany)
3	14.15 - 14.30	1570913607	Experience the Theory: New Perspectives through VR Learning Environments for Photography Education	Andreas Fuchs and Paul Grimm (Darmstadt University of Applied Sciences, Germany)
4	14.30 - 14.45	1570919339	Exploring Art in the Digital Era: Creating and Deploying an Immersive Virtual Gallery Experience	Hestiasari Rante and Kirana Hanifati (Politeknik Elektronika Negeri Surabaya, Indonesia); Cahya Miranto (Politeknik Elektronika Negeri Surabaya & Politeknik Negeri Batam, Indonesia); Toni Tan (University of Bremen, Germany)
5	14.45 - 15.00	1570913740	Gamification Interaction Design for Membatik Application in Mixed Reality	Kirana Hanifati, Hestiasari Rante and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Tuesday, 8 August 2023
Session : 2 (15.15 - 17.00)
Location : Room I (Jembrana)
Track : ETA - Power Engineering and Energy Technology
Moderator : Dr. Nu Rhahida Arini, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	15.15 - 15.30	1570913801	Numerical Analysis of Vertical Axis Tidal Turbine: A Comparison of Darrieus and Gorlov Type	Akhmadi Firman Sasmita and Nu Rhahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia); Dendy Satrio (Institut Teknologi Sepuluh Nopember, Indonesia)
2	15.30 - 15.45	1570915921	Parallel Operation of Virtual Synchronous Generator for Islanded Microgrid System	Ony Qudsi and Adi Soeprijanto (Institut Teknologi Sepuluh Nopember, Indonesia); Ardyono Priyadi (ITS, Indonesia)
3	15.45 - 16.00	1570919193	MPPT Algorithm Based on Modified Human Psychology Optimization for PV System in Partial Shading Conditions	Rivaldi Dwi Syah Putera (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Moh. Zaenal Efendi and Ony Qudsi (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.00 - 16.15	1570919308	Implementation of Intelligent Speed Control for Autonomous Electric Vehicle	Ardhana Putra Setyawan and Dedid Cahya Happyanto (Politeknik Elektronika Negeri Surabaya, Indonesia); Alrijadjis Alrijadjis (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
5	16.15 - 16.30	1570919362	Packed U-Cell Inverter with Mamdani Type Fuzzy Logic Controller to Regulate Output Voltage for Off-Grid Applications	Abdul Hakim Azis, Rachma Prilian Eviningsih and Moch Rafi Damas Abdilla (Politeknik Elektronika Negeri Surabaya, Indonesia); Nibras Syarif Ramadhan (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Novie Ayub Windarko (Politeknik Elektronika Negeri Surabaya, Indonesia)

6	16.30 - 16.45	1570919433	Single Step Multivariate Solar Power Forecasting using Adaptive Learning Rate LSTM Model with Optimized Window Size	Darushini Kunalan (Universiti Tenaga Nasional, Malaysia); Prajindra Sankar Krishnan, Ir. (Institute of Sustainable Energy, Universiti Tenaga Nasional, Kajang, Malaysia); Navinesshani Permal (Faculty of Engineering and Built Environment (FETBE), UCSI University, Kuala Lumpur, Malaysia)
7	16.45 - 17.00	1570922407	Implementation of a Combination of Push-pull Converter and Selective Harmonic Distortion Based Full-bridge Inverter on Multi-stage Microinverter	Endro Wahjono, Ony Qudsi, Fifi Hesty and Novie Ayub Windarko (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Tuesday, 8 August 2023
Session : 2 (15.15 - 17.00)
Location : Room II (Tabanan)
Track : ETA - Robotics Technology and Control Systems
Moderator : Dr. Eng. Bima Sena Bayu Dewantara, S.ST., M.T.

No	Time	Paper ID	Paper Title	Authors
1	15.15 - 15.30	1570917400	Comparative Reconstruction 3D Object Mapping Methods using drone	Julardo Satriawan and Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
2	15.30 - 15.45	1570918710	PENSHIP: Implementation of Image Processing Methods for the Mission of Kontes Kapal Cepat Tak Berawak Nasional (KKCTBN)	Pradono Kristio Putro (Politeknik Elektronika Negeri Surabaya, Indonesia); Tri Budi Santoso (Electronic Engineering Polytechnic of Surabaya (EEPIS), Indonesia); Adytia Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	15.45 - 16.00	1570919017	T-FloW 4.0 Biped Kinematics Computations Using Pseudoinverse and Orthogonal Rotational Matrix	Faiz Ulurrasyadi (PENS, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
4	16.00 - 16.15	1570919287	Communication and Coordination for Multi AGVs Based on MQTT Protocol	Muhammad Rizal Ariyadi, Andi Yuda Pratama, Didik Setyo Purnomo, Mohamad Nasyir Tamara, Niam Tamami, Novan Asdianto Ramadhan (Politeknik Elektronika Negeri Surabaya, Indonesia), Bambang Pramujati (Mechanical Engineering, Institut Teknologi Sepuluh Nopember (ITS) surabaya)
5	16.15 - 16.30	1570919395	Double Loop Controller of Four Mecanum-Wheel Automated Guided Vehicle using SMC-PID	Muhammad Faiz, Bambang Sumantri and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia)

6	16.30 - 16.45	1570922207	Modelling Differential Drive Mobile Robot for High-Resolution Multi-View Image Capturing	Ali Syaugi Bilfagih, Anhar Risnumawan, Martianda Anggraeni and Adytia Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
7	16.45 - 17.00	1570922745	Development of the Electric Bus Platform: Components Layout and Structural Analysis	Luthfi Aminulloh (Politeknik Elektronika Negeri Surabaya, Indonesia & PT. VKTR Teknologi Mobilitas, Indonesia); Evi Nafiatus Sholikhah (Politeknik Elektronika Negeri Surabaya, Indonesia & Universitas Billfath, Indonesia); Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Gilarsi Wahyu Setijono (PT. VKTR Teknologi Mobilitas, Indonesia); Dadet Pramadihanto (PENS, Indonesia)

Date : Tuesday, 8 August 2023
Session : 2 (15.15 - 17.00)
Location : Room III (Klungkung)
Track : KCIC - Knowledge Base and Engineering
Moderator : Sritrusta Sukaridhoto, S.T., Ph.D

No	Time	Paper ID	Paper Title	Authors
1	15.15 - 15.30	1570919002	Analysis of Big Data Readiness in East Java Provincial Government	Zulkarnain Qo'id Basuki (Sepuluh Nopember Institute of Technology, Indonesia); Supeno Mardi Susiki Nugroho (Sepuluh Nopember Institute of Technology, Indonesia); Iwan Wirawan (ITS, Indonesia)
2	15.30 - 15.45	1570922818	Driver Drowsiness Detection System Using Deep Learning Method to Reduce Risk Accident	Mochamad Riswandha Lazuardi (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Mochammad Zen Samsono Hadi and Rahardhita Widyatra Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	15.45 - 16.00	1570923055	CSLS: Design Of Security Lighting Systems For Pedestrians As Part Of Smart City	Alfandi Juliansyah, Mike Yuliana and Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.00 - 16.15	1570923102	Intelligent System for Monitoring the Availability of Bus Passenger Seats using the YOLO Method	Atiqotun Nabilah and Mochammad Zen Samsono Hadi, Aries Pratiarso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
5	16.15 - 16.30	1570923152	Frame by Frame Analysis for Assessing Chickens Flock Movement	Wahjoe Tjatur Sesulihatien (Keio University & Politeknik Elektronika Negeri Surabaya, Japan); Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia); Piko Permata Ilham Prasetyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
6	16.30 - 16.45	1570923207	Knowledge Representation on Pharmacotherapy Using Knowledge Ontology	Selvia Kusuma (Politeknik Elektronika Negeri Surabaya, Indonesia); Mohammad Naufal (Universitas Surabaya, Indonesia); Rifda Tarimi Octavia (Universitas Airlangga, Indonesia)

Date : Tuesday, 8 August 2023
Session : 2 (15.15 - 17.00)
Location : Room IV (Ballroom A)
Track : KCIC - Computational Intelligence
Moderator : Dr. Eng. Agus Indra Gunawan, S.T., M.Sc.

No	Time	Paper ID	Paper Title	Authors
1	15.15 - 15.30	1570913745	Mouth Tracking on Aerosol Suction Robot to Assist Dentist Surgery Using Deep Learning	Riyanto Sigit, Bayu Sandi Marta and Bayu Julianto (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	15.30 - 15.45	1570920938	Stereo Camera Multi-Perception System for Self-Driving Vehicles	Athallah Naufal Pratama (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Dedi Cahya Happyanto and Akhmad Hendriawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	15.45 - 16.00	1570923053	Optimization of Road Detection Using Pruning Method for Deep Neural Network	Moch. Raditya Aulya Aramdhan, Haniah Mahmudah and Rahardhita Widyatra Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia); Md Manowarul Islam (Jagannath University, India)
4	16.00 - 16.15	1570923079	Analysis of Attraction Response on Product Packaging Based on EEG Signal: (A preliminary study of Neuromarketing on Packaging)	Jauzaa Maylia Suhendro (Institut Teknologi Sepuluh Nopember, Indonesia); Arbintoro Mas (Institut Teknologi Sepuluh November Surabaya, Indonesia); Adhi Dharma Wibawa (Institut Teknologi Sepuluh Nopember Surabaya, Indonesia)
5	16.15 - 16.30	1570923165	Mobile Application for Early Screening of Skin Cancer Using Dermoscopy Image Data Based on Convolutional Neural Network	Arna Fariza, Mohamad Akbar Fadlika Wibowo, Tri Hadiyah Muliawati and Yuliana Setiowati (Politeknik Elektronika Negeri Surabaya, Indonesia)

6	16.30 - 16.45	1570923253	Comparison of CNN-Based Design for Shrimp Seed Counting Machine	Firnanda Pristiana Nurmaida (Politeknik Elektronika Negeri Surabaya & EEPIS, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Alfany Riza Mahendra (PT. Pakoakuina, Indonesia); Julian Widya Prayanata (PT Sandana, Indonesia); Setyo Wahyu Trianto (Politeknik Elektronika Negeri Surabaya, Indonesia); Zulfikar Davbi Mahendra Fasya (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
7	16.45 - 17.00	1570930809	A Forest-fire Damage Estimation and Visualization Method for Time-series Multi-location Analysis	Amane Hamano (University of Musashino, Japan); Shiori Sasaki (Musashino University, Japan)

Date : Tuesday, 8 August 2023
Session : 2 (15.15 - 17.00)
Location : Room V (Ballroom B)
Track : KCIC - Intelligent Multimedia Systems
 KCIC - Immersive Technology and Interactive Media
Moderator : Dr. Muhammad Agus Zainuddin, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	15.15 - 15.30	1570913528	Indoor Navigation Using Augmented Reality For PENS Postgraduate Building	Nike Suryawati, Sritrusta Sukaridhoto, Hestiasari Rante and Oktafian Sultan Hakim (Politeknik Elektronika Negeri Surabaya, Indonesia); Evianita Dewi Fajrianti (Okayama University, Japan)
2	15.30 - 15.45	1570913644	Immersive Experience for Sustainable Tourism - The Potential of a Community-based 3D Scanning Database App on the Example of South East Asia	Hannah Schepper (Brandenburg University of Applied Sciences, Germany); Levent Bektas (Technische Hochschule Brandenburg, Germany)
3	15.45 - 16.00	1570918636	A Scenario Selection for Tourism Promotions Serious Game Based on Player Expectations	Yunifa Miftachul Arif, Viona Novriantama, Hani Nurhayati and Ahmad Fahmi Karami (Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia); F Nugroho (Universitas Islam Negeri Maulana Malik Ibrahim, Indonesia); Fachrul Kurniawan and Supriyono Supriyono (Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia); Fardani Annisa Damastuti (Institut Teknologi Sepuluh Nopember & Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.00 - 16.15	1570919347	Determining Mathematics Subject Materials For Learning Media Using Fuzzy Mamdani Based on Initial Evaluation Criteria	Hani Nurhayati, Yunifa Miftachul Arif and Ahmad Fahmi Karami (Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia); F Nugroho and Puspa Miladin Nuraida Safitri A Basid (Universitas Islam Negeri

				Maulana Malik Ibrahim, Indonesia); Eryan Rachman Hakim (UIN Maulana Malik Ibrahim Malang, Indonesia)
5	16.15 - 16.30	1570923042	Versatile Vision: Innovation of a Node-RED-based Smart Surveillance System	Muhammad Rafli Ardiansyah, Anhar Risnumawan and Farida Gamar (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	16.30 - 16.45	1570923234	Interactive 3D Software Development with Integrated Bike Data for Virtual Cycling Experience	Muhammad Yusuf Maliki and Adytia Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Artiarini Nurindiyani (Lecturer & Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Wednesday, 9 August 2023
Session : 1 (11.00 - 12.45)
Location : Room I (Jembrana)
Track : ETA - Power Engineering and Energy Technology
Moderator : Dr. Muh. Zen Samsono Hadi, S.T., M.Sc.

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1570919298	Enhancing Battery SOC Estimation Method Through ANN-Based Incorporation of SOH Degradation	Muhammad Adib Kamali (Institut Teknologi Telkom Surabaya, Indonesia)
2	11.15 - 11.30	1570921113	Harmonic Distortion Mitigation with Single Tuned Filter in ULP Sungguminasa Using Whale Optimization Algorithm	Sofyan (Polytechnic State of Ujung Pandang (PNUP), Indonesia); Muhira Dzar Faraby and Bakhtiar (Politeknik Negeri Ujung Pandang, Indonesia); Andarini Asri (State Polytechnic of Ujung Pandang, Indonesia); Hammad Hammad (State Polytechnic of Ujung Pandang, Indonesia); Isminarti Isminarti (Politeknik Bosowa & Bosowa Education, Indonesia)
3	11.30 - 11.45	1570917299	Minimizing Power Loss in Distribution Networks by placing Electric Vehicle Charging Stations using Particle Swarm Optimization	Syechu Nugraha (Institut Teknologi Sepuluh Nopember); Mochamad Ashari (Sepuluh November Institute of Technology, Indonesia); Dedet Riawan (Institut Teknologi Sepuluh Nopember, Indonesia)
4	11.45 - 12.00	1570922593	Reducing Total Harmonic Distortion of 7-Level Packed U-cell Multilevel Inverter Using Genetic Algorithm	Faizulddin Ebrahimi and Novie Ayub Windarko (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
5	12.00 - 12.15	1570922735	Improving The Performance of Cascade Vapor Refrigeration System by Using Al2O3 Nanoparticles	Rafi Jusar Wishnuwardana, Arrad Ghani Safitra and Teguh Hady Ariwibowo (Politeknik Elektronika Negeri Surabaya, Indonesia)

6	12.15 - 12.30	1570922764	Estimation of Shear Stress and Weber Number on Bubble Breakup in Venturi Microbubble Generator	Muhammad Aghist Fitrony, Teguh Hady Ariwibowo and Arrad Ghani Safitra (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Lohdy Diana and Herlinda Fifiana (Politeknik Elektronika Negeri Surabaya, Indonesia)
7	12.30 - 12.45	1570922774	Preliminary Study of Tree-shaped Ground Heat Exchanger Based on Constructal Theory for GSHP Application	Zainatun Nasiroh, Teguh Hady Ariwibowo, Arrad Ghani Safitra and Arya Rafi Abrari (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Wednesday, 9 August 2023
Session : 1 (11.00 - 12.45)
Location : Room II (Tabanan)
Track : ETA - Telecommunication Engineering Technology
Moderator : Dr. Eng. Idris Winarno, S.ST., M.Kom.

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1570903800	The UAV Assisted Wireless Powered on D2D Communication Hybrid AF/DF Multi Relay Based	Arifin Arifin (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Annysa Aprilya, Meyra Chusna Mayarakaca, Faridatun Nadziroh and Yoedy Moegiharto (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1570912842	Outage Analysis of Flexible Overlay Communications	Van Khuong Ho (Ho Chi Minh City University of Technology, Vietnam)
3	11.30 - 11.45	1570913666	Implementation of Tiny Machine Learning (TinyML) as Pre-distorter for High Power Amplifier (HPA) Linearization of SDR-based MIMO-OFDM	Melki Mario Gulo and I Gede Puja Astawa (Politeknik Elektronika Negeri Surabaya, Indonesia); Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Naufal Ammar Priambodo and Muhammad Wisnu Gunawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.45 - 12.00	1570913765	Blockchain Integration for Mixed Reality Based Smart Lab Systems	Cahyo Arissabarno, Zacky Maulana Achmad and Maretha Ruswiansari; Achmad Fatrian Romadhoni; Naufal Adi Satrio (Politeknik Elektronika Negeri Surabaya, Indonesia); Rizqi Putri Nourma Budiarti (Universitas Nahdlatul Ulama Surabaya, Indonesia); Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)

5	12.00 - 12.15	1570919126	Development of cyclist health notifications based on route tracking and body's parameters	Nasya Alfa Shaumy, Nur Adi Siswandari, Ari Wijayanti, and Okkie Puspitorini (Politeknik Elektronika Negeri Surabaya, Indonesia); Karimatun Nisa (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Muhamad Milchan (Politeknik Elektronika Negeri Surabaya, Indonesia)
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Date : Wednesday, 9 August 2023
Session : 1 (11.00 - 12.45)
Location : Room III (Klungkung)
Track : KCIC - Applied-Computing Sciences
Moderator : Dr. Muhammad Agus Zainuddin, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1570913738	Implementation of Private Blockchain Extension on Open Source IoT Platform using Hyperledger Besu	Agus Prayudi and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Rizqi Putri Nourma Budiarti (Universitas Nahdlatul Ulama Surabaya, Indonesia); Oktafian Sultan Hakim (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1570913743	Stress Condition Detector Based on the Physiological Response using K-Means Cluster Analysis	Sheila Maharani (Politeknik Elektronika Negeri Surabaya, Indonesia); Rika Rokhana (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia); Eru Puspita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
3	11.30 - 11.45	1570913805	A Proposal of Code Typing Problem for Basic Java Programming Learning	Mustika Mentari (Politeknik Negeri Malang, Indonesia); Nobuo Funabiki and Huiyu Qi (Okayama University, Japan); Yan Watequlis Syaifudin and Imam Fahrur Rozi (State Polytechnic of Malang, Indonesia); Komang Candra Brata (Brawijaya University, Indonesia)
4	11.45 - 12.00	1570918933	Stunting Program Classification in East Java, Indonesia from Internet News Using Location-Based and SVM	Caesar Jalu Ananta, Arna Fariza and Rengga Asmara (Politeknik Elektronika Negeri Surabaya, Indonesia)

5	12.00 - 12.15	1570919083	Systematic Literature Review Langchain Proposed	Rakha Asyrofi (Hang Tuah University, Indonesia); Mutia Rahmi Dewi (Politeknik Negeri Padang, Indonesia); Muhammad Irfan Lutfhi (Universitas Negeri Yogyakarta, Indonesia); Prasetyo Wibowo (Politeknik Elektronika Negeri Surabaya, Indonesia)
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Date : Wednesday, 9 August 2023
Session : 1 (11.00 - 12.45)
Location : Room IV (Ballroom A)
Track : ETA - Electronics Systems and Electrics Technology
Moderator : Akhmad Alimudin, S.ST, M.Kom, Ph.D

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1570909083	Design of Solenoid Based Kicker with ZVS Boost Converter for Wheeled Soccer Robot	Zainul Abidin and Mochammad Al Faridzi (Universitas Brawijaya, Indonesia); Ponco Siwindarto (Faculty of Engineering, Brawijaya University, Indonesia)
2	11.15 - 11.30	1570913189	Carbon Nanotubes Enhancement of Fiber Bragg Grating Surface Plasmon Resonance Sensor	Punithavathi Thirunavakkarasu (Universiti Kuala Lumpur British Malaysia Institute, Malaysia); Ahmad Shukri bin Muhammad Noor (Universiti Putra Malaysia, Malaysia); Norazlina Saidin (International Islamic University Malaysia, Malaysia); Abdul Ali Khan (Universiti Kuala Lumpur, Malaysia); Muhammad Syahnizam Sulaiman (Universiti Kuala Lumpur - British Malaysian Institute, Malaysia); Arafat Abdallah Shabaneh (Palestine Technical University-Kadoorie-, Palestine)
3	11.30 - 11.45	1570918028	Design and Performance Analysis of Ion-Sensitive Gated Bipolar Transistor (ISBiT) for pH sensing Applications	Chitrakant Sahu (NIT Raipur, India); Rahul Tyagi (Siemens India, India)
4	11.45 - 12.00	1570919162	Improved Dynamic Threshold Timer for Emergency Vehicle Preemption Exit Strategy	Kunti Khoirunnisaa, Rudy Hartanto, I Wayan Mustika, Ika Arva Arshellla (Department of Electrical Engineering and Information Technology, Gadjah Mada University, Indonesia)

Date : Wednesday, 9 August 2023
Session : 1 (11.00 - 12.45)
Location : Room V (Ballroom B)
Track : ETA - Robotics Technology and Control Systems
Moderator : Sritrusta Sukaridhoto, S.T., Ph.D

No	Time	Paper ID	Paper Title	Authors
1	11.00 - 11.15	1570923027	Real-time Beat Tracking System with Mel-Frequency Cepstral Coefficient Method and ANN for ERISA Dance Robot Motion	Nur Menik Rohmawati, Rahardhita Sudibyo, Novian Fajar Satria and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Dwi Kurnia Basuki (Tokyo Metropolitan University, Indonesia & Politeknik Elektronika Negeri Surabaya, Indonesia); Rachmat Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.15 - 11.30	1570923181	Obstacle Detection and Tracking System for Robot Soccer ERSOW based on Centroid Tracking Method	Vega Kurnia Garindra Wardhana, Iwan Kurnianto Wibowo and Mochamad Mobed Bachtiar (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.30 - 11.45	1570923187	Design of Path Planning System for Multi Agent AGV Using A* Algorithm	Andi Yuda Pratama, Didik Setyo Purnomo, Muhammad Rizal Ariyadi, Novan Asdianto Ramadhan and Mohamad Nasyir Tamara (Politeknik Elektronika Negeri Surabaya, Indonesia), Bambang Pramujati (Institut Teknologi Sepuluh Nopember, Surabaya)
4	11.45 - 12.00	1570923218	Goalpost Detection and Recognition on Robot Soccer ERSOW Using SSD MobileNet-V2 FPNlite	Ujang Supriyadi, Mochamad Mobed Bachtiar and Iwan Kurnianto Wibowo (Politeknik Elektronika Negeri Surabaya, Indonesia)

5	12.00 - 12.15	1570923236	Design and Fabrication of Swerve Drive Mechanism for Mobile Robot Platform	Andri Setiawan (Electronic Engineering Polytechnic Institute of Surabaya & Politeknik Elektronika Negeri Surabaya, Indonesia); Mochammad Iqbal Faisal and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Himmawan Sabda Maulana (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Novian Fajar Satria (Politeknik Elektronika Negeri Surabaya, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)
6	12.15 - 12.30	1570923289	Design and Experiment of a Four-Fingered Robotic Hand for T-FLoW 4.0 humanoid robot	Kevin Ilham Apriandy (Politeknik Elektronika Negeri Surabaya (PENS) & Robotics and Intelligent Systems Center (RoISC), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Dadet Pramadihanto (PENS, Indonesia); Catoer Ryando (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Date : Wednesday, 9 August 2023
Session : 2 (13.30 - 15.30)
Location : Room I (Jembrana)
Track : ETA - Power Engineering and Energy Technology
Moderator : Dr. Muh. Zen Samsono Hadi, S.T., M.Sc.

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1570922854	Preliminary Study of Helical Discrete Double-Inclined Ribs Tube with Various Backfill Materials on Horizontal Ground Heat Exchanger Performance	Arya Rafi Abrari, Teguh Hady Ariwibowo, Arrad Ghani Safitra and Zainatun Nasiroh (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1570922956	Numerical study of Porous Material Effect on Venturi Microbubble Generator Performance	Herlinda Fifiana, Teguh Hady Ariwibowo and Arrad Ghani Safitra (Politeknik Elektronika Negeri Surabaya, Indonesia); Agus Indra Gunawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Lohdy Diana and Muhammad Aghist Fitrony (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.00 - 14.15	1570923132	Experimental Study The Influence of Cooling Tower Filler Configuration on Heat Transfer Rate and Simulate Fluid Flow Characteristic	Arrad Ghani Safitra, Nu Rhahida Arini, Agung Setya Herwanda and Suci Rindya Kaswarie (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	14.15 - 14.30	1570923220	CFD Study of Fluid Characteristic and Heat Transfer in Tubes with Disturbance Bodies	Lohdy Diana, Wahyu Fadilah and Awad Akmal Bamahry (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	14.30 - 14.45	1570923242	Fuzzy Logic-Based Control System for Solar Street Lighting	Ilham Arif Firmansyah (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Ardik Wijayanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)

6	14.45 - 15.00	1570923256	Reliability Analysis of Horizontal Axis Wind Turbine Using Qualitative and Quantitative Methods	Guntur Purbo Dwi Hutomo, Hendrik Elvian Gayuh Prasetya and Nu Rhahida Arini (Politeknik Elektronika Negeri Surabaya, Indonesia)
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Date : Wednesday, 9 August 2023
Session : 2 (13.30 - 15.30)
Location : Room II (Tabanan)
Track : ETA - Telecommunication Engineering Technology
Moderator : Dr. Mike Yuliana, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1570921583	Design and Implementation of Intelligent Systems Using ESP-32 Based Fuzzy Logic on Smart Agriculture System for Mustard Plants	Anisa Lutfiani Salsabila, I Gede Puja Astawa, Anang Budikarso and Budi Aswoyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1570922803	Prediction Of Milkfish Harvest Potential Based On Pond Environment To Support Smart Fishery Towards Technology 4.0	Karimatun Nisa (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Siska Amalia, Okkie Puspitorini, Ari Wijayanti, Nur Adi Siswandari and Muhamad Milchan (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.00 - 14.15	1570923001	Enhancing Document Authenticity with QR Codes and ECC-Based Digital Signatures	Wildan Dharma Walidaniy, Mike Yuliana and Haryadi Amran Darwito (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	14.15 - 14.30	1570923063	Implementation of LiDAR Array System for Damaged Road Characteristic Identification on Moving Vehicle	Naura Zuhdi Nuzula, Rahardhita Sudibyo, Haniah Mahmudah and Nihayatus Sa'adah (Politeknik Elektronika Negeri Surabaya, Indonesia)

Date : Wednesday, 9 August 2023
Session : 2 (13.30 - 15.30)
Location : Room III (Klungkung)
Track : KCIC - Applied-Computing Sciences
Moderator : Sritrusta Sukaridhoto, S.T., Ph.D

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1570919651	Development of IoT Framework for Monitoring Human Health Conditions	M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Idris Winarno and Muhammad Satriyo Aji (Politeknik Elektronika Negeri Surabaya, Indonesia); Grezio Arifiyan (Institut Teknologi Sepuluh Nopember & Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1570923173	Effective Searching of Drowning Victims in the River using Deep Learning Method and Underwater Drone	Diana Agustine Rose Ellen (Electronic Engineering Polytechnic Institute of 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	14.00 - 14.15	1570923174	Drone-to-drone Collision Detection Algorithm in Flight Traffic Management	Muhajirin Ida Ilyas (Politeknik Elektronika Negeri Surabaya, Indonesia & PT. Digital Entropy Venture, Indonesia); Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
4	14.15 - 14.30	1570923292	The combination of the NDBI and machine learning algorithms to classification the development of urban areas in Surabaya uses Landsat 8 Imagery	Prasetyo Wibowo, Arna Fariza and Ferry Astika Saputra (Politeknik Elektronika Negeri Surabaya, Indonesia)

5	14.30 - 14.45	1570930804	Using of Kinship Terms in Pronoun Substitute and Address Terms in the Thai Language	Thatsanee Charoenporn (Musashino University, Japan); Virach Sornlertlamvanich (Musashino University, Japan & Thammasat University, Thailand)
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Date : Wednesday, 9 August 2023
Session : 2 (13.30 - 15.30)
Location : Room IV (Ballroom A)
Track : ETA - Electronics Systems and Electrics Technology
Moderator : Akhmad Alimudin, S.ST, M.Kom, Ph.D

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1570919295	Nanofibrous Filter Synthesis and Characterization of ZiF-8 Metal-Organic Framework for Efficient PM Particle Filtration on Cotton Substrate	Ashish Kumar (National Institute of Technology, Raipur, India); Vinay Kanungo (Swami Keshvanand Institute of Technology & Malaviya National Institute of Technology, India); Vikas Saini (Indian Institute of Information Technology, Kota); Priyanka Harjule (Malaviya National Institute of Technology Jaipur, India); Vinita Tiwari (Indian Institute of Information Technology Kota, India); Basant Agarwal (Central University of Rajasthan, India)
2	13.45 - 14.00	1570920943	A Portable and Mobile Systems for Identifying Cardiac Arrhythmia Using Naïve Bayes	Aviq Nurdiansyah Putra (Politeknik Elektronika Negeri Surabaya, Indonesia); Kemalasari (Indonesia, Indonesia); Hary Oktavianto (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.00 - 14.15	1570922826	Comparative Analysis of EEG-based Emotion Recognition between Male and Female Participants using Hjorth Parameter	Nur Fatih and Adhi Dharma Wibawa; Mauridhi Hery Purnomo; Arbintoro Mas (Institut Teknologi Sepuluh Nopember Surabaya, Indonesia)
4	14.15 - 14.30	1570923138	Microcontroller-based Piezoelectric Driving Method as Mesh Nebulizer for Inhaled Therapy	Nawa Kinarya Palupi and Mochammad Rochmad (Politeknik Elektronika Negeri Surabaya, Indonesia); Rika Rokhana (Politeknik Elektronika Negeri Surabaya, Indonesia & Institut Teknologi Sepuluh Nopember, Indonesia)

Date : Wednesday, 9 August 2023
Session : 2 (13.30 - 15.30)
Location : Room V (Ballroom B)
Track : KCIC - Applied-Computing Sciences
Moderator : Dr. Muhammad Agus Zainuddin, S.T., M.T.

No	Time	Paper ID	Paper Title	Authors
1	13.30 - 13.45	1570921331	Design and Develop A COVID-19 Vaccine Level Detection System For Access Public Services Users Using Face Recognition by Raspberry-pi	Sadriva Zalukhu, I Gede Puja Astawa and Anang Budikarso (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	13.45 - 14.00	1570922171	Performance Evaluation of Docker Containers for Disaster Management Dashboard Web Application	Dibyo Widodo; Prima Kristalina; Mochammad Zen Samsono Hadi and Aprilia Dewi Kurniawati (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	14.00 - 14.15	1570922356	GIS-Based Disaster Management using Support Vector Machine Model for Hazard Level Classification in Disaster Areas	Aprilia Dewi Kurniawati; Prima Kristalina; Mochammad Zen Samsono Hadi and Dibyo Widodo (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	14.15 - 14.30	1570923167	Eye Disease Classification Based on Fundus Images Using Convolutional Neural Network	Rafi Denandra, Arna Fariza and Yanuar Risah Prayogi (Politeknik Elektronika Negeri Surabaya, Indonesia)

Keynote Speaker 1

Prof. Dr.-Ing. Gabriel Zachmann
University of Bremen, Germany

Topic:
Virtual Twins for Science, Engineering, and Decision-Making

Profile:

Gabriel Zachmann is professor for computer graphics, visual computing, and virtual reality at University of Bremen, Germany. He is the head of the computer graphics lab since 2012. Before that, he established and headed the computer graphics group at Clausthal University, Germany, where he was a professor with the Computer Science Department since 2005.



Zachmann's research interests include geometric algorithms for computer graphics, in particular proximity computations and 3D acceleration data structures, massively-parallel algorithms on the GPU, virtual medical simulation, virtual twins, and virtual prototyping, algorithms in haptics and force-feedback, immersive 3D user interaction, immersive visualization, and others.

Zachmann has published many papers at international conferences in areas like collision detection, virtual prototyping, intuitive interaction, mesh processing, and camera-based hand tracking. He has also served on numerous program committees, as a reviewer for journals, conferences, and publishers, and as a referee for many PhDs, both national and international.

Each year, Prof. Zachmann serves on many international program committees and contributes actively to the organization of conferences such as IEEE VR and VisWeek. He also served as expert reviewer for the EU to monitor an FP6 project, as a member of the review panel "Information and Communication Technologies" for the Cyprus Research Promotion Foundation (RPF), and on the Review Panel in the Human Brain Project for the Competitive Call for additional project partners. And, of course, he has also served as a reviewer for many funding agencies, such as the DFG (German Research Foundation), the Israel Science Foundation (ISF), the Austrian Science Foundation (FFG), and the Investitions- und Strukturbank Rheinland-Pfalz (ISB).

Further Information: <http://www.cs.uni-bremen.de/~zach/>.

Keynote Speaker 2

Prof. Dipl. Des. Julia Schnitzer
Brandenburg University of Applied Sciences, Germany

Topic:
Virtual Identity in Social XR

Profile:

Julia Schnitzer has been Professor of Digital Media at Brandenburg University of Applied Sciences since March 2020. From November 2005 to February 2020, she was Professor of Media Design at the Mediadesign Hochschule in Berlin, in 2017 she was appointed its Rector. In addition to her teaching position, she manages the berlindesign.net project, a platform for Berlin designers. In 2009, it was awarded the title “Place of Ideas” by the then German President Horst Köhler. As a member of the Creative Industries Steering Committee of the Berlin Senate Department, she was involved in several projects of the city of Berlin, including the establishment of Berlin as a “Creative City”. Since 2018, she has also been an external evaluator at the German Academic Exchange Service (DAAD). Julia Schnitzer is originally from Vienna and lives with her family in Berlin.



Further information: <https://www.zem-brandenburg.de/en/akteure/prof-julia-schnitzer-2/>

Keynote Speaker 3

Prof. M. Udin Harun Al Rasyid, Ph.D
Politeknik Elektronika Negeri Surabaya, Indonesia

Topic:
Mobile Edge Computing and Crowdsensing on the Internet of Medical Things

Profile:

Udin Harun received the B.Sc. degree in the Informatics Engineering Department in 2004 from Sepuluh Nopember Institute of Technology (ITS) Indonesia and the Ph.D. degree in Computer and Communication Network Program in 2012 from College of Electrical Engineering and Computer Science (CECS) National Taiwan University of Science and Technology (NTUST - Taiwan Tech) Taiwan. He is currently an Associate Professor at Informatics and Computer Engineering Department, Politeknik Elektronika Negeri Surabaya (PENS) Indonesia. He heads the research group of Mobile Sensing and Edge Computing Technology (MSECT) PENS. His Research Interest is mainly in Internet of Things (IoT), Wireless Sensor Network (WSN), Wireless Body Area Network (WBAN), and Elearning Technology.



Further information: <https://udinharun.lecturer.pens.ac.id/>

Keynote Speaker 4

Prof. Dr. Paul Grimm

Darmstadt University of Applied Sciences, Germany

Topic:

Immersive Spaces

Profile:

Paul Grimm is Professor for Expanded Realities at Darmstadt University of Applied Sciences. Before that, he has been Professor of Computer Graphics at the Fulda University of Applied Sciences (Dean 2013-2016) and Erfurt University of Applied Sciences.



After studying Computer Science and Physics at TU Darmstadt, he worked as a research assistant at the Fraunhofer Institute for Computer Graphics. From 1997 to 1998 he was a visiting scientist at the National Center for Supercomputing Applications (NCSA) in Urbana-Champaign, USA. From 2009 to 2010 he did a research semester at Daimler Protics GmbH in the Virtual Engineering & Consulting division.

The research interests of Prof. Dr. Paul Grimm are simplification of the creation process for Virtual and Augmented Reality and he has pursued this in various national and international projects.

Further information: <https://er.medien-campus.h-da.de/grimm/>

Keynote Speaker 5

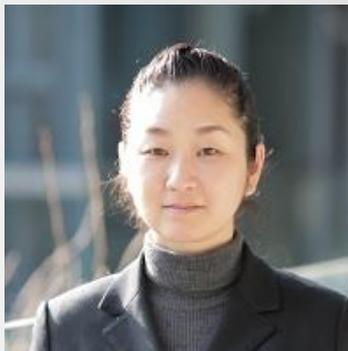
Assoc. Prof. Dr. Shiori Sasaki
Musashino University, Japan

Topic:
Global Environmental Database System

Profile:

Shiori Sasaki is an associate professor of the Faculty of Data Science, Musashino University, Japan.

She received her M.A. degree in Law & Politics in 1998 and Ph. D. degree in Media and Governance in 2010 from Keio University. She had been a lecturer (2004-2007), a project assistant professor (2007-2014) and a project associate professor (2014-2022) of Global Environmental System Leaders program (GESL) adopted by Ministry of Education (MEXT) in Graduate School of Media and Governance, Keio University.



She is currently involved in several international research projects in the Faculty of Data Science, Musashino University. Her research interests include Knowledge base Creation, Multimedia Databases, Geographical Information Visualization, Cross-Cultural Communication and their application to the field of global environment analysis.

Keynote Speaker 6

Prof. Wen-Chung Kao

National Taiwan Normal University, Taiwan & President of IEEE Consumer Technology Society

Topic:

Visible-spectrum Gaze Tracking System Design and Its Application

Profile:

Wen-Chung Kao is a chair professor with the Department of Electrical Engineering, National Taiwan Normal University, New Taipei, Taiwan.

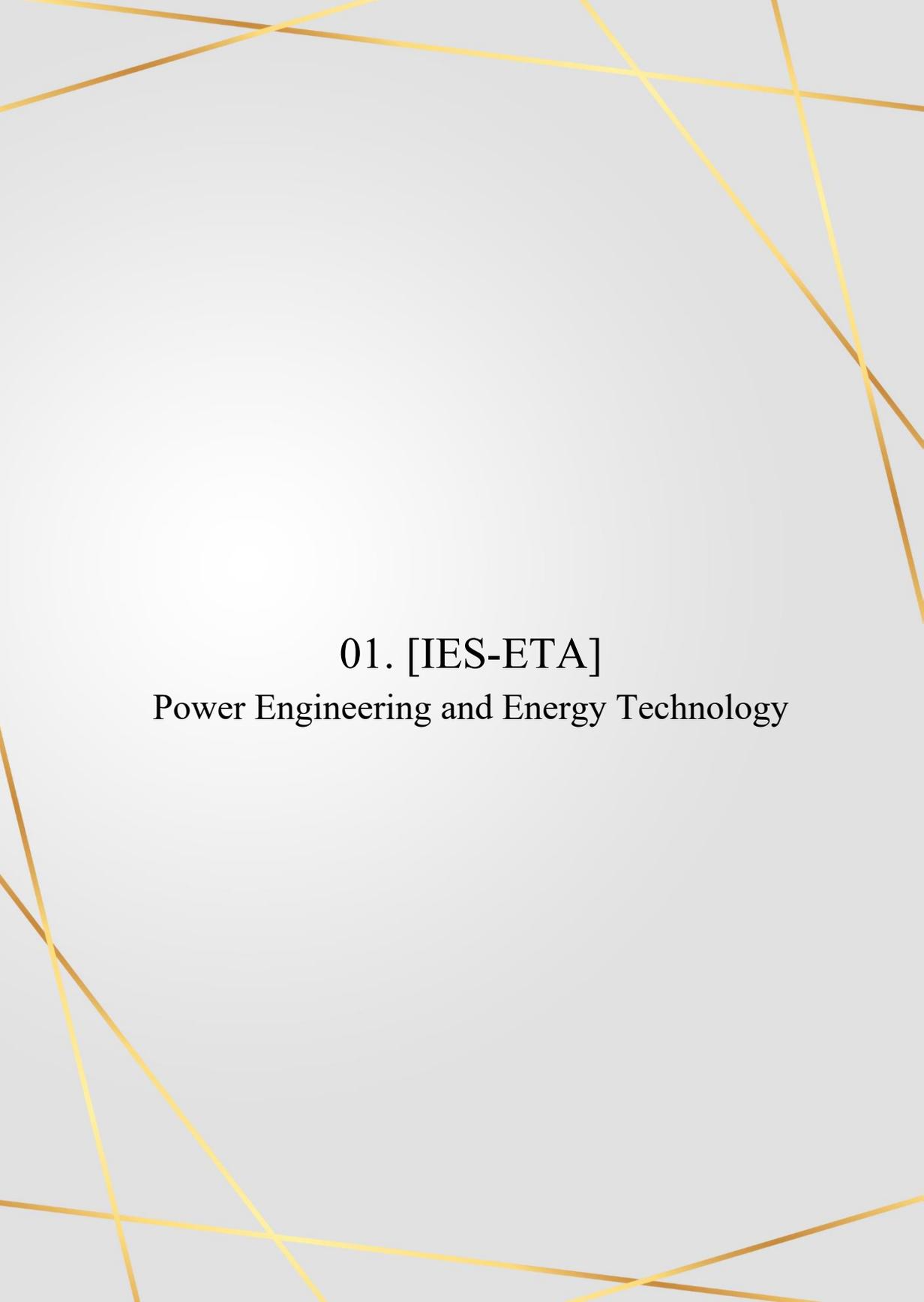
Before he joined academia in 2004, he was a department manager with SoC Technology Center, ITRI, Taiwan, an AVP with NuCam Corporation, Foxlink Group, and the co-founder of SiPix Technology Inc.

His research interests include system-on-a-chip (SoC), embedded software design, flexible electronic paper, machine vision systems, and digital camera systems.



Kao received the M.S. and Ph.D. degrees in electrical engineering from National Taiwan University, New Taipei, in 1992 and 1996, respectively.

He is the president of the IEEE Consumer Electronics Society. He is a fellow of IEEE.



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



Numerical Study on the Effect of Wheel Aerator Paddle Profiles to Fluid Flow Characteristics and Aeration Performance Prediction

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Muhammad Asroril Mubarak¹, and Marvin Barivure Sigalo²

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Abstract –Water quality plays an essential role in the success of aquaculture in fishery industries. The quality relies on the substance's level in the water and one of the substances is dissolved oxygen level. Most cases in modern fishery farms, the farmers use artificial aerators to maintain dissolved oxygen as required. Therefore, dissolved oxygen levels in water are strongly related to the design of the artificial aerator to be used in a fish farming system. One type of artificial aerator available in the market is a paddle wheel or water wheel. The paddle offered in the market is designed with several models. Farmers should select a suitable paddle for their pond to get maximum aeration. However, the selection is challenging as farmers have no reference for a suitable paddle for aerating the pond. The paper aims to analyze the influence of the wheel aerator paddle design/profile on the flow characteristics of the water. The flow affects aeration of water and eventually the dissolved oxygen. In this study, two different paddle profile models are numerically observed. Both models are developed and evaluated using the CFD (Computational Fluid Dynamics) method. The models are evaluated using OpenFOAM software. From the simulation results, the paddle B profile which has larger surface area with greater number of holes is expected to give a higher level of dissolved oxygen to the water rather than the paddle A (smaller one). That is because the bigger paddle produces a higher fluid velocity (48 m/s compared to 22 m/s at paddle A) and has a higher turbulence intensity level (17.3% compared to 7.4% of paddle A), so it is likely to produce a stronger mixing effect. The size and numbers of the hole give important effect to the aerating process. The smaller the hole and the larger number of holes provide strong circulation thus the flow regime is more chaotic which gives better aeration.

Keywords: Paddle Wheel Aerator, Aeration Prediction, Computational Fluid Dynamics, Paddle Profile



Independent Voltage Mode Control for 3-Level Buck Converter

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Abstract –A 3-level buck converter has half the switch voltage stress compared with a conventional buck converter. In addition, the operating frequency of the output inductor is not only twice the switching frequency, but also the flying capacitor voltage can reduce the slope of the inductor current, resulting in a smaller output inductor size. As a result, a 3-level buck converter can achieve high efficiency and power density, provided that the flying capacitor voltage is maintained at half of the input voltage. Most conventional control methods for ensuring the voltage balance of the flying capacitor adopt peak or valley current mode control techniques, which require real-time current sensing. Therefore, these control methods not only require high-performance and expensive digital controllers to implement their complex control algorithms but are also susceptible to noise. This paper proposes an independent 2-loop voltage mode control technique that can ensure that the flying capacitor voltage is half of the input voltage. The proposed control technique is simple to implement and does not require current detection or complex control algorithms, allowing the use of a simple and low-cost microcontroller. Experimental results from a 500-W prototype confirm the validity of the proposed control technique.

Keywords: 3-level buck converter, high efficiency, high power density, slim converter, voltage mode control



Numerical Analysis of Modified Savonius Wind Turbine Blade with Overlap Ratio Variations

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Abstract –Savonius wind turbine is a type of vertical axis wind turbine (VAWT) which converts wind energy from all wind directions. Savonius turbines are appropriate to be applied to urban areas with low wind velocity. Other advantages of the Savonius turbine are the ability to operate in turbulence intensity and to self-start at low wind speeds. Wind conditions in urban areas reduce the performance of the Savonius wind turbine. This study aims to determine the effect of blade modification on the performance of the Savonius wind turbine by varying the overlap ratio (OR) applied in urban areas. This study uses Computational Fluid Dynamics (CFD) as a numerical method to model and simulate flow using OpenFOAM. The transient model simulation using pimpleFoam. The overlap ratio variations used are overlap ratio 0.0 and OR 0.15. The wind speed used for the simulation is 2.9 m/s and the simulation is for four turbine revolutions. Performance of Savonius turbines can be evaluated using coefficient of power, contour velocity, and contour pressure. The results show the coefficient of power value has increased by 30% at OR 0.15.

Keywords: Wind Turbine; Savonius; Urban Area; Overlap Ratio; CFD



Optimization of Horizontal Axis Tidal Turbines Farming Configuration Using Particle Swarm Optimization (PSO) Algorithm

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Abstract –Turbines installed in farming have slightly different characteristics. Mainly the problem is when several tidal turbines are placed side by side at the location of the tidal current flow. Therefore, is it necessary to predict energy at specific marine locations or to optimize the arrangement of turbines. The farm layout is precisely arranged to obtain the best position. One of the stages of optimizing turbines is the effective placement of turbine configuration using the Particle Swarm Optimization (PSO) algorithm. This method is suitable for solving turbine positioning problems. This study aims to optimize position optimization to obtain the maximum power and minimum cost per power of the turbine using the PSO algorithm. The optimization of 2D position in three different scenarios has a substantial impact on the spacing between turbines and effects of objective function. The results of case 3 have a higher objective function value than cases 1 and 2, with an objective function value of 2.330 for five turbines and 1.415 for ten. The result shows turbine arrangement, the three cases show the influence of the current direction from various directions showing positions that are more spread out and pointing in identical directions but do not significantly affect the power generated. Speed has a significant effect on the power produced by the turbine. Variations in direction cause the position of the turbine to spread, while at an identical speed in one direction, the turbine's position is directed in that direction. The PSO method can produce optimal solutions at a cost per product in complex environments with varying directions and speeds in actual circumstances.

Keywords: Horizontal Axis Tidal Turbine, Ocean Renewable Energy, Optimization, PSO, Tidal Farm



Numerical Analysis Of Vertical Axis Tidal Turbine: A Comparison of Darrieus and Gorlov Type

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Abstract – Tidal current energy is a natural resource which can replace fossil energy. A vertical-axis tidal turbine is a device that can be used to extract tidal current energy. However, the influence of the vertical axis tidal turbine is not fully understood. Under the actual condition, the vertical axis tidal turbine produces a high torque fluctuation, making the turbine power coefficient low. This study aims to numerically analyze the performance of vertical axis tidal turbine straight blade (Darrieus type) and helical blade (Gorlov type) and the blade inclination angle effect to improve the power coefficient of vertical axis tidal turbines. 3D CFD models of vertical axis tidal turbines developed using OpenFOAM software—the blade profile using NACA 0012 with a given tip speed ratio (TSR) 2,2. The simulation result of a turbine with a straight blade and helical blades 55°, 65° is compared. The results show the advantages of the helical blade over the straight blade, including the significantly reduced torque fluctuations: where the TRF is reduced from 1.288 up to 0.6204. The power coefficient increases from 23 % to 25 %. Therefore, a vertical-axis tidal turbine with a helical blade has a smoother torque fluctuation and a better power coefficient. The uniqueness of this research is compared to previous studies where the turbine was analyzed at a flow rate corresponding to ocean in Indonesian with a flow velocity of 2m/s. In this study, a variation of the angle of inclination of the blades was carried out on the Gorlov-type turbine so that it could determine the inclination angle Optimal blade for the Gorlov-type turbine.

Keywords: Vertical Axis Tidal Turbine, Gorlov Turbine, Helical Blade, Darrieus Turbine, Straight Blade, Ocean Renewable Energy

Parallel Operation of Virtual Synchronous Generator for Islanded Microgrid System

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Abstract –This paper presents the parallel operation of a Virtual Synchronous Generator (VSG) on an islanded microgrid system. The parallel operation of VSG must be able to carry out well-coordinated load sharing so that system stability is maintained. This makes the system more complex in the control strategy used. In this study, a control strategy is proposed for the parallel operation of VSGs using P-f droop control and Q-V droop control on each VSG. P-f droop control generates the frequency and angle for the internal voltage from VSG. Q-V droop control produces a voltage deviation for the voltage reference on the d-q frame. This control strategy allows VSG to carry out load sharing while maintaining the dynamic stability of the microgrid system. Based on the simulation results, VSG is able to operate in parallel in a microgrid system under normal conditions and when there is a change in load without disturbing the dynamic stability of the system.

Keywords: VSG, microgrid, parallel operation, droop control



Minimizing Power Loss in Distribution Networks by placing Electric Vehicle Charging Stations using Particle Swarm Optimization

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Department of Electrical Engineering, Institut Teknologi Sepuluh Nopember,
Surabaya, Indonesia

¹7022222011@mhs.its.ac.id ²ashari@ee.its.ac.id ³dedet.riawan@ee.its.ac.id

Abstract –This paper demonstrates a method for obtaining minimum power loss in a distribution network by determining the location of electric vehicle charging stations (EVCs) using particle swarm optimization (PSO). In this study, the IEEE 33 bus distribution network is used as a reference for the installation of 5 EVCs. The IEEE 33 bus network is divided into 5 areas. Each area contains 1 EVCs. Each EVCs has a capacity of 22 cars. Each EVCs has 3 types of chargers, namely 15 chargers at level 1 with a maximum capacity of 105 kW, 5 chargers at level 2 with a maximum capacity of 110 kW, and 2 chargers at level 3 with a maximum capacity of 120 kW. The power loss is obtained through power flow analysis. Power flow analysis was used to compare EVCs placed randomly and when optimally placed with PSO. Based on the simulation results, the optimal installation location for EVCs can reduce the power loss by 0.040 MW.

Keywords: power losses, electric vehicle charging stations (EVCs), particle swarm optimization (PSO), optimal placement

MPPT Algorithm Based on Modified Human Psychology Optimization for PV System in Partial Shading Conditions

Rivaldi Dwi Syah Putera¹, Moh. Zaenal Efendi², and Ony Asrarul Qudsi
Department of Electrical Engineering, Politeknik Elektronika Negeri Surabaya,
Surabaya, Indonesia

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Abstract –The alternative energy that is often offered today is solar panels. One of the disadvantages of using solar panels is that they require sufficient sunlight to obtain optimal power. This problem can be overcome by building an MPPT system that allows solar panels to produce maximum power even in partial shading conditions using algorithms ranging from conventional to AI. One of them is modified HPO. This method is an optimization method that can be used in an MPPT system by tracking the duty cycle. This duty cycle will be fired at the SEPIC Converter as a voltage regulator to increase or decrease the voltage value according to the load to be used. This method was chosen because it can make the solar panel output reach the GMPP value which when using conventional methods is sometimes stuck in the LMPP area. The simulation results demonstrated that adjusting the value of the Modified HPO method led to an accuracy level of up to 99.99%, accompanied by a tracking time spanning from 0.189 to 0.241 seconds. These findings provide evidence that the power output from solar panels is not confined to the Local Maximum Power Points (LMPP).

Keywords: Modified HPO, MPPT, Partial Shading, SEPIC Converter, Solar Panel

Enhancing Battery SOC Estimation Method Through ANN-Based Incorporation of SOH Degradation

Muhammad Adib Kamali

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Abstract –A massive number of electronic devices that use batteries as the main power source demand to maintain the battery’s safe operation and lengthen its lifespan. To respond to these demands, a state of charge (SOC) estimation has been extensively developed. Nevertheless, the existing SOC estimation methods often overlook the degradation of the battery state of health (SOH), which can lead to inaccurate estimations. This is because crucial parameters in SOC estimation, such as capacity, vary with battery SOH. An artificial neural network is used for modeling actual SOC trajectories and to predict the actual SOC. To improve accuracy, the model adjusts the SOC parameter by updating the initial SOC value using the updated SOH. This addresses the inadequacy of conventional SOC estimation models trained on fresh cells in accurately estimating SOC in aged batteries. Results indicate that the proposed model consistently achieves lower errors, with the largest improvement observed in the estimation of aged batteries. This reduction in errors by up to 45% in mean absolute percentage error highlights the effectiveness of the proposed method. The proposed model leverages measurable battery data for SOC estimation, reducing computational complexity. By utilizing computationally less complex measurable battery data, the model can be implemented on edge devices, alleviating the computational burden and complexity associated with traditional estimation methods. This further enhances the overall performance and reliability of battery-powered electronic devices, meeting the demands for efficient battery management in practical scenarios.

Keywords: Battery states estimation, machine learning, lithium-ion, neural networks, state of charge, state of health.



Implementation of Intelligent Speed Control for Autonomous Electric Vehicles

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Department of Electrical Engineering, Politeknik Elektronika Negeri Surabaya,
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Abstract – This paper will discuss the implementation of an intelligent speed control system for autonomous electric vehicles. This autonomous electric vehicle uses a Brushless DC motor as the prime mover. Speed control on a vehicle consists of two aspects, namely throttle and braking. In autonomous vehicles, it is necessary to create a throttle and braking system that can work autonomously. In general, the input for throttle and brake which was previously done manually by stepping on the throttle pedal and brake pedal will be replaced by an intelligent system namely autonomous throttle system and autonomous braking system that can regulate speed automatically without human control. This intelligent speed control also added a system that can stabilize the motor response when loading occurs according to the reference speed of the autonomous system using fuzzy logic control. The experiment would be observe the performance result of the speed control system. The result prove that the speed control system works well and can fix the speed problem when given additional load up to 68%. The ultimate goal is to achieve full autonomy in electric vehicles at the desired speed. This research are expected to advance the development of autonomous electric vehicles with smarter and more efficient control systems.

Keywords: autonomous electric vehicle, brushless dc motor, intelligent speed control, autonomous throttle system, autonomous braking system, fuzzy logic control

Packed U-Cell Inverter with Mamdani Type Fuzzy Logic Controller to Regulate Output Voltage for Off-Grid Applications

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Abstract – This paper focuses on the utilization of the Seven Level Packed U-Cell (PUC) inverter topology in the conversion of DC to AC electrical power from the off-grid photovoltaic (PV) system, aiming to achieve less distortion and constant output voltage. Traditional Multilevel Inverter (MLI) topologies suffer from drawbacks such as the numerous requirements of switching components, DC voltage supplies, and capacitors, particularly for higher voltage levels. To overcome these problems, Seven Level PUC inverter topology is applied here. To maintain the voltage output at the required level even when the input voltage fluctuates, a Fuzzy Logic Controller (FLC) with Mamdani type is employed. Simulation shows that the PUC inverter with the FLC successfully maintains the output voltage level at the desired range. Furthermore, to assess the superiority of the FLC, a comparative evaluation between the FLC and the Proportional-Integral-Derivative (PID) control methods for the PUC is conducted. The results reveal that the FLC exhibits more consistent and reliable feedback compared to the PID controller. By providing a comprehensive analysis of the FLC's performance and comparing it with the PID controller, this paper confirms the advantages of utilizing the FLC in achieving a constant and less distorted voltage output in the Seven Level PUC inverter.

Keywords: Fuzzy Logic Controller; Packed U-Cell Multilevel Inverter, Voltage Regulation.

Single Step Multivariate Solar Power Forecasting using Adaptive Learning Rate LSTM Model with Optimized Window Size

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Abstract – Accurate photovoltaic (PV) power forecasting is crucial for the successful integration of residential PV systems into the electrical grid. It enables grid operators to optimize grid operations, ensure stability, facilitate market operations and trading, and plan for future system expansion. In this study, we propose a new model that combines an adaptive learning rate Long Short-Term Memory (LSTM) with an optimized window size for improved PV power forecasting. The proposed model is trained and tested using historical time series data of projected PV power and weather conditions, considering the GPS location of the PV system. The model's performance is compared against other commonly used forecasting models, including LSTM, Bi-LSTM, LSTM-Transformer, and CNN-LSTM, for single-step size forecasting, specifically predicting PV power for the next hour. The results demonstrate that the proposed model outperforms all other models in terms of accuracy for the single-step forecasting task. The adaptive learning rate LSTM with optimized window size demonstrates superior performance, indicating its effectiveness in capturing the temporal patterns and dependencies in PV power generation.

Keywords: LSTM network, Solar Irradiation forecasting, PV generation, Adaptive Learning Rate, Optimized Window Size.



Harmonic Distortion Mitigation with Single Tuned Filter in ULP Sungguminasa Using Whale Optimization Algorithm

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Abstract – The spread of harmonic distortion in a distribution electricity system is a problem that can reduce system performance in terms of power quality. This can cause losses to equipment damage. This study attempts to optimize the placement and size of single tuned filters at harmonic orders 5, 7, 11, 13, 17 using the Whale Optimization Algorithm (WOA) method which has been validated in the electricity system of ULP Sungguminasa PT. PLN (Persero) with the objective function of minimizing total losses. the maximum optimization results were obtained in the form of placement and filter size at order 5 of 5081.22 kVAR on bus 83 capable of reducing total losses by up to 28.05% compared to the location and size of single tuned filters in other orders and the %THD_v value was able to be reduced to the allowable limit.

Keywords: Single Tuned Filter, Harmonic Distortion, ULP Sungguminasa, WOA, Power Quality.

Implementation of Push-pull Converter Combination and Selective Harmonic Distortion based Full-bridge Inverter on Multi-stage Microinverter

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Abstract – Microinverters are becoming more popular as the number of PV installations in low-power applications increases. When compared to single-stage microinverters, multi-stage microinverters offer many advantages, one of which is simple control techniques. A microinverter with two stages was created in this study: the first stage is the DC-DC conversion process using a push-pull converter, and the second stage is the DC-AC conversion process using a full-bridge inverter. The average efficiency of the push-pull converter and full-bridge inverter is 63% and 93%, respectively, according to the test results. Based on the experimental results of total harmonic distortion at the microinverter output voltage of 2.3%, the selective harmonic elimination method works effectively.

Keywords: multi-stage microinverter, PV, push-pull converter, full-bridge inverter, selective harmonic distortion.



Reducing THD of 7-Level Packed U-cell Multilevel Inverter Using Genetic Algorithm

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Abstract –in this paper, a single-phase, 7-level inverter is presented using the modified pulse width modulation (MPWM) technique and packed U-cell (PUC) topology. The simulation is done in the MATLAB Simulink software. Currently, multi-level inverter (MLI) technology is a crucial option in the high-power, medium-voltage energy control sector. Despite the multi-level inverter's many benefits, using so many semiconductor switches results in drawbacks at the higher level. The inverter's size and price could grow as a result, and losses could rise. Therefore, it is advised to cut back on the switches in the new multi-level inverter in order to reduce these issues. A proposed 7-level PUC multilevel inverter (PUC-MLI) is shown to decrease overall harmonic distortion and price. The semiconductor switches switching sequences enhance the multilevel inverter's performance. This paper represents a new method to reduce the total harmonic distortion (THD) of the output voltage of an inverter utilizing a genetic algorithm (GA). It is shown that the proposed algorithm reduced THD significantly. The proposed method is applicable to different topologies of inverters as well as different levels. By utilizing the proposed method without spending any money, the THD can be reduced.

Keywords: MLI, PUC, THD analysis, genetic algorithm



Improving The Performance of Cascade Vapor Refrigeration System by Using Al₂O₃ Nanoparticles

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Abstract – The utilization of cascade refrigeration systems in the frozen food industry has proven advantageous, as they offer improved reliability compared to two-stage refrigeration systems. This study focuses on investigating the application of nanoparticles in a cascade vapor refrigeration system (CVRS). This research is done to assess the impact of nanoparticles refrigeration capacity, compressor power, and coefficient of performance (COP). Al₂O₃ nanoparticles with mass concentration of 0.1% and 0.2%. The CVRS employed R134a and R410a refrigerants in the high and low circuits, respectively. The system analysis was conducted with varying concentrations of Al₂O₃ nanoparticles in the R134a circuit. The nanoparticles' presence in the system led to increased subcooling at the condenser exit. Additionally, it was observed that the COP of the system improved by up to 40.7% following the addition of nanoparticles.

Keywords: nano refrigerant, Al₂O₃, cascade vapor refrigeration system, COP



Estimation of Shear Stress and Weber Number on Bubble Breakup in Venturi Microbubble Generator

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Abstract – The increasing demand for clean water due to climate change, industrialization, and population growth has spurred the development of new technologies, including microbubble generators. Venturi type, which has shown promise for economically and efficiently cleaning water. The venturi microbubble generators performance depends on geometrical parameters of the venturi itself, which takes effect on forces on bubble breakup. Several forces that affect the most to deform bubbles are shear stress force and pressure gradient force. This study uses a three-dimensional computational fluid dynamics simulation to estimate the most favorable locations for bubble breakup on rectangular venturi. Due to the low volumetric fraction of tiny bubbles, the numerical investigation was conducted as single-phase flow and a single bubble was located on diverging section. The prediction from CFD results indicated that the highest shear force was located in the center line of venturi. Weber number also investigated in this study. Weber number able to surpass the critical weber number higher than Reynolds number 10000 in case of 0.3 bubble diameter.

Keywords: microbubble, venturi, shear stress, weber number.



Preliminary Study of Tree-shaped Ground Heat Exchanger Based on Constructal Theory for GSHP Application

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Abstract – The horizontal ground heat exchanger (GHE) has several advantages over the vertical GHE, such as easy installation and not requiring specialized skills. However, the GHE has less heat transfer rate than that of vertical GHE. Based on Constructal theory, this study uses a horizontal tree-shaped GHE with three branches for GSHPs. Water was selected as the working fluid, and the flow rate was set to 1, 4, and 8 L/min. The bifurcation angles were 30°, 60°, and 120°. The effect of flow rate and bifurcation angle on the heat transfer rate and pressure drop was observed. COP improvement factor evaluates energy savings due to increased heat transfer rate and energy loss due to pressure drop on GHE. The smooth straight pipe was selected as a benchmarking performance of Tree-shaped GHE. Results show that the heat transfer and pressure drop in the horizontal treeshaped GHE at the flowrate of 8 L/min is 171-175% and 128-263%, respectively greater than that of in a smooth straight pipe. Based on the COP improvement factor, the horizontal treeshaped GHE at the flowrate of 8 L/min improves the COP improvement factor of GSHPs by 1.71 – 1.75. The results show that the horizontal tree-shaped GHE is superior to the smooth straight pipe GHE. Based on these findings, the tree-shaped GHE is recommended for applications in horizontal GHE. However, further study is needed to understand the influence of ground thermal conductivity on the performance of the horizontal tree-shaped GHE.

Keywords: heat transfer rates, pressure drop, ground heat exchanger, constructal theory



Preliminary Study of Helical Discrete Double-Inclined Ribs Tube with Various Backfill Materials on Horizontal Ground Heat Exchanger Performance

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Abstract – Ground heat exchanger (GHE) is a equipment for transferring heat in space heating or cooling by using geothermal as heat source or sink. Horizontal GHE is one of the preferred types of GHE if the GHE is viewed from the aspect of ease of installation and installation costs. However, horizontal GHE has worse thermal performance than vertical GHE. With the same heat transfer rate, Horizontal GHE requires longer dimensions than vertical GHE. Thus, this problem becomes an obstacle to utilize horizontal GHE. Discrete Double-Inclined Ribs (DDIR) is a method of increasing heat transfer by generating a longitudinal vortex. This study aims to improve the thermal performance of Horizontal GHE by adding Helical DDIR on straight pipes. The heat-released performance in some backfill materials. The backfill materials are sandy-clay, dry-sand bentonite, and wet-sand bentonite. The study found that tubes modified with helical DDIR are better than smooth tubes in the first 60 minutes. The backfill material provides a significant increase of up to 80 W/m.

Keywords: Ground Heat Exchanger, Backfill Material, Helical DDIR



Numerical study of Porous Material Effect on Microbubble Generator Venturi type Performance

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Abstract – Venturi is one of industrial water treatment systems' most commonly used microbubble generator devices. This research focuses on the effect of porous Aluminum on the performance of the microbubble generator. Simulations were carried out using a 2-dimensional model, at various water velocities, air velocities, and porosity values. Various air and water velocities were tested. In this study, the venturi was tested with several variations of aluminium porosity, namely 10, 20, and 40 PPI. Pressure drop in porous material flow is calculated using the Forchheimer equation. The parameters that were used to determine the performance of the microbubble generator were hydraulic power and bubble generating efficiency. The results show that the microbubble generator's performance, such as the bubble generating efficiency, increases with increasing porosity, air, and water velocity. Furthermore, hydraulic power decreases if there is a decrease in air velocity, water velocity, and porosity, The flow structure shows that there are many wave patterns at the water-air interface as the water velocity and air velocity increase.

Keywords: microbubble generator, microbubble, venturi, porous aluminum, pressure drop



Experimental Study The Influence of Cooling Tower Filler Configuration on Heat Transfer Rate and Simulate Fluid Flow Characteristic

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Abstract – A Cooling Tower is a heat exchanger that cools high-temperature water with air. Heat transfer occurs directly through contact between water and air and dissipates heat into the air or free atmosphere. Heat transfer in cooling towers is strongly influenced by filler configuration and airflow characteristics. In this research, the filler configuration is varied with straight and wavy arrangements; the first variation is straight with an 80° angle arrangement, and the second variation is a straight wave arrangement with an 80° angle arrangement. This research observed the effect of the filler configuration on cooling tower performance, such as heat transfer rate, effectiveness, NTU (Number of Transfer Units), efficiency, and evaporation loss. The experimental results found that the straight waveform combination filler has significant heat transfer effectiveness because the more turbulent the fluid flow, the greater the heat transfer. The heat transfer rate, NTU effectiveness, efficiency, and evaporation loss were highest in the combination of straight wave filler variations with a heat transfer value of 4.56 kW, NTU effectiveness of 3.45, evaporation loss of 0.0056/hour, and efficiency of 53.11%.

Keywords: cooling tower, forced draft, NTU, effectiveness, filler, fluid flow

CFD Study of Fluid Characteristic and Heat Transfer in Tubes with Disturbance Bodies

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Abstract – Low-Pressure Heater (LPH) is a type of shell & tube heat exchanger that used as a feed water preheater that will enter the boiler with steam turbine extraction as a heater. The tubes in LPH are arranged very tightly to maximize the heat transfer process, so that the resulting pressure drop is very large. There are two methods to reduce the pressure drop that occurs, that is the active control and passive control methods. The passive control method used the inlet disturbance body (IDB) on the upstream tube side. This research was conducted with 2D numerical simulation method, using computational fluid dynamic (CFD) software. The purpose of this study was to know about the flow characteristic of the LPH tube with the addition of IDB. The simulation test model is in the form of five LPH tubes arranged staggered and the variations are without IDB, cylindrical IDB, and rectangular IDB. Simulation results show that the basic variations, it is without IDB. It can reduce more pressure drop on LPH compared to using cylindrical IDB, and rectangular IDB. This is proven by the results of the smallest drag coefficient value of 0.0769 and the value of the drag coefficient increases as disturbance body angle increasing. Besides that, it is also supported with a wake speed profile of 0.21 m/s and a Nusselt number of 45.88.

Keywords: low-pressure heater, disturbance, pressure coefficient, nusselt number, cylindrical, rectangular.



Fuzzy Logic-Based Control System for Solar Street Lighting

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Abstract –Solar-powered street lighting is a street lighting system that utilizes solar energy as its power source. In Indonesia, public street lighting accounts for the one of the largest electricity consumption and has been increasing over the years. In this paper, researchers aim to develop a fuzzy logic-based control system supported by the use of an ultrasonic sensor HC-SR04 for adaptive lamp activation. Furthermore, this system utilizes solar panels as its power source, enabling it to be self-sustaining and ensuring continuous energy supply. The testing of light intensity and battery discharge demonstrates the low power consumption with significant power efficiency in the self-made street lighting system. The fuzzy logic testing between the device and simulation yields an average error of 0.05% for the PWM percentage output and an average error of 0.08% for the dimming output.

Keywords: Solar Street Lighting, Fuzzy Logic, Ultrasonic Sensor



Reliability Analysis of Horizontal Axis Wind Turbine Using Qualitative and Quantitative Methods

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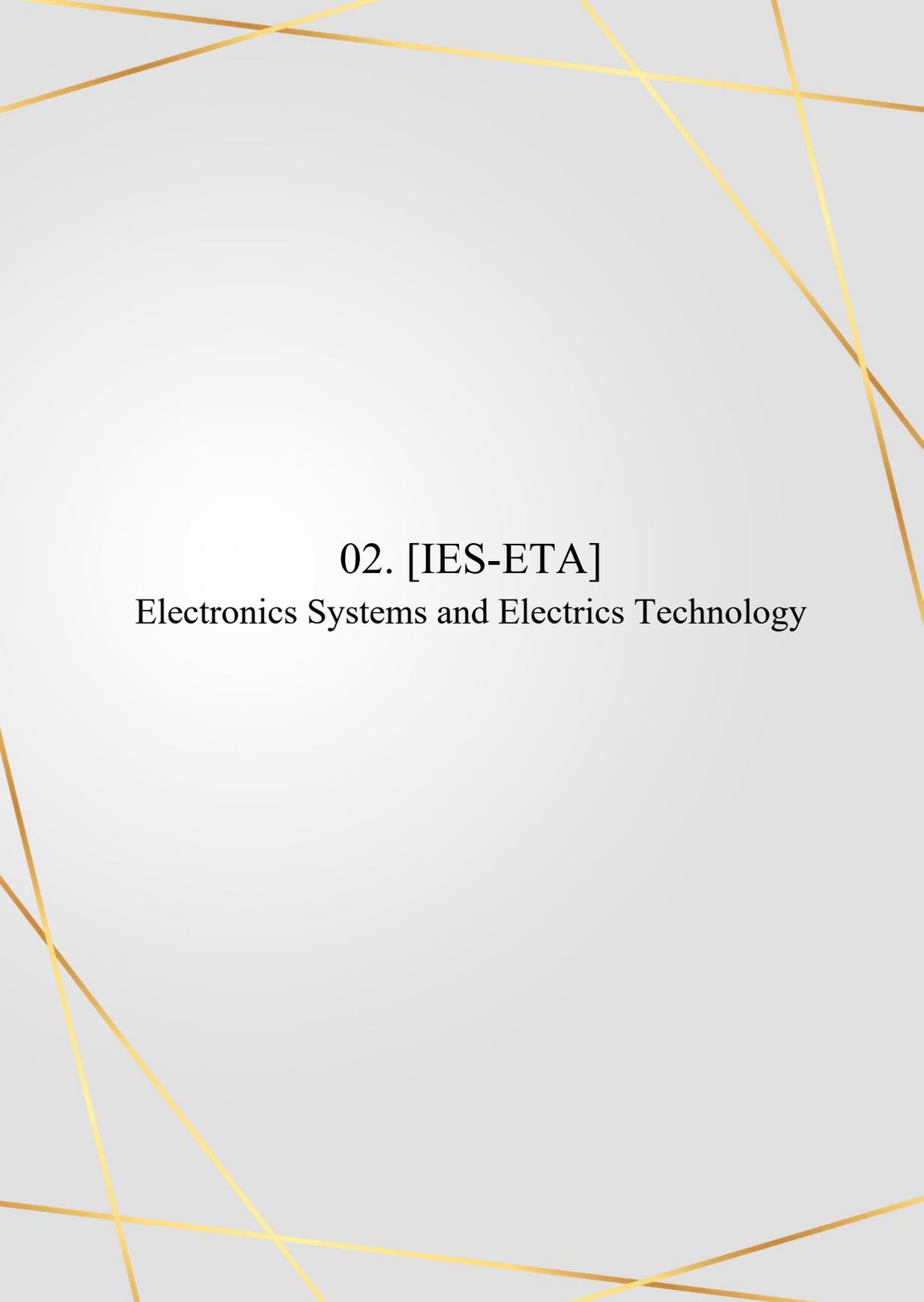
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Abstract – A wind power plant is a facility that produces electricity by harnessing the power of the wind. The fundamental principle behind a wind turbine is the conversion of wind's kinetic energy into rotational energy, which, in turn, drives a generator to generate electricity. The performance and reliability of wind turbine must be maintained so that production runs well. This study aims to determine the critical components, determine the failure rate, how to improve reliability, and get the MTBF value on the 600 kW horizontal axis wind turbine components. Analysis is carried out by qualitative and quantitative methods. Based on the results obtained from Failure Mode and Effect Analysis (FMEA) qualitative analysis, there are three most critical components of wind turbines, generators with a value of 165.888, hub (main shaft) 156.1, and transmission (gearbox) 149.625, while the lowest components are blades and towers. The MTBF value of the most critical components is a generator of 1151.5 hours, a hub (main shaft) of 2464 hours, and a transmission (gearbox) of 9635.5 hours. Reliability in generator components, main shafts and gearboxes increases when maintenance is carried out at intervals $R(t)$ 80% and 90% and is better than reliability with maintenance at MTTF time intervals.

Keywords: Wind Turbine, Reliability, FMEA, MTBF/MTTF



02. [IES-ETA]

Electronics Systems and Electric Technology



Design of Solenoid Based Kicker with ZVS Boost Converter for Wheeled Soccer Robot

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Abstract —Wheeled soccer robot must have actuator system consists of moving, dribbling, and kicking. Solenoid based kicker was claimed to be one of the most efficient kickers. It uses solenoid coil to generate magnetic field and Lorentz force to move plunger of the kicker. In this study, a solenoid based kicker was designed with Zero Voltage Switching (ZVS) boost converter. The designed kicker was expected to move a ball about 6m which is half of the field in the Indonesian Wheeled Soccer Robot Contest. By charging the capacitor bank less than 5 seconds using the ZVS boost converter, the designed solenoid can produce Lorentz force for the expected distance. Furthermore, the kicker can adjust the kick distance by regulating the voltage charged to the capacitor in order to pass the ball accurately. The kicker was successfully implemented on wheeled soccer robot with kick distance until 6.07m, energy supply of 348J, power of 14116.41W, and charging time of 4.7 seconds. The experiment results prove that the designed kicker has good performance of kicking with short charging time.

Keywords: wheeled soccer robot, solenoid kicker, ZVS boost converter, charging time



Carbon Nanotubes Enhancement of Fiber Bragg Grating Surface Plasmon Resonance Sensor

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Abstract — In this research, a telecommunication standard fiber Bragg grating is sputtered with a 45 nm gold film to obtain surface plasmon resonance. Carbon nanotubes are deposited over the gold layer for sensitivity enhancement due to its unique chemical and optical properties. The developed sensor is interrogated with a broad-spectrum light source and spectrophotometer setup in the visible region and the sensing performance is analyzed. The sensor showed high sensitivity of 526 nm/RIU which was more than 4 time higher than a sensor without the carbon nanotubes enhancement. This shows great promise in the application of CNTs and possibly other sensitive nanomaterials as sensing enhancements of future sensing using optical fibers.

Keywords: fiber Bragg Grating, surface plasmon resonance, carbon nanotubes, optical fiber sensor, ethanol



Design and Performance Analysis of Ion-Sensitive Gated Bipolar Transistor (ISBiT) for pH Sensing Applications

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Abstract—In the paper, the design and performance analysis of ISBiT is presented for pH sensing applications, where, the pH sensitivity of the ISBiT is investigated at different sensing ion-sensitive membranes. It has been observed that in both nearthreshold and subthreshold regimes, the ISBiT works at the lower operating voltage and has a greater transconductance as compared to ISFET. The proposed ISBiT shows the maximum voltage sensitivity of 59.7, 60.3, 61.1, and 62 mV/pH for SiO₂, Si₃N₄, Al₂O₃ and Ta₂O₅ respectively which is greater than the Nernstian limit (59.2 mV/pH). Further investigation of the ISBiT pH sensor at various temperatures reveals current sensitivity of 152.6, 146.7, 137.8, 127.6 μ A/pH at 250, 300, 350, and 400K temperatures respectively.

Improved Dynamic Threshold Timer for Emergency Vehicle Preemption Exit Strategy

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Abstract —This paper examines the Dynamic Threshold Timer (DTT) as an exit strategy for Emergency Vehicle Preemption (EVP), a critical service that prioritizes emergency vehicles' passage through traffic by pre-empting traffic signals. However, the use of EVP can lead to traffic congestion and delays for other vehicles. To address this issue, an Exit Strategy can be used to optimize traffic signal timing and improve traffic flow, thereby mitigating the negative impacts of EVP on other vehicles. The study focuses on a case study of one such strategy: Dynamic Threshold Timer, which was enhanced and evaluated for its effectiveness in reducing waiting time. The results indicate that the improvisation of DTT into the Dynamic Exit Phase can significantly reduce the average waiting time by 18% across all traffic flows saturation level. In contrast, the Fixed Phase does not reduce congestion but rather increases it by 10%, compared to a traffic light system without the Exit Strategy. Furthermore, the study reveals that applying DTT with an exit to the South Phase yields the most effective results, reducing waiting time by 20%. The findings from this research underscore the potential of utilizing DTT with exit strategies for the Dynamic Phase to improve traffic flow and mitigate delays. The implications of this study are significant for managing smart city transportation systems and enhancing emergency service provision.

Keywords: EVP, Exit Strategy, Dynamic Threshold Timer



Nanofibrous Filter Synthesis and Characterization of ZIF-8 Metal Organic Framework for Efficient PM Particle Filtration on Cotton Substrate

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Abstract —In this work, we optimized the electrospinning method and prepared a ZIF-8@PAN (Zinc Imidazolate Framework-8/Polyacrylonitrile) solution to fabricate a ZIF-8 MOF (Metal Organic Framework) nano fibrous filter for efficient filtration of PM_{2.5} and PM₁₀ particles. The solution was deposited on a cotton substrate, chosen for its high flexibility, low air flow resistance, abundant interactive sites for pollutants, and cost-effectiveness. Structural characterization was performed using X-Ray Diffraction (XRD) analysis with the Bruker D8 Advance instrument, confirming the successful preparation of the ZIF-8@PAN sample. The XRD spectra exhibited distinct diffraction peaks corresponding to the associated planes of the deposited thin film, indicating the presence of the Sodalite structure. The surface morphology of the synthesized sample was examined using Field Emission Scanning Electron Microscopy (FESEM), revealing a uniform distribution of nano fibrous structures with a mesh-like surface morphology. The fabricated sample was further characterized using a Nova Touch LX2 gas sorption analyzer, which revealed a BET surface area of 664.953 m² g⁻¹ and a pore volume of 0.3916 cm³ g⁻¹ for the composite ZIF-8@PAN.

Keywords: Air Pollution, MOF, ZIF-8, Electrospinning, PM_{2.5}, PM₁₀



A Portable and Mobile Systems for Identifying Cardiac Arrhythmia Using Naïve Bayes

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Abstract —Arrhythmia is an abnormality of the heart's rhythm. If this is not treated quickly, it can lead to serious problems, such as sudden cardiac arrest which results in death. An electrocardiogram (ECG) is a medical device used to check the activity of the heart's electrical signals to identify arrhythmias. It is difficult for ordinary people or patients with heart disease to monitor their heart health independently because of the high cost of detecting heart problems using an ECG in a medical laboratory without supervision from a medical doctor. Therefore, a portable ECG is needed as a heart signal monitoring tool that everyone can have to detect early symptoms, where the results can be sent to a doctor for further treatment. This study uses the ADS1293 acquisition module to monitor the electrical activity of the heart with three lead points, namely lead I, lead II, and lead V1. Those three lead points are sufficient to assess cardiac status. The signals from each lead will then be classified using the Naive Bayes method. The results obtained have an accuracy of 85% and a precision of 88.23% based on 20 tests. The waveform from each lead and the classification results are sent to the user's smartphone using Bluetooth.

Keywords: Arrhythmias, Electrocardiogram, Portable, ADS1293, Naive Bayes



Comparative Analysis of EEG-based Emotion Recognition between Male and Female Participants Using Hjorth Parameter

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Abstract —In recent years, scientists have investigated the potential of EEG for identifying emotional states. Analyzing the patterns and frequencies of brainwave activity makes it possible to detect and classify different emotional states, such as happiness, sadness, fear, or anger. In daily life, it is evident that there are differences in how men and women think and approach various aspects, such as perceiving and experiencing emotions. Given the scarcity of research on gender-based EEG studies, it is crucial to explore this area to gain valuable insights into the unique neurological aspects of gender. This study examines gender disparities in emotion recognition using the Hjorth Parameter analysis. This study recorded the data of 24 healthy subjects (22 ± 5.6 years old) using a wireless OpenBCI EEG device. The participants were stimulated in two ways: by seeing happy and sad videos. The electrodes used in this study were placed in the frontal area channels F7, F8, FP1, and FP2, following the internationally recognized 10/20 EEG system. EEG pre-processing techniques include signal filtering and ICA for Artifact removal. The EEG signals were separated into alpha, beta, and gamma sub-bands using Butterworth filters. The analysis was to compute the Hjorth parameters: in activity, mobility, and complexity type. These parameters provide essential measures of signal characteristics within the time series data. We used the fisher ratio to identify the most influential features. The most prominent features were then processed and analyzed using SVM, KNN, Naive Bayes, and Random Forest algorithms for emotion classification. This study has shown that Hjorth Activity outperforms other Hjorth parameters such as Hjorth mobility and complexity in accurately recognizing emotions, and the beta subband is the most sensitive subband in distinguishing between happy and sad emotions. On the gender aspect, differences in emotional



responses between men and women are evident. Women tend to exhibit more similar EEG patterns among themselves, while men show more significant individual differences. The other intriguing finding is that the value of the gamma subband is higher for both men and women in the sad condition, indicating that the cognitive process appears more evolved than in the happy condition.

Keywords: Cognitive Process, EEG, Emotion Recognition, Fisher Ratio, Gamma Subband, Gender-based, Hjorth Parameter.



Microcontroller-based Piezoelectric Driving Method as Mesh Nebulizer for Inhaled Therapy

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Abstract —The pandemic of COVID-19 had taken tolls abroad the globe. Efforts have been done to mitigate the mortality rate of the disease. One of those is to inhale drugs directly into the respiratory system. While the drug delivery devices, such as mesh nebulizer, are available widely, the cost might be a burden. Since mesh nebulizer works by driving a piezoelectric element, a piezoelectric driving method is designed to establish an independent mesh nebulizer system. The design is purposed to be easy-implemented with low cost and widely distributed components. Hence, Arduino Nano microcontroller is used as primary microcontroller along with other widely available external components. The final result ensures the proposed design is able to mimic the working of a mesh nebulizer by a maximum measured flow rate of 1.686 milliliter per minute, which is far higher than typical nebulizer, and consequently produces unwanted audible noise. Leading to suggestions to implement resonant frequency tuning in addition to the current method and to

Keywords: piezoelectric, mesh nebulizer, mist making, Atmega328P, piezodriver.



03. [IES-ETA]
Telecommunication Engineering Technology



The UAV Assisted Wireless Powered on D2D Communication Hybrid AF/DF Multi Relay Based

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Abstract — This work investigates the implementation of hybrid AF and DF relaying protocol on multi relay D2D wireless powered communication system. To get the system performance we propose three scenarios of AF and DF utilization and three conditions of the distance $S - R$ and $R - D$ which impact to the system performance on throughput term. From the simulation results we conclude that the distance of $R - D$ will produce the highest SNR value which result the best throughput system value. The simulation results verify that AF relaying protocol produce better SNR value and better throughput value than DF relaying protocol, which can be shown that the first scenario when all relay work with AF relaying protocol.

Keywords: D2D communication, hybrid AF and DF, throughput.



Outage Analysis of Flexible Overlay Communications

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Abstract —Overlay communications asks secondary transmitters (STs) to aid primary transmitters (PTs) for rewarding the usage of primary spectrum for transmission, dramatically meliorating spectral efficiency. Our work proposes a flexible overlay communications wherein STs operate adaptively with amongst direct transmission, decode-and-forward, and amplifyand- forward to further ameliorate spectral efficiency, system performance, and energy efficiency. The outage probability of the flexible overlay communications is analyzed and evaluated through

Keywords: Overlay communications; outage probability; Rayleigh fading; spectral efficiency.



Implementation of Tiny Machine Learning (TinyML) as Pre-distorter for High Power Amplifier (HPA) Linearization of SDR-based MIMO-OFDM

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Abstract — This paper implements a new pre-distorter (PD) scheme using Tiny Machine Learning (TinyML) to compensate for the non-linear High-Power Amplifier (HPA) in the Software Defined Radio (SDR)-based Multiple-Input Multiple-Output Orthogonal Frequency Division Multiplexing (MIMO-OFDM). TinyML is used because there are weaknesses in the PD neural network (NN), which has a large model size and high computational costs. Some research uses PDNN because it has flexible advantages and can provide the inverse characteristics of sophisticated PA modelling. Using PDNN in the SDR-based MIMO-OFDM will cause system degradation because the SDR device has low computational memory. The system degraded because the execution time of the transmitter was high, which affected the latency of the communication system. TinyML will reduce the complexity of the NN model, resulting in a smaller model size and a lower computational cost. The implementation of PD TinyML in SDR-based MIMO-OFDM can improve the execution time by 40% compared to the use of PDNN. Even though it has a lower execution time, TinyML can compensate for HPA and perform similarly to PDNN. The maximum SNR value of PD TinyML is only 2.07 dB, lower than the maximum SNR value of PDNN. In addition, the BER graph of PDTinyML's SNR to achieve a minimum BER is 1.37 dB higher than PDNN. From this, the performance decrease in PDTinyML is not too significant.

Keywords: MIMO, OFDM, Neural Networks, TinyML, Predistortion, SDR



Blockchain Integration for Mixed Reality Based Smart Lab Systems

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Abstract —Smart lab is a system for controlling electronic equipment in a laboratory room that is possible to be operated remotely via the internet network and integrate mixed reality for a more realistic user interface. In the smart lab system, it is important to know the activity history of each device, particularly in case of malfunctions or misuse. Therefore, the usage of devices in laboratories needs to be traceable. Blockchain is one type of technology that able to address traceability issues. Blockchain's distributed and transparent nature makes it simpler to track each transaction occurrence. In a smart lab system, we are integrating Blockchain as a data storage system for historical smart device usage data. Blockchain has successfully recorded smart devices history data. Based on testing, the transaction throughput on the blockchain is an average of 1 transaction per second with a transaction delay of 1.2 seconds. The REST API developed for the smart lab system able to handle more than 20 requests from 5 users simultaneously with an average response time of 3.75 seconds at a bandwidth ranging from 8 Mbps to 0.5 Mbps. However, there are already failed requests when 10 users use it simultaneously at 8 Mbps. Traceability in the smart lab has been enabled by preserving historical records of smart device usage on the blockchain system.

Keywords: Blockchain, Smart Lab, Mixed Reality, Internet Of Things, Smart Contract



Development of Cyclist Health Notifications Based on Route Tracking and Body's Parameters

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Abstract — For many people, cycling is one of the easiest and healthiest sports. This paper describes the creation of an application designed to determine route recommendations, monitor the mileage that has been traveled, and adjust health factors such as age, gender, and blood pressure. By implementing the SAW (Simple Additive Weighting) algorithm, several recommendations for the best safe and appropriate cycling routes around the user will be displayed for consideration of the user's cycling route choice. The calculation of the mileage that the user has traveled while cycling will appear in the application so that it can be monitored properly how far the mileage has been traveled. A warning notification will appear when the mileage traveled exceeds a predetermined limit. The application of the SAW method was successfully carried out by producing 2–4 route recommendations tailored to user goals and having an accuracy of 88,23% of the 17 routes traveled.

Keywords: Simple Additive Weighting (SAW), bicycle, distance, health.



Design and Implementation of Intelligent Systems Using ESP-32 Based Fuzzy Logic on Smart Agriculture System for Mustard Plants

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Abstract— Weather changes affect the growth of a plant, causing the plant to adapt to the occurring changes. The surrounding environment of the land is an essential factor in plant growth. The main parameters required for plant growth are the amount of water and the appropriate timing for the irrigation process, adjusted to the land's needs. Excessively dry or overly humid soil conditions will disrupt plant growth. This issue can be addressed through the Design and Implementation of Intelligent Systems Using ESP-32 Based Fuzzy Logic on Smart Agriculture Systems for Mustard Plants. The data acquisition parameters in our research include soil moisture measurement using a soil moisture sensor, air temperature measurement using a DHT22 sensor, and an infrared sensor to detect plant height. The sensor data is processed in the microcontroller using fuzzy logic to determine the irrigation duration based on the plant's condition. The sensor readings are stored in a database and displayed on an LCD and a website for real-time system monitoring.

Keywords: Monitoring, ESP32, Fuzzy Logic.



Prediction Of Milkfish Harvest Potential Based On Pond Environment To Support Smart Fishery Towards Technology 4.0

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Abstract –The production of fishery cultivation for simple pond commodities for three years (2017–2019) tends to continue to increase by 16.32%. Less optimal fish yields both in terms of quality and quantity are due to poor water quality management, such as unstable pH and temperature. The water quality department must have regular observations of the water quality in the ponds to be able to find out the state of the water in the ponds. For fish production results and budgets to be optimally prepared, farmers must be able to predict the yields that will be obtained in the future. However, the problem occurs because the planned production results that have been targeted are different from the production results produced. To address these issues, the author creates a website utilizing the Naive Bayes algorithm, a data mining algorithm. Many variables can affect crop production predictions, including the number of seeds planted, the size of the field, and the quality of the water, including pH and temperature. The TP value is 9, the TN is 8, the FP is 0, and the FN is 1. So that the Precision value is 1, Recall is 0.9, and F1-Score is 0.947. An accuracy number of 94.44%, which is very near to 100%, is produced by evaluating the Naive Bayes algorithm in the confusion matrix mode, suggesting that the resulting model exhibits maximum outcomes.

Keywords: Naïve Bayes, Yield Prediction, and Information System.



Enhancing Document Authenticity with QR Codes and ECC-Based Digital Signatures

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Abstract— Handwritten signatures are commonly used to validate the authenticity of documents. In the digital realm, cryptographic signatures, known as digital signatures, provide integrity, authentication, and non-repudiation. This paper explores the utilization of the Edwards-Curve Digital Signature Algorithm (EdDSA) and Quick Response (QR) code technology for document authentication. The proposed system replaces conventional signatures with QR codes containing digital signatures, enabling the verification and validation of documents. Performance evaluation of EdDSA and the more commonly used Elliptic Curve Digital Signature Algorithm (ECDSA) reveals that EdDSA surpasses ECDSA in key generation, signature generation, and signature verification. EdDSA demonstrates better efficiency, shorter execution times, and lower sensitivity to the execution count, resulting in an average improvement in speed of approximately 98.17% compared to ECDSA. The findings highlight the practical feasibility and superiority of EdDSA for secure and efficient document authentication using QR codes.

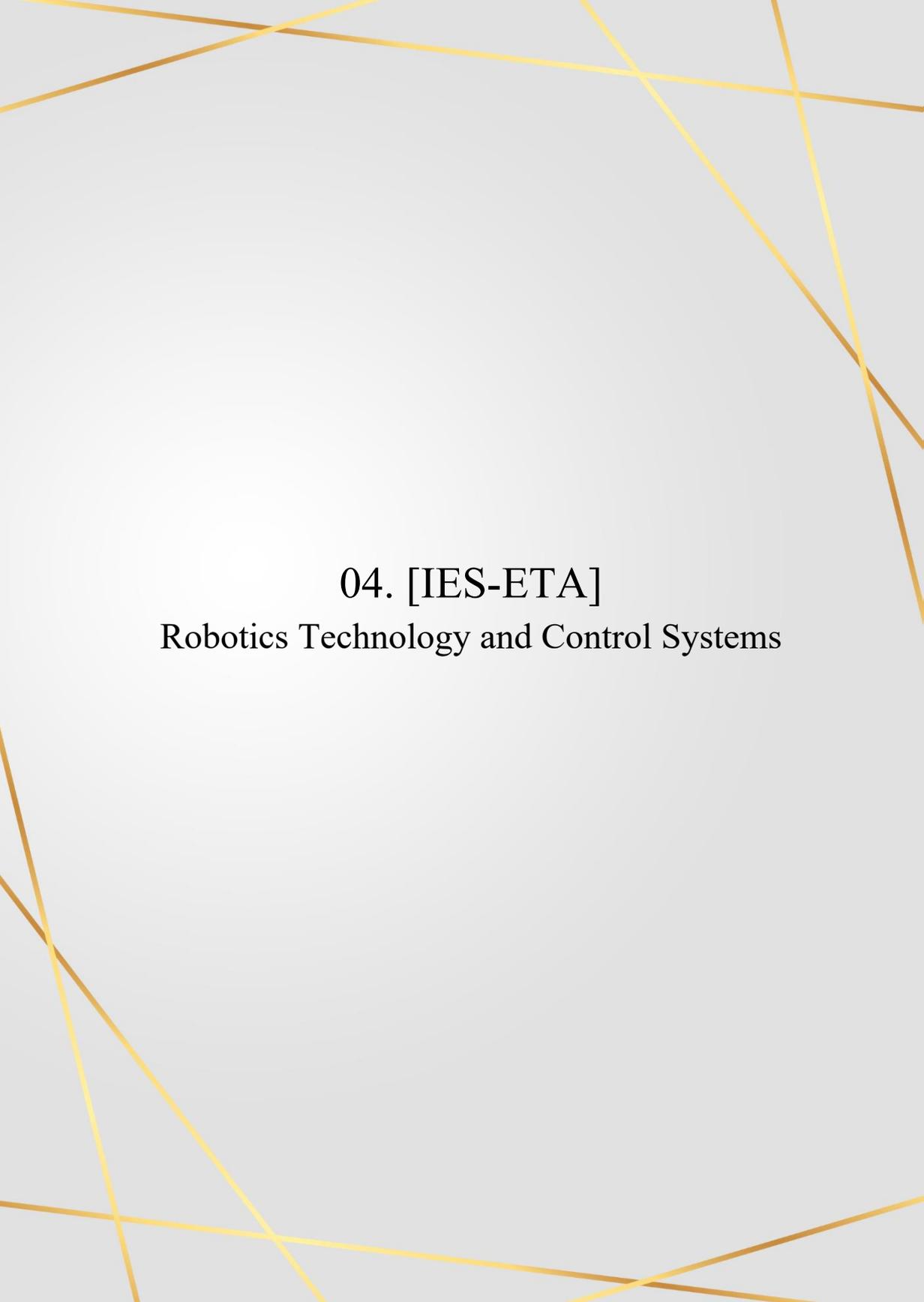
Keywords: Digital Signatures, QR Code, EdDSA, Authentication.

Implementation of LiDAR Array System for Damaged Road Characteristic Identification on Moving Vehicle

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Abstract— In smart city infrastructure, road management is a critical component of transportation infrastructure inspection to ensure a safe driving experience. The current method relies on a visual inspection or survey to monitor road conditions. Several studies have been widely developed to change visual surveys, such as ultrasonic detection systems, but the accuracy of the devices is limited due to environmental factors. LiDAR, on the other hand, provides a more accurate alternative by measuring distance. In this paper, we propose a low-cost infrared Time of Flight (ToF) sensor with a programmable Region of Interest (RoI) feature to adjust the pointing of the sensor. The RoI identifies road characteristics by setting a LiDAR array, including depth/height, width, and length information. The success of this system was tested through an experiment with an error rate of less than 20% for the width and depth measurement but 35% for the length measurement.

Keywords: LiDAR, ToF Sensor, Damaged Road.



04. [IES-ETA]

Robotics Technology and Control Systems

Spline Trajectory for Three Wheel Mobile Robot Swerve Drive

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Abstract— Wheeled mobile robot platform has been widely used in various fields such as industry, exploration, education, and hobbies. Some mobile platforms support holonomic motion and others only support non-holonomic motion. A mobile platform that supports holonomic motion became more popular recently since it provides more flexibility in omnidirectional motion. Currently, Omni-wheels and mecanum-wheels based mobile robot platforms are the most common holonomic platforms in the market. They are simpler and cheaper to be implemented. But in applications, it needs more traction and higher efficiency, the swerve drive mobile robot platform will become a more viable solution. It has more smooth movement compared to other holonomic mobile robots because this type of mobile robot can rotate the wheel angle independently, so it has very little wheel slip against the floor. However, when the swerve drive mobile robot is run on an angled trajectory at high speed, this type of mobile robot will experience steering delay so that the robot will come out of the predetermined track. Therefore, it is necessary to modify the angled trajectory into a curved line trajectory using the Spline method to smooth the robot's movement. On the curved line trajectory, swerve drive can run with higher speed and higher accuracy than the angled trajectory. On the bézier spline swerve drive can run with a velocity of up to 3.25 m/s with an average position error decrease of 36 cm on the bézier spline with $\omega=1$, 72 cm on the bézier spline with various ω values. While on cubic spline swerve drive can run with a velocity up to 2.44 m/s with an average position error decrease of 69.25 cm.

Keywords: Mobile robot, Swerve drive, Trajectory, Spline, Bézier, Cubic.

Navigation System Development on ATRACBOT using F-SFM

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Abstract –Navigation systems are very important for social robots, especially autonomous robots, because they are required to be adaptive to their surrounding environment. This paper proposes a new navigation system for the Autonomous Trash Can Robot (ATRACBOT) using the Fuzzy-based Social Force Model (F-SFM). The navigation system used in previous development relied on the Braitenberg method, which resulted in the robot's movement looking stiff. In contrast, the Social Force Model (SFM) utilizes the forces around objects to interact with and avoid other objects. The magnitude of the force to avoid objects is determined by the SFM parameters and the stimulus received by the robot. The Fuzzy Inference System (FIS) is used to obtain the optimal value of the gain factor, k , which is one of the SFM parameters, based on the relative distance, d , and relative angle, γ , between the obstacle and robot. The FIS will process both inputs and produce a suitable gain factor, k , so that the stimulus received can match the robot's reactivity and responsiveness. Based on the results from a realistic 3D simulator V-Rep, the implementation of the F-SFM method can deliver the robot to the goal point without hitting obstacles and make the robot's movements more natural compared to the Braitenberg method.

Keywords: navigation, ATRACBOT, Braitenberg, SFM, Fuzzy Inference System



ERISA Humanoid Robot Balance System Using 2D Axis Parameters (Pitch and Roll)

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Abstract— The Indonesian Robot Contest (KRI) is a design and engineering competition in the field of robotics. One of the competition divisions is KRSTI or Indonesian Dance Robot Contest. ERISA is a humanoid robot developed by PENS students to participate in such contests. One of the assessment points of the contest is the stability of the robot's balance in each zone, where each zone has different field characteristics, which makes the robot prone to falling. This paper focuses on creating a balance system for the ERISA humanoid robot. In maintaining this balance, a tilt detection system is needed for the robot's position and a balancing system when the robot is about to fall. Using the slope value, the mechanical robot servo control equation is manipulated using PD system. Therefore, the robot independently shifts its position in reverse to the direction of fall. The degree of the inclined surface is set to vary from 2° up to the maximum capability of the robot. The test results show that the addition of the control system balance gives the ERISA robot the ability to walk on an inclined surface up to 10° for the pitch parameter and 6° for the roll parameter.

Keywords: KRSTI, ERISA, Humanoid Robot, PID system.



Lidar-based Human Detection for a Mobile Robot in Social Environment using Deep Learning

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Abstract –One of the crucial skills for a mobile robot to work and be accepted in a human social environment is the ability to respond and interact while considering human existence. Meanwhile, considering that the lidar sensor is almost always available in many robot navigation cases, it becomes an accessible tool for detecting the presence of humans in its surroundings. We apply some object selection based on weak characteristics, such as the acceptable range radius of the object and the acceptable distance between two legs. The result of the process is a group of human candidates. We use a deep learning model with a pretrained mobilenetv3 model as the feature extractor to ensure whether the candidates are humans. The experiment results show the system's performance with an F1 score of 0.837.

Keywords: Mobile Robot, Lidar Sensor, Object Selection, Deep Learning, MobileNet



Balancing Control of ERISA Humanoid Robot using GY-952 and PD Control to Walk on Unequal Heights Surfaces

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Abstract— With current technological advances, innovation in the world of robotics is also growing rapidly, especially in humanoid robots. The basic thing to pay attention to in a humanoid robot is its balance in the process of walking using its two legs. In the last two years of the Indonesian Robot Contest (KRI), in the Indonesian Art Dance Robot Contest (KRSTI) division, there has been a challenge that requires the robot to walk through the surface of the field that has unequal height. Thus, the bend detection system and its balance recovery system are needed to restore the stability of the robot when it is close to falling. To solve this problem, the balance control system is implemented using the PD control method with the GY-952 sensor. Thus, by detecting the position of the angle of the tilt condition, the robot can provide balance-recovery action. Using input from the GY-952 sensor and the hip-ankle balance recovery method, the robot managed to climb and descend the field with unequal heights up to 10 mm thick.

Keywords: Humanoid robot, ERISA, GY-952, balance recovery, unequal height.



Comparative Reconstruction 3D Object Mapping Methods Using Drone

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Abstract –The increasing need for 3d map information, technology is needed to create 3d maps quickly and easily. Drones make it possible to photograph a situation or area from a certain height easily. The main objectives of this research are to be able to visualize a three-dimensional (3D) mapping of a place or area which includes terrain, obstacles, etc. with level 2 detail or Level of Detail 2 (LoD 2) from the results processing of aerial photo data and comparing the best combination of SHIFT, AKAZE, HAHOG, ORB with FLANN, BOW, BruteForce. From various aspects compared, the best method combination is HAHOG - BruteForce and the second best is AKAZE - FLANN. This research expected people to avoid control drones anymore when mapping a particular place or area and find out the best possible results also compare the various existing 3D Reconstruction methods.

Keywords: 3D reconstructions, drone, photogrammetry



PENSHIP: Implementation of Image Processing Methods for the Mission of Kontes Kapal Cepat Tak Berawak Nasional (KKCTBN)

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Abstract –Artificial intelligence using image processing method is the development of robotics technology that can make robots navigate automatically. The automatic navigation system is one of the important elements in the automation system in managing the movement of this ship robot. However, until now it is still rare to find water transportation system tools that are equipped with the ability to navigate and run autonomously. In this research an autonomous control system has been designed for ship robots by utilizing image processing technology on a mini pc platform. The RGB value of the image that has been captured with the camera and converted using the HSV filter and the threshold value that is set on the mini pc to produce an output image that has been set in the reading room so that the ship's robot can move automatically through obstacles. The Obstacle Detection System has achieved 80-90% accuracy at an ideal distance of 1-2 meters between the webcam and a spherical object and the ship has successfully reached the finish line determined by the committee of the Kontes Kapal Cepat Tak Berawak Nasional (KKCTBN).

Keywords: Autonomous, Thresholding, HSV filter, mini pc, Image Processing, Kontes Kapal Cepat Tak Berawak Nasional (KKCTBN)

T-FLoW 4.0 Biped Kinematics Computation Using Pseudoinverse and Orthogonal Rotational Matrix

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Abstract— A full kinematics analysis that considers both position and orientation is necessary to produce motion in humanoid robots, specifically for walking trajectory. The orientation analysis is often left out of publications when dealing with kinematics model. Therefore, this study provides full kinematics analysis both forward and inverse of bipedal system of our newest FLoW humanoid robot, T-FLoW 4.0. For the study of forward kinematics, Denavit-Hartenberg (DH) notation is used. While for inverse kinematics, we use pseudoinverse with the Jacobian method to solve the positions of the end effector and an orthogonal rotational matrix to solve the rotation one. Following that, an actual biped robot and Coppeliassim simulator were used to implement the algorithm. The outcomes demonstrate that using our kinematics model, the end effector could follow the specified trajectory with an average joint error equal to 0.05 degree and an average kinematics's calculation time of 1 ms, which is sufficient for walking motion.

Keywords: T-FLoW, humanoid robots, inverse kinematics, Coppeliassim



Communication and Coordination for Multi AGVs Based on MQTT Protocol

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Abstract— This research focuses on the development of communication and coordination systems for Multi-Agent AGVs. The designed system consists of 3 subsystems, those are 4 AGVs, a trajectory generator, and GUI. The MQTT is used as a communication protocol to manage the sending and receiving of data such as coordinates, obstacles, and paths. The start and goal coordinates are provided by the GUI to the trajectory generator, which produces a safe and accurate path for the AGV. If the AGV comes across an obstacle on its way to the goal, it communicates with the trajectory generator of the obstruction's location, current position, and goal coordinates for rerouting. The AGV sends its real-time position to the GUI continuously for control and monitoring. The experiments show the efficient and reliable performance of MQTT as a communication protocol on multiple AGVs. Three directions of communication were successfully developed including AGV to GUI, trajectory generator to AGV, and GUI to trajectory generator.

Keywords: Multi AGVs, trajectory generator, GUI, data transmission, tracking AGV.



Double Loop Controller of Four Mecanum-Wheel Automated Guided Vehicle using SMC-PID

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Abstract – In industry, robots are often used to assist humans, mostly used in logistics, production lines, and warehouses. Wheeled mobile robots are extensively used for transporting materials such as AGV (Automated Guided Vehicles). Because of the complexity, uncertainty, and nonlinearity, a robust control method is considered to be used to improve the control performance. Several common control algorithms are used in AGV, PID, Fuzzy, Backstepping, Adaptive control, and SMC. In this paper, we propose a controller SMC-PID that is implemented in four mecanum wheel. Proposed controllers are compared to SMC, and simulation to verify control performance. Control performance was verified using rise time, settling time, overshoot, peak, and peak time. Also, in the simulation, disturbances were added to evaluate robustness of the controller. The result of proposed controller (SMC-PID) has 2% less overshoot, and 0.006% less peak to SMC in X Axis. Y Axis, has 0.15% less rise time, 0.05% less settling time and 2.8% less overshoot compared to SMC. When a disturbances occurs, the SMC produces a peak up to 0.4 m/s, while our proposed method produces 0.2538 m/s. From these results, a method we propose is capable of dealing with existing disturbances.

Keywords: AGV, Mecanum Wheel, Sliding Mode Control, PID

Modelling Differential Drive Mobile Robot for High-Resolution Multi-View Image Capturing

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Abstract – This paper presents a specialized differential drive robot with a high-resolution camera that captures detailed 3D images from multiple perspectives. To make 3D models of an object using different viewpoints, this robotic has two DC motors to propel itself and caster wheels supporting its flank for better balance. The creative mechanical design includes a DSLR camera attached through a tripod-mounted fixture that rotates along with vertical axis relative to capturing focused views of middle-direction objects against varied points of view surrounding them. Essentially integrated into operation concepts within major planning modules, our mathematical model algorithm combines straight-line or curved movement to permit coordinated control over position and motion while ensuring continued accuracy during image acquisition, thus allowing undisturbed focus when maneuvering around an object. Further application of this model is seen in determining motor drive speeds and camera angles while keeping steady motion on the path toward achieving specific robotic goals. Our research shows how advanced differential drive robots can accurately carry out detailed imaging from multiple vantage points. Mathematical modeling advances like those in this paper have furnished a sound foundation for upcoming specialized robot developments.

Keywords: mathematical model, differential drive robot, 3D imaging, multiple angles viewing, photography



Development of the Electric Bus Platform: Components Layout and Structural Analysis

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Abstract – Electric buses are a promising solution for sustainable transportation, but their performance and efficiency depend on the design of the platform, component layout, and structural analysis. In this paper, we present a comprehensive study on the development of an electric bus platform, focusing on the arrangement of key components and the structural analysis of the bus frame. The proposed modular electric bus platform allows for flexible configuration of components, catering to different operational requirements and facilitating the integration of advanced technologies. We present a systematic approach to component placement, taking into consideration factors such as weight distribution, thermal management, and ease of maintenance. The optimized component layout achieved a more balanced weight distribution, leading to enhanced vehicle stability, handling, and braking performance. Structural analysis is essential for evaluating the strength, durability, and safety of the electric bus frame. We employed Finite Element Analysis (FEA) to assess the structural rigidity of the bus frame under various loading conditions. The proposed modular platform and optimized component layout resulted in significant improvements in vehicle performance, safety, and reliability, with significant implications for the development of sustainable public transportation solutions.

Keywords: Electric Bus, Platform, Component's Layout, Structural Analysis, FEA



Real-time Beat Tracking System with Mel-Frequency Cepstral Coefficient Method and ANN for ERISA Dance Robot Motion

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Abstract— The Indonesian Robot Contest (KRI) is a robotics-related design and engineering competition. One of the competition categories is the Indonesian Dance Robot Contest (KRSTI), which requires contestants to create robots that can perform to the beat of the music. ERISA is a humanoid robot created by PENS students for the competition. One of the evaluation criteria for the competition is the congruence between dance movements and musical accompaniment. This paper focuses on designing a system for humanoid robots to be able to dance according to certain parts of music. If the robot has certain troubles during performances, it is not necessary to repeat the motions from the beginning instead of following the beat at that time. The proposed system combines the Mel Frequency Cepstral Coefficient for feature extraction and the Neural Backpropagation Network for voice recognition. The effectiveness was tested through experiments for music recognition, which indicate that the robot's average response time is approximately 13.011 seconds, with a success rate of 100 percent in determining movement.

Keywords: Humanoid robot, music recognition, KRSTI, MFCC, ANN.

Obstacle Detection and Tracking System for Robot Soccer ERSOW based on Centroid Tracking Method

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Abstract – EEPIS Robot Soccer on Wheeled (ERSOW) is a wheeled soccer robot developed by Politeknik Elektronika Negeri Surabaya and participated in the national robot competition, Indonesian Robot Contest in KRSBI Wheeled division. ERSOW team has striker robot, striker robot was used in attack strategy for scoring goals. The ability to tracking the obstacle is one of main abilities that striker robot must has. Obstacle tracking plays a crucial role in robot soccer on wheels due to the dynamic and unpredictable nature of the game. As robots navigate the field, they encounter various obstacles such as opponents, teammates, and static objects (obstacle). Accurate and real-time tracking of these obstacles enables robots to make informed decisions, adapt their strategies, and effectively interact with the environment. Obstacle tracking enhances situational awareness. By continuously monitoring the positions and movements of obstacles, robots gain valuable information about the current game state. Tracking system on this research works with centroid tracking algorithm. The fundamental concept of the centroid tracking algorithm revolves around assigning a distinct identification (ID) to every tracked object by taking their centroids, this algorithm takes the center of obstacle bounding box as an input, to generated bounding box this system used thresholding detection method based on HSV color space. The center of bounding box (in pixel coordinate) converted into world coordinate by using Ab-exponential regression and Linear regression. The testing results of tracking system could estimate obstacle from 50cm – 250 cm from the robot with 0,967 cm error average, the system also could track the obstacle with 86% accuracy when the robot moved 330 cm ahead.

Keywords: Tracking, Robot, ERSOW, Thresholding, Regression, Centroid Tracking



Design of Path Planning System for Multi-Agent AGV Using A* Algorithm

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Abstract— This study aims to design an efficient pathplanning system for Multi-Agent AGV. The path planning system developed is based on an improved A* algorithm to be able to control the path division for several AGVs that operate without a collision. Path planning will be placed on the server to receive input from each AGV in the form of start coordinates and goal coordinates that they will achieve. From some of the incoming input from several AGVs, A* which has been added to the collision calculation function will look for the multi-AGV collision points. A collision point is defined as a point from different AGVs that have the same coordinates and are on the same road order. The stopping point of one AGV will also be the crash point of another AGV. The crash point is then defined as a new obstacle point which is used as input for the next path-planning process. The path planning process is iterated until all AGVs find path points that are safe from collisions. The simulation results show that using the collision calculation method, the enhanced A* algorithm produces multi-paths with zero collisions.

Keywords: Collision Management, Path Allocation, Mobile Robot, Positioning, Multi AGV



Goalpost Detection and Recognition on Robot Soccer ERSOW Using SSD MobileNet-V2 FPNlite

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Abstract – In the Indonesian Robot Contest, EEPIS Robot Soccer on Wheeled (ERSOW) plays soccer on wheels. Based on the rules, the victory of a team is taken from the highest score of the robot in scoring goals against the goalpost. However, it's not as simple as it may be thought to score goals against the goalpost. The robot has to maneuver during the game without stopping, causing the robot's position data generated by the odometry and IMU sensors to experience an accumulation of errors. The goal position data, which will be a reference for the robot's kick against the goalpost, will be impacted by the accumulated errors. This paper presents a goalpost detection system that can be used on robots. Deep Learning Neural Network (DNN) is used by the detecting system to teach itself the crucial visual characteristics of the goalpost in order to make detections. The deep learning model makes use of the Single Snapshot Detector (SSD) MobileNet V2 FPNLite 640x640. An individual image dataset of the goal point from the omnidirectional cameras. SSD MobileNetV2 FPNLite 640x640 model with 1% classification loss, 0.1% localization loss, 9% total loss and confidence score is 96-100%. The accuracy of goalpost detection and recognition is 93% with the frame rate average is 49 FPS.

Keywords: Goalpost, Detection, Recognition, ERSOW, SSDMobileNetV2, FPNlite



Design and Fabrication of Swerve Drive Mechanism for Mobile robot Platform

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Abstract— The competitiveness of the Indonesian ABU Robot Contest (KRAI) has been increasing within the last decade. Due to the theme that changed every year, it is necessary to have a robot platform that can be used quickly and precisely. One other platform is the mobile robot platform as it used in each year rule. The swerve drive mechanism became the current trend in the robot contest as it gives a swift maneuverability and high tyre traction to the game field. While it has more excellent performance compared to other holonomic mobile platforms, its complexity is the highest. Each swerve drive need to have two mechanisms consisting of steering system and drive system that need to be combined in a compact design. In addition to the electronic system, the speed and the steering need a separate controller. In this paper, we proposed to use a PID method for controlling the steering system. Both steering and drive system are actuated using BLDC motor to get high power to size ratio in the overall swerve drive mechanism. For the wheel drive system, a small hub motor is chosen as it has small form factor but can deliver speed and torque for the designed application. As for the steering system, the motor needs an additional gear reduction is needed to get enough steering torque. The material and structure of the swerve drive platform need to be carefully examined as the platform is designed to withstand up to 30 kg of load.

Keywords: Swerve drive, steering system, drive system, PID control.

Design and Experiment of a Four-Fingered Robotic Hand for T-FLoW 4.0 humanoid robot

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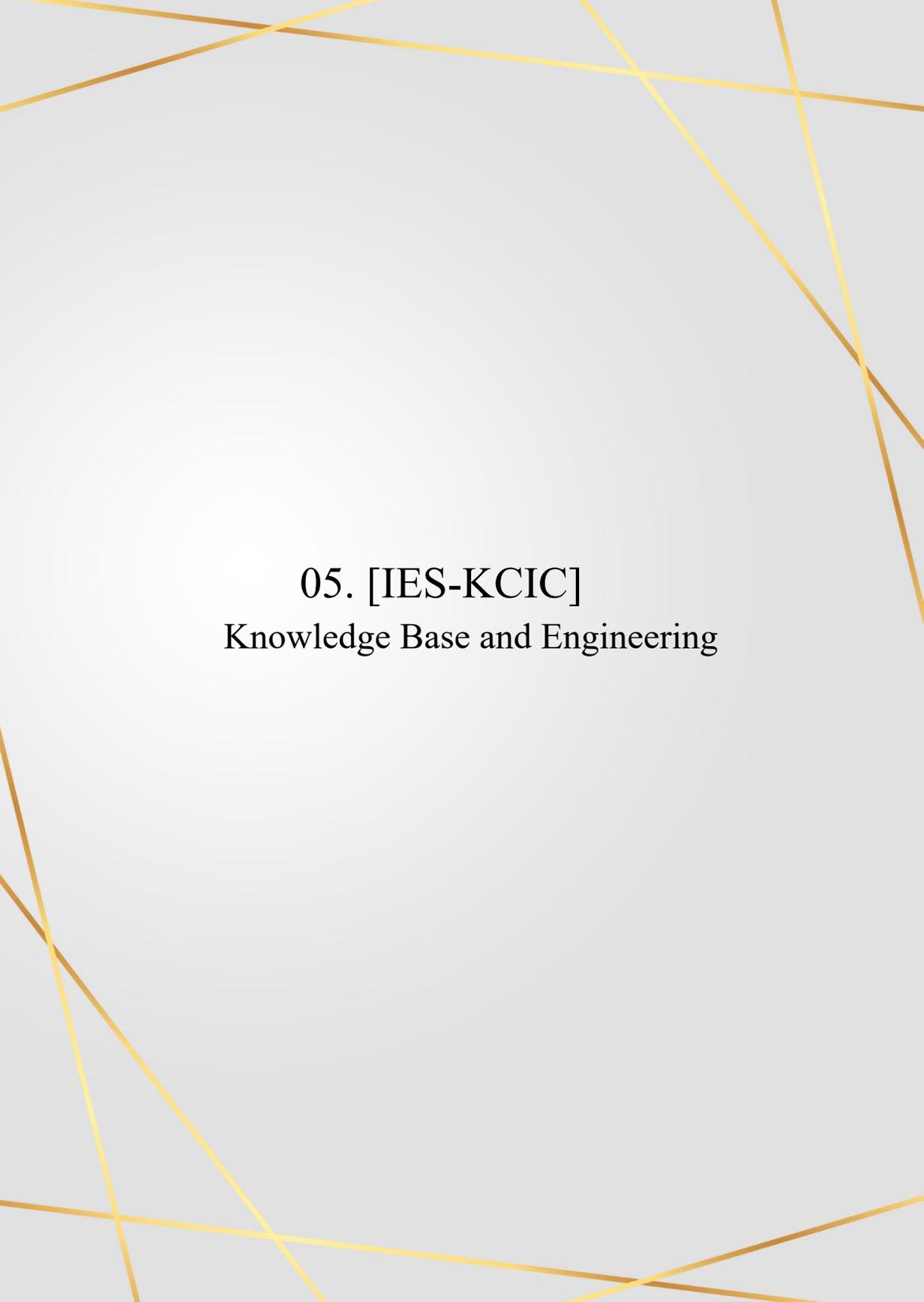
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Abstract – In this research study, we present a novel design of a four-fingered robotic hand for T-FLoW 4.0 humanoid robot along with its experiments to validate its grasping performance. Our proposed robotic hand designed with four fingers and five Degree-of-Freedom (DoF), with a configuration of a thumb, index, middle, and ring fingers to remain within the criteria of an anthropomorphic type robot hand. Our hand is built with a modular design on each finger and its mechanism, allowing for easy assembly and achieving a compact hand result. Main controller Arduino Mega implement the system for grasping movement, and then PCA9685 PWM controller get the hand movement instructions from it and generates the required PWM signal for the servo motors. The process of manufacturing the hand involves 3D printing technology to produce hands with a realistic appearance, and use PLA filament material achieve lightweight, affordable, and easy-to-maintain outcomes. The grasping experimental results show that our proposed robotic hand could perform basic grasping movements on household objects. With the use of Cini's taxonomy of grasp as the hand functionality standard, we achieved a success rate of 8 out of 14 tests conducted.

Keywords: T-FLoW 4.0 robot's hand development; anthropomorphic robot hand; mechanical design; grasping ability; modularized robot finger



05. [IES-KCIC]
Knowledge Base and Engineering



Optimizing User-PC Computing System with Multicore CPU Utilization through Parallel Computing Jobs Distributions

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Abstract – This paper presents a dynamic job-worker assignment algorithm for a User-PC computing system (UPC) that assigns and processes multiple jobs simultaneously on each worker, in order to minimize the time required to process all jobs. The algorithm assigns queuing jobs to workers based on their available computing resources when a worker becomes idle after completing its assigned job. In reality, jobs are assigned to workers based on the number of available CPU cores. This paper presents, a new approach parallel job distribution algorithm for assigning jobs to workers in the UPC system, which allows multiple jobs to be processed at once on each worker. The algorithm assigns jobs to workers based on their available computing resources, and considers the arrival of new jobs to the system. The evaluation of the algorithm was done using up to 20 jobs and six workers with different computing resources. The results showed that the proposed algorithm reduced the makespan up to 17% compared to another proposed algorithm.

Keywords: UPC, distributed computing, CPU core, thread, parallel job distribution, optimization, multicore worker.



Implementation of Design Patterns on Unity Components to Increase Reusability and Game Speed Development

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Abstract –In the past few years, a few game studios have already developed mid-core games. In this kind of game, U is one of the most crucial and complex parts. Game companies have to develop their products quickly and effectively so they can compete in the industry. Developing games quickly with a good architecture is not easy, especially the products that are developed are products with high complexity. Plus, currently, there is still no special framework or library that helps the development of mid-core games. This research implements design patterns to develop Unity Engine framework to develop game UI components. Validation results showed an increase in the development time by 28% to 91% and in the interaction cost by 10% to 66%. Moreover, the survey result also shows a customer satisfaction rate of 78% using CSAT formula. It is considered an excellent response by CSAT standard, so it could be concluded that according to customer, this framework already has an excellent performance.

Keywords: Unity framework, Mid-core game development, Design pattern, Reusability



Selection of Priority Aspects from User Experience Design (UED/UXD) to Develop the Bakamla Messenger Application Using the Analytic Hierarchy Process (AHP) Method

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Abstract – This study aims to evaluate priority aspects in the user experience design of the Bakamla Messenger application using the Analytic Hierarchy Process (AHP) method. This study uses six assessment aspects and twenty-six sub-aspects referring to the User Experience Questionnaire (UEQ) framework. The results showed that the attractiveness aspect was the top priority ($A = 0.274$), followed by perspicuity ($P = 0.248$), efficiency ($E = 0.172$), dependability ($D = 0.133$), stimulation ($S = 0.102$), and novelty ($N = 0.071$). Enjoyable and pleasing sub-aspects have a significant influence on the attractiveness of the application, while understandable and easy-to-learn aspects contribute to creating a high perception of perspicuity. Efficiency and practicality are important factors in increasing the efficiency of applications. Application security and the ability to meet user expectations affect the level of dependability. Valuable and engaging experiences provide a positive stimulus to users, while creative elements and the latest technology create new and exciting experiences. The contribution of this research provides guidance for application developers to prioritize aspects that are important in optimizing Bakamla Messenger application development.

Keywords: user experience, Bakamla Massenger, UEQ, AHP

Analysis of Big Data Readiness in East Java Provincial Government

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Abstract – The readiness of big data implementation in the East Java Provincial Government, especially in the regional government agency which has the main function as e-government public service agencies, is an important element in determining the success and sustainability of big data implementation within the East Java Provincial Government. Readiness analysis in public service organizations is needed to carry out their main tasks and functions in big data management and public services. This is needed so that the organization gets the maximum benefit from the use of big data analysis. This research discusses and analyzes the level of big data readiness in 5 regional government agencies in East Java using the gap analysis method based on in-depth interviews and data review. The results showed that in terms of big data implementation readiness, regional government agencies in East Java Provincial Government have not been able to implement big data optimally. In total, 66% of the organizations studied scored a readiness level of 3, while 33% of the organizations scored a readiness level of 2. Development in the aspects of IT governance, IT resources, internal attitude, external attitude, legal compliance, data governance, and human resources is needed because there is still a gap between the current condition and the expected ideal condition. This research also provides development proposals based on the Capability, Accessibility, Readiness, and Leverage (CARL) method for organizations to minimize gaps in order to improve organizational capabilities in Big Data implementation.

Keywords: big data, knowledge management, decision support, gap analysis, e-government, CARL method.



Knowledge Management Readiness In The Airport Industry: The Case of Juanda International Airport, Indonesia

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Abstract – The airport is one of the country's vital objects. The airport is a driving and supporting factor for industrial, trade, and tourism activities in encouraging national economic growth. In addition, airports play an essential role in ensuring integration with other development sectors. With the airport, air transportation becomes more accessible in all regions. The airport must consider the 3S + 1C elements in its management: Safety, Security and Services, and Compliance. Every airport person must understand this as a reference in organizing the airport. A knowledge Management System (KMS) is an information system used to manage knowledge in an organization to support and improve organizational processes that include creating, storing, retrieving, transferring, and applying knowledge. In implementing the Knowledge Management System, organizations need to make comprehensive arrangements such as organizing the organizational structure and involving the human resources in this system. In this study, a knowledge management readiness measurement was carried out on the implementation process of the Juanda International Airport knowledge management system. Several aspects of assessment are carried out, namely management & strategy, organization, culture, and technology. It is a part or component of the knowledge management critical success factor (KMCSF). The knowledge management system's readiness level is measured on a Rao Scale. Data was collected using a Likert scale questionnaire. It involves 40 respondents who are company employees. This research successfully presents that from four aspects of the assessment, the management & strategy aspect gets a result of 94%, the organizational element receives a result of 89%, and the culture aspect gets a result of 90%. The technology aspect receives a result of 87%. It indicates that the organization can adapt and has the flexibility to realize KM Readiness.

Keywords: Airport, Knowledge Management System, KM Readiness, KMCSF



Database Matching Service for Stable Marriage Problem

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Abstract – This work focuses on examining the dynamic preference aspect of the stable marriage problem (SMP). An SMP with static preference takes $O(n^2)$ time using the Gale-Shapley algorithm. Meanwhile, to find stable matching with dynamic preferences it takes quite a long time, which is $O(k \cdot n! \cdot n^2)$. Most of the process of finding stable matching under dynamic preference is an iterative search process. This motivates us to develop a database that contains an SMP instance and its stable matchings. With this database, we can reduce the time to find static stable matching from $O(n^2)$ to $O(n)$. In addition, several features in our application also make it easier for users to understand the structure of stable matching in an SMP instance, such as visualization using a lattice structure.

Keywords: stable matching, database, time complexity

Driver Drowsiness Detection System Using Deep Learning Method to Reduce Risk Accident

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Abstract – Fatigue is a common problem that often causes drowsiness in individuals. This condition can have serious repercussions, especially in activities that require high alertness such as driving. In research, we propose a system that detects the condition of the driver on a means of transportation. The system uses You Only Look Once Version Five (YOLOv5) algorithm that has been turned off with thousands of images from the dataset of open eyes, closed eyes, and yawning mouth with different hyperparameters for performance to be analyzed in order to get the most optimal model. As a result, the YOLOv5 deep learning model produces an accuracy rate of 0.737 which will detect the driver's condition and when sleepiness is detected, the buzzer will light up as a reminder and the time of the incident is sent to the database using Long Range (LoRa) communication.

Keywords: Artificial Intelligent, Deep Learning, YOLOv5, Long Range



CSLS: Design Of Security Lighting Systems For Pedestrians As Part Of Smart City

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Abstract – Serious crimes, such as robbery, assault, and beatings, generally occurred at night. Therefore, people's concern about crime at night is increasing. Some pedestrians may still feel that the existing lighting levels are insufficient. We propose a CSLS (Connected Security Lighting System) system by utilizing ESP32 communication technology, LDR Sensors, and Passive Infrared Sensors to reduce pedestrian fear of crime at night. This CSLS system can turn on lights with 0 to 100% brightness in various conditions starting from bright, dim, and off. LDR and PIR sensor values are constantly changing according to the surrounding conditions, with a range of readings per 1 second. With this CSLS system, the energy consumption of lamps will be more efficient, provide pedestrians security and reduce crime rates at night.

Keywords: Pedestrian, Smartphone, PIR sensor, LDR sensor, Connected Security Lighting System

Intelligent System for Monitoring the Availability of Bus Passenger Seats using the YOLO Method

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Abstract – The existence of public transportation is very important to support the increasing mobility of the community because it has a large carrying capacity, one of which is the bus. However, people's interest in using public transport began to decline along with the increase in private vehicles. One of them, due to inadequate facilities, especially in terms of information on the availability of passenger seats on the bus. In this paper, a system for monitoring the availability of passenger seats on buses is proposed to support a program from the Indonesian Ministry of Transportation, namely the National Movement Back to Public Transport to improve mass transportation performance. This system detects and calculates objects using the You Only Look Once version 5 (YOLOv5) method. The dataset used in this study has only one class, namely "Person". The results of the model training test obtained the best model with a scenario of batch size 16 and epoch 200, which produced a precision value of 0.883, a recall of 0.815, a mAP of 0.905, and an F1 score of 0.85. While the model accuracy value when integrated with NVIDIA Jetson Nano is 81.56%. The system is integrated with WebGIS to display the calculation results for the number of passengers, available seats, and bus locations.

Keywords: Passenger Seats, Public Transport, You Only Look Once version 5 (YOLOv5), WebGIS



Frame-by-Frame Analysis for Assessing Chickens Flock Movement

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Abstract –Assessing the behavior and welfare of chickens is crucial for successful chicken rearing and product quality. Recent research has focused on using advanced cameras and computer vision technologies to analyze chicken behavior. This camerabased approach captures high-resolution video footage, which is then processed using computer vision algorithms to extract insights on movement patterns, feeding behavior, and social interactions. While this approach has advanced our understanding, there is a need for studies employing a frame-by-frame analysis to obtain fine-grained details of chicken behavior. This method allows for precise measurements and real-time analysis, facilitating informed decision-making in chicken farming. To expedite the assessment process, a bandpass filter 470 nm lens is incorporated into the camera setup, optimizing image segmentation and reducing processing time. The proposed system combines this specialized camera with frame-by-frame calculations to track and measure the velocity, acceleration, and position of chickens within a flock. The integration of these technologies holds the potential for improving our understanding of chicken behavior, enhancing welfare, and driving data-driven decision-making in chicken farming practices.

Keywords: frame-by-frame analysis, advanced cameras, computer vision, movement patterns.



Knowledge Representation on Pharmacotherapy Using Knowledge Ontology

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Abstract – Pharmacotherapy is fundamental knowledge within the medical domain, specifically concerning the utilization of drugs or drug therapy for treating diseases or health disorders. Representation of knowledge from pharmacotherapy is needed to deepen scientific knowledge in that domain. Ontology is an approach in the domain of computer science that can be used to represent knowledge. Ontology has been widely used to represent knowledge in the medical domain. However, the modeling that is done is only focused on the triplet relationship concept between two class or two entities. Even though the knowledge that comes from Pharmacotherapy material is very complex. Therefore, this research used a new ontology model called knowledge ontology to represent information from pharmacotherapy materials. This study uses a dataset from e-book about pharmacotherapy. In this experiment, a total of 200 sentences were represented in knowledge ontology. The results of the representation are then evaluated by Pharmacotherapy's experts. Based on the experiments that have been carried out, it is known that the proposed ontology model can be used to represent information in the Pharmacotherapy with a testing accuracy of 95%. The results of this study can serve as a valuable resource for students in the field of pharmaceuticals, enabling them to gain a deeper understanding of pharmacotherapy.

Keywords: pharmacotherapy, knowledge ontology, knowledge representation.



06. [IES-KCIC]
Computational Intelligence



Generating Background Music from Vocal Sound with Low-End Hardware using AutoEncoder and GRU

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Abstract – Composing a background music that fits the vocal of a song depends on the mood, creativity and quality of the music composer. Currently, there is no deep learning model capable of automatically composing background music from human vocal input. Existing models are limited to Musical Instrument Digital Interface files and the use of Recurrent Neural Networks or Transformers for generating musical notes. The proposed model incorporates two types of vocal input: short-input and combed-input. By combining the AutoEncoder and Gated Recurrent Unit models, the architecture enables training on low-end hardware. The best model achieves an average loss of 0.0217 in the AutoEncoder and 0.1166 in the Gated Recurrent Unit. Additionally, the selection of the best and worst models is based on the creativity of the generated background music. This novel approach allows training on large music datasets using low-end hardware.

Keywords: Vocal, background music, autoencoder, gated recurrent unit, combed.



High Dimensional Vectors based on Discrete Cosine Transform in Generating Background Music from Vocal Sound

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Abstract – Creating background music based on vocal sounds using deep learning is challenging. The task involves multiple input and multiple output cases that require lengthy input and output as data. However, training the models with raw data using low-end computers is expensive. Previous studies have used Recurrent Neural Networks or Transformer trained with scripted notes' pitch, timing, and amplitude to generate new background music sequences. In this research, we proposed a novel training procedure using simple Gated Recurrent Units as the basic architecture of the model, which is trained with compacted high-dimensional vectors based on long audio sequences. Our experiments showed promising results, even with low-end hardware. Our best model achieved a cumulative moving average of the loss of around 0.016, and the model successfully produced interesting background music based on vocal sound.

Keywords: Discrete cosine transform, Gated recurrent unit, Background Music, Vocal sound.



3D Object Pose Estimation using Local Features Based for Industrial Appliance

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Abstract – Object localization in the industrial field plays an important role to obtain the pose information of an object. For supporting the localization works, 3D point cloud data is used as its primacy containing the shape of an object. Despite its rapid development, the problems faced by each object used are heterogeneous. In this research, Time-of-Flight (ToF) camera is used to obtain the data considering its capability to provide a small form factor and sufficient point cloud data. As the one of most popular objects in the industrial field, fitting pipe is used in whole systems. Start from obtaining the data using a ToF camera, then followed by preprocessing which eliminate Non-measured data and point outside of the threshold range. Segmentation by separating the object with its planar, and separating each other into individual objects done by RANdom SAMple Consensus (RANSAC) and Density-based Spatial Clustering Application with Noise (DBSCAN). Before the pose estimation is applied, CNN is used to recognize the object. By using Fast Point Feature Histogram (FPFH) with SAMple Consensus Initial-Alignment (SAC-IA) as the coarse pose estimation and Iterative Closest Point (ICP) as the refinement pose estimation, average rotation error in Euclidean space (roll, pitch, yaw) as 0.47 degree, in translation is 4.17 mm. Also, we estimate the size of the pipe which has an average error of 5.30 mm.

Keywords: 3D Object Pose Estimation, Local Feature, Time-of-Flight, Point Cloud



Mouth Tracking on Aerosol Suction Robot to Assist Dentist Surgery Using Deep Learning

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Abstract – COVID-19 disease is an unprecedented health condition and has never been diagnosed in humans before. According to scientific evidence, COVID-19 can spread from person to person through respiratory droplets, which are released when an infected individual coughs or sneezes. Those at the highest risk of contracting the disease include healthcare professionals, teachers, general practitioners, and dental hygienists. In dental practice, the transmission of COVID-19 often occurs through aerosols and splatters from the patient's oral cavity. Aerosol may be generated during upper respiratory tract instrumentation of the oral and nasal cavities. Extra-oral suction (EOS) is a device for sucking patient aerosols during surgery or dental treatment. However, must move the tool manually to position the EOS chimney above the patient's mouth. So that when the patient changes the position of his face, there is a possibility that some particles from the aerosol are not sucked in by Extra-oral Suction (EOS). Therefore, this research will build a system for tracking faces using Deep Learning on aerosol suction robots to assist dentist operations. To perform mouth detection, the MobileNET SSD method is used, and the centroid tracking algorithm is used to find the midpoint of the detected object, namely the human mouth, which will then enter the calculation process to look for ErrorX to obtain the tracking position of the human mouth. Mouth tracking on aerosol suction robots can be implemented automatically to assist dental health professionals in preventing the spread of COVID-19. To detect the mouth using the SSD MobileNet method with an accuracy rate of 94% from 815 testing images and the final results of the mouth tracking test, humans on the Extra-oral suction (EOS) robot get an accuracy of 93%.

Keywords: COVID-19, Extra-oral Suction (EOS), mouth detection, mouth tracking, deep learning, SSDmobileNET, centroid tracking.



Identification of Acute Myeloid Leukemia (AML) Subtypes: M1, M2, M3 on White Blood Cells Using Microscopic Images

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Abstract – Leukemia is a form of blood cancer characterized by an overproduction of abnormal white blood cells that invade the body's immune system. Leukemias are divided into four main groups based on cell type and growth rate. Acute Myeloid Leukemia (AML) is one of them, namely leukemia that occurs in the myeloid series. AML itself is divided into several subtypes, according to the French-American-British (FAB), namely M0-M7. AML subtypes M1, M2, and M3 are influenced by the same cell type, namely myeloblast cells, so a more detailed analysis is needed to classify them. Therefore we need a system that can identify the presence of AML in the blood, this identification is done by classifying white blood cells on microscopic images. To detect the presence of AML in microscopic images, multiple processes will be used, including preprocessing, segmentation, feature extraction, and classification stages by applying the K-NN method. This classification procedure will result in a diagnosis of M1, M2, or M3 blood cells. At the end of phase 1 of this final project, pre-processing and segmentation processes and graphical user interface (GUI) designs have been carried out. This final project resulted in an accuracy of 80% for the identification of subtype M1, 70% for the identification of subtype M2, and 80% for the identification of subtype M3.

Keywords: Leukemia, Acute Myeloid Leukemia, Image Processing, AML Subtypes, Classification, K-NN Method.

A Novel Approach to Visual Search in E-commerce Fashion Using Siamese Neural Network and Multi-Scale CNN

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Abstract – The growing number of users on fashion e-retail platforms has highlighted the limitations of the current text-based search system, as users struggle to effectively describe the clothing products they are searching for. To address this challenge, the integration of a visual search system becomes essential. Visual search allows users to find similar products based solely on images. In this research, we propose the utilization of a Siamese Neural Network for implementing visual search in an e-commerce fashion. The Siamese network consists of two identical networks that process different images. By training the network to learn and represent the differences between images as embedding vectors, we enable the generation of similarity scores for pairs of images. To achieve accurate feature extraction, we employ a Multi-Scale CNN approach that captures both high and low-level features. Various experiments are conducted in this study, including the selection of multi-scale CNNs, distance metrics, and diverse data, to determine the network architecture that achieves the highest accuracy. Our findings demonstrate that utilizing the VGG19 model with a shallow layer and fractional distance metrics achieves an impressive accuracy of up to 97%. This indicates the effectiveness of our model in accurately predicting image similarity.

Keywords: Visual search, e-commerce fashion, Siamese Neural Network, Multi-Scale CNN.

Stereo Camera Multi-Perception System for Self-Driving Vehicles

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Abstract—Stereo cameras play a crucial role in self-driving vehicles as they provide cost-effective depth estimation. They serve various purposes, including object classification, semantic segmentation, depth estimation, and more. These cameras are valuable sensors for enabling advanced perception capabilities in self-driving vehicle systems. In this work, we proposed multi-perception systems such as object distance measurement, object classification, and object position estimation using stereo camera view. This system utilizes deep neural networks to perform object classification on image frames captured by the stereo camera. Utilizing the calculated disparity image derived from two stereo images obtained from the stereo camera, the system estimates the depth of the detected objects on the vehicle simultaneously. We estimate the position of the object from the y coordinate of the centroid object that came across it, which will be converted to world coordinates. Based on the results, the multi-perception system demonstrated an average accuracy of 97.11% when tested with diverse objects. The system demonstrated an average processing time of 84 milliseconds, or 11.8 frames per second (FPS). Operating at 1.5 GHz on the Jetson Nano 4GB, this system is optimally designed to cater to a wide range of low-speed ADAS applications. Furthermore, its capabilities enable multi-sensor fusion for localization, mapping, and path planning in autonomous vehicle applications. These results highlight the system's potential for enhancing the perception capabilities of self-driving vehicles.

Keywords: Self-driving vehicle, stereo multi-perception, a deep neural network, depth estimation, position estimation.



Optimization of Road Detection Using Pruning Method for Deep Neural Network

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Abstract – Road detection is essential for autonomous driving and road maintenance. However, the complexity of Deep Neural Networks (DNN) used for this task poses challenges for resource-constrained platforms like edge TPUs. To address this, we propose a pruning-based optimization technique in TensorFlow. Pruning selectively removes unnecessary parameters from the network, reducing its size without compromising accuracy. In our experiment, We asses the effect of pruning on road detection performance by utilizing the Fast R-CNN MobileNet V2 model. The results show that pruning significantly reduces parameters without sacrificing accuracy. We observed that the pruning-based optimization technique not only reduces the parameters of the network but also minimizes loss values. This indicates that the pruned model is able to maintain a high level of accuracy while producing more efficient representations of the road features. By reducing loss values, the pruned model demonstrates improved robustness and precision in detecting road conditions.

Keywords: Road damage detection, Pruning, Deep Neural Network.



Analysis of Attraction Response on Product Packaging Based on EEG Signal: (*A preliminary study of Neuromarketing on Packaging*)

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Abstract – Product packaging is a key component of the marketing strategy. Packaging is a powerful visual marketing tool that grabs consumers' attention and shapes their perception of brands and products. Neuromarketing tries to show how product packaging affects customer behavior, emotional responses, memory, and cognitive processes in the brain. In addition, it can provide deeper insight into consumers' unconscious brain responses to product packaging compared to traditional methods such as surveys or interviews. Recently, electroencephalogram (EEG) technology has been used widely by researchers to record and analyze brain activities, but very few on analyzing consumers' brain activity when interacting with product packaging. This study involves 30 volunteers to investigate the brain signals of attractive and unattractive packaging. Four EEG channels were used to record the signals, namely T3, T4, O1, and O2. EEG-preprocessing was done to do the feature extraction, and classification stage. The cleaned EEG signals were decomposed into Alpha, Beta, and Gamma sub-bands. To classify attractive and unattractive packaging, features Power Spectral Density (PSD) was taken from EEG data and computed. Based on the result, we found that the PSD value on attractive packaging is relatively higher than on unattractive packaging from each subband (alpha, beta, and gamma). It can be concluded that the high PSD value also indicates high enthusiasm for attractive packaging. We also found that the activity in the gamma subband indicates a higher cognitive process on attractive packaging. The three classification algorithms used in this study are Random Forest, KNN, and SVM. The best results were obtained from the random forest algorithm (73%), followed by KNN (60%), and SVM (52%).

Keywords: Electroencephalography (EEG), Neuromarketing, Packaging, Power Spectral Density (PSD).

Mobile Application for Early Screening of Skin Cancer Using Dermoscopy Image Data Based on Convolutional Neural Network

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Abstract – The dermoscopy image produced by the dermatoscope represents the skin surface structure in more detail than clinical images because the imaging technique uses optical magnification and liquid immersion lighting or cross-polarization. Detection of skin cancer is a challenge for several reasons. Doctors find it difficult to detect the presence of cancer on the skin only with dermoscopy images. Sometimes further tests are needed to confirm the results of the diagnosis, such as a biopsy or pathology examination, that is relatively time-consuming. Mobile skin screening technology can be used as an early screening tool for the early detection of melanoma, allowing patients to share images of their lesions with their skin specialists quickly. In this study, a novel method for early skin cancer detection based on dermoscopy pictures and the convolution neural network (CNN) algorithm is proposed. Three convolution layers, two average pooling layers, and a batch normalization layer make up the five feature extraction layers of CNN's proprietary design. The ISIC Archive, which has a collection of skin lesion photos, was the dataset utilized to create the model. Four thousand dermoscopy images in JPG format are used in this study and are divided into two classes: benign and malignant. The dataset is divided randomly into 80% training data and 20% test data. The experiments found that the model with the best performance resulted in a training data accuracy of 99.3% and a test data accuracy of 97.63%. It concludes that the model with batch normalization can distinguish the benign and malignant well. The model requires a small enough space to be easily accessible through mobile devices.

Keywords: Dermoscopy, Batch normalization, Convolution neural network, Early screening.



07. [IES-KCIC]
Applied-Computing Sciences



Implementation of Private Blockchain Extension on Open Source IoT Platform using Hyperledger Besu

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Abstract – The Internet of Things has been rapidly developed in many applications. Currently, a lot of IoT applications are using a conventional database as their data accumulation process. A conventional database is centralized and not immutable. So, data security will be a challenging task in IoT applications, especially for confidential data and reliable data. In this research, we would like to build a comprehensive security system to increase IoT data security in the IoT platform. The proposed system is an implementation of blockchain extension in the IoT platform as a connector to the blockchain network. Blockchain extension will be contained of WebSocket, Kafka, and smart contracts. WebSocket act as a data collector from the IoT platform, Kafka act as data queue processing, and the smart contract will act as data models and contract that will be stored and executed as a transaction of data in the blockchain. Kafka makes the blockchain extension more accessible from the outside platform, so users are able to build their smart contract by subscribing to Kafka's topic. We have tested our system on several bandwidths in several scenarios (Blockchain API execution time, Blockchain API speed, Blockchain, retention performance, and Smart Contract Vulnerability Testing). In Kafka, the optimal Transaction Per Second value is on 8Mbps with 0.76TPS and the smallest TPS value is 0.46TPS at 2Mbps. We also tested the smart contract vulnerability, the results are high severity, and the estimated gas will be 29898 – 136483 gas fees.

Keywords: blockchain, internet of things, internet of things security, extension, private blockchain.



Stress Condition Detector Based on the Physiological Response using K-Means Cluster Analysis

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Abstract – Everyone is required to be able to solve problems in living daily life that can cause stress. From various studies on stress, most state that stress contributes negatively to health, and increases the risk of disease and decreased endurance. This makes early stress monitoring very necessary, by identifying stress conditions can help in preventive steps to manage stress symptoms to improve and avoid the impact of prolonged stress that affects health such as sleep disorders, changes in appetite, and even one's social life. From changes in the body's physiological response can be known stress conditions through heart rate, body temperature and galvanic skin response (GSR). Based on this, this study made a portable tool to detect stress conditions based on physiological changes in the body then a decision was made for someone in normal, mild stress, or severe conditions using K-Means Cluster Analysis. The results of stress condition detection are displayed on the android UI via Bluetooth connection. Test results from 45 datasets obtained centroid points on the sensor for each stress level. Sensor reading values that are close to the centroid value will be grouped in the centroid cluster.

Keywords: stress detection, heart rate, galvanic skin response, body temperature, k-means cluster analysis.

A Proposal of Code Typing Problem for Basic Java Programming Learning

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Abstract – Java is an object-oriented programming language that helps programmers to run programs easily. A web-based Java Programming Learning Assistant system (JPLAS) has been developed to help improve skills through self-learning. Learning Java programming for beginners requires quick practice routines in code typing programs, but JPLAS didn't have that problem type yet. In this paper, we propose Code Typing Program (CTP) as a new type in JPLAS. CTP is a new instance that displays code references that must be rewritten that cannot be copied and pasted. CTP evaluation was given to 21 second-semester students taking a Java programming course. The problem-solving did on 8 Java programming topics, where each case consisted of at least two Java files with 624 lines of program code. The results show that the highest average level of truth is 99.1%, and the trend of the ratio of the average number of submissions to the number of question lines is decreasing. A decreasing ratio indicates an increase in students' understanding while using CTP.

Keywords: java programming, learning assistant system, code typing programs

Stunting Program Classification in East Java, Indonesia From Internet News Using Location Based and SVM

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Abstract – Stunting is a serious health problem for toddlers in Indonesia, especially in East Java, which makes the Indonesian government seriously try to overcome it to achieve the Golden Generation of Indonesia. To reduce the prevalence of stunting, programs related to stunting are held regularly. This research aims to compile and classify information regarding stunting programs in East Java from internet news. The solution is to create a website that visualizes the prevalence of stunting and stunting programs in East Java, Indonesia, in the form of a map that is divided into several districts in East Java. Stunting prevalence data is taken from SSGI data that has been collected by the Indonesian Ministry of Health, while information about the stunting program is taken from mined internet news, filtered using the SVM machine learning algorithm, and classified based on the location of the stunting program reported. The SVM filtering model created can classify and filter news with an accuracy rate of up to 87%. With this website, it is hoped that the public can easily get information about stunting programs in their location and that the government can conduct an interactive analysis of stunting data in East Java.

Keywords: Stunting, Stunting Program, East Java, Visualization, Internet News, Text Classification, SVM

Systematic Literature Review Langchain Proposed

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Abstract – While systematic literature reviews are frequently carried out within software engineering research, performing them in a rigorous and reproducible manner can be difficult. This paper proposes some new methods for evaluating and validating systematic literature reviews. Our approach consists of several steps, such as: Selecting a set of relevant scientific papers to analyze, Developing a list of questions and criteria to evaluate each literature review, and Determining what types of functionality and performance should be evaluated. We tested our method by having multiple experts evaluate the literature reviews based on our questions and criteria. We measured the similarity in scores between each expert to determine the reliability of the evaluations. The average similarity index between experts was 0.58 to 0.83, indicating a reasonable level of agreement in their assessments. This shows our evaluation method can produce fairly consistent results, even when different experts are involved. The relatively high level of agreement is notable considering each expert brings their perspectives and opinions in analyzing literature reviews. By providing concrete questions, criteria, and evaluation methods, we aimed to guide the experts toward more uniform evaluations. In summary, we developed and tested a new approach for evaluating and validating systematic literature reviews in software engineering. By assessing reliability via inter-rater agreement, we showed that consistent and reproducible results are possible using our evaluation framework and methodology. Our methods could



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help researchers gain more insight into what makes for an effective and high-quality literature review.

Keywords: Documents Review, LangChain, Systematic Literature Review, Software Engineering.



Development of IoT Framework for Monitoring Human Health Conditions

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Abstract – Health and technology have a close relationship in the current era of the industrial revolution 4.0, such as the existence of IoT technology. Medical device applications in the IoT sector also contribute to preventing the increased risk of chronic disease. In implementing the use of IoT tools in the health sector, the use of framework technology that can receive various kinds of data from IoT sensors in the health sector and real-time to facilitate monitoring of human health at this time is still not optimal and sometimes still not accurate. This study proposes an IoT web framework called EWARAS, which is built on the cloud and serves to simplify and accelerate the process of developing IoT tools for the healthcare sector. The services provided by EWARAS are divided into two parts, back-end services and front-end services. Back-end services function to receive, send, store, and process data, while front-end services function to retrieve and display the results to users. The basic types of features provided by EWARAS include real-time data monitoring using health sensors, health data analysis components, and history of medical examination results. Experiments were carried out to send 10 types of sensor data both from the CSV format dataset and from the MySignals Health sensor device and to get the health condition output from the sent sensor data. The experimental results show that the overall error percentage for each sensor is 0%, both for the CSV dataset and the MySignals sensor device data concludes that this test was successfully carried out relatively smoothly and can be received by the EWARAS web in real-time. For accuracy, when compared to health sensors commonly used in the medical world, it has an accuracy close to the same with the largest difference percentage of around 1.54% only from trials on 4 types of sensors.

Keywords: Cloud service, EHealth, Framework, Health sensor, IoT.



Design and Develop A COVID-19 Vaccine Level Detection System For Access Public Services Users Using Face Recognition by Raspberry-pi

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Abstract – The COVID-19 pandemic has transformed many aspects of society, including widespread social restrictions. The COVID-19 vaccination has been actively advocated throughout Indonesia and is now a requirement for accessing public services. Facial recognition technology has emerged as one of the solutions used during this pandemic. In this research, we propose a system that can detect individuals vaccinated against COVID-19 by leveraging facial recognition technology based on the Haar Cascade algorithm, using data stored in a database. The facial recognition process underwent several tests, including dataset acquisition distance, attributeless face recognition, and face recognition with glasses. Dataset acquisition at a distance of 150 cm was deemed safe and produced accurate results. Furthermore, the system recognized attributeless faces and correctly identified individuals wearing glasses. This facial recognition system is integrated with a database, ensuring user data is accurately displayed based on the detected facial recognition results. The results of these tests demonstrate the system's ability to present data following the dataset and user ID stored in the database.

Keywords: The COVID-19 pandemic, social restrictions, facial recognition, database, Haar Cascade algorithm.



Performance Evaluation of Docker Containers for Disaster Management Dashboard Web Application

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Abstract – A disaster management dashboard web application is an application used to display streaming data from IoT devices placed in disaster areas. Since its data sent by IoT devices' Search and Rescue (SAR) agency from a separate place is confidential, it will be stored and processed on a private cloud system. As such, the dashboard web application using Docker containers was built as a solution for data storage and processing in the private cloud server. The ability of the web application to handle and process the user requests, and the performance of serving is the sole responsibility of the container is the key focus of this research. To evaluate its performance, we performed the performance testing of this cloud-based web application using JMeter. The evaluation includes stress testing, endurance testing, and spike testing. These evaluations were executed to monitor the CPU usage, memory, and data transfer for each container of web server, database, messaging, and database administration. The experimental results showed that NGINX applications as web servers used an average of 3% of total CPU usage, while other applications in 3 types of observability scenarios used less than 2%. On the other hand, MySQL as a database application uses an average of 20% of total memory usage, while other applications only use less than 2%. In data transfer measurement, the throughput size tends to be increased linearly according to the number of user requests increases as well. Given the result, this research contributed to providing recommendations for the further development of SAR Agency's web applications.

Keywords: Web Application, Docker Containers, Cloud Server, Performance Evaluation, Disaster Management



GIS-Based Disaster Management using Support Vector Machine Model for Hazard Level Classification in Disaster Areas

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Abstract – Due to the regular occurrence of catastrophes in Indonesia, the Indonesian SAR (Search and Rescue) team is essential in assisting with search and rescue activities for disaster victims, which frequently result in fatalities. However, they frequently encounter significant difficulties when determining the potential level of risks in the area. Apart from prioritizing the safety and security of victims, the SAR team's safety is also important before they can effectively save others. In this study, we propose a system that can classify the level of hazard in a disaster area based on environmental parameters. Utilized a customized dataset with information on temperature, humidity, carbon dioxide (CO₂), dust level, air pressure, and hydrogen sulfide (H₂S), this system optimized the kernel function and data splitting using the SVM (Support Vector Machine) algorithm. As an outcome of this modeling, the degree of environmental hazard is divided into three categories: safe, moderate, and dangerous. With a 90% data training and 10% data testing distribution, the classification model training test results the highest accuracy. Among the four evaluated kernels, the Sigmoid kernel emerged as the top performer in terms of various model performance metrics, such as accuracy, precision, recall, f1-score, and confusion matrix. The results of the hazard level classification are also mapped on a GIS website to allow the SAR team to monitor and update the risk evaluation, and respond appropriately according to changing environmental conditions.

Keywords: SAR Team, Support Vector Machine, Geographic Information System, Disaster Management

Eye Disease Classification Based on Fundus Images Using Convolutional Neural Network

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Abstract – The eye is a vital organ in the human body. Through the eyes, humans can absorb over 80% of visual information used to carry out various daily activities. However, in Indonesia, there are many cases of vision impairments that, if not properly addressed, can lead to blindness. Examples of such impairments include cataracts, glaucoma, and diabetic retinopathy. Currently, there are many research studies on eye diseases that are aided by technologies like Artificial Intelligence (AI). One of the AI technologies that is commonly developed is Convolutional Neural Network (CNN). CNN is a deep learning framework that excels in solving image or picture classification problems because its architecture applies convolution layers, which can break down images to extract features and easily reduce the high dimensionality without losing the image's information itself. In this study, the author used various CNN models to find the most suitable model for classifying eye diseases, including EfficientNet, ResNet, Inception V3, and many others. Through various model training experiments, the accuracy for the ResNet50 model was found to be 95% with a loss of 17%, followed by Xception with an accuracy of 95% and a loss of 21%, and EfficientNetV2B2 with an accuracy of 92% and a loss of 25%.

Keywords: Eye, Visual Impairments, Cataract, Glaucoma, Diabetic Retinopathy, Fundus, AI, DL, ML, CNN.



Effective Searching of Drowning Victims in the River using Deep Learning Method and Underwater Drone

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Abstract – The search for drowning victims can be a time-consuming and challenging task, often hindered by limited equipment in the field. However, advancements in technology, particularly underwater drone technology and deep learning methods for object detection, present promising solutions. YOLOv5 (You Only Look Once Version 5) is a cutting-edge object detection model known for its high detection speed and accuracy. In this study, the researchers leveraged the capabilities of YOLOv5 to enhance the efficiency of searching for submerged victims. The YOLOv5s configuration model was utilized, and the model was trained for 400 epochs. The results demonstrated impressive performance, with an accuracy value of 89%, precision of 100%, and recall of 95%.

Keywords: detection of drowning humans, underwater drone, deep learning, human detection, YOLOv5.



Drone-to-drone Collision Detection Algorithm in Flight Traffic Management

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Abstract –This paper presents an algorithm for detecting collisions in flight traffic management for drones. The algorithm is simple to implement and can be used to effectively manage the flow of drones in a safe and efficient manner. The algorithm has been tested in simulation and has been shown to be effective in detecting collisions between drones. The algorithm is also simple to implement and can be used with existing drone traffic management systems. As the number of drones in the sky continues to grow, this algorithm will become increasingly important for ensuring the safety of drone operations.

Keywords: Flight Planning, Collision Detection, Drone Delivery Service, Drone Traffic Management.



The combination of the NDBI and machine learning algorithms to classification the development of urban areas in Surabaya uses Landsat 8 Imagery.

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Abstract – Development is a transformation that occurs in order to better people’s lives. In this instance, efforts are required to monitor development progress swiftly and efficiently so that outcomes that support the government’s new policies are obtained. With a population of 2,848,583 people, Surabaya is the largest metropolitan city in Eastern Indonesia. An increase in population can impact Surabaya’s development and generate potential issues with urban planning development. Through these issues, remote sensing technology can efficiently and swiftly detect advances in Surabaya. This research study employs Landsat 8 image data with a combination of Normalized Build-Up Index (NDBI) as pre-processed pixels to segment into urban areas. It employs machine learning to classify urban areas to separate class types in depth. The findings show that the method successfully classified subclasses in residential and industrial areas. Random Forest (RF) outputs have an overall accuracy of 85%, whereas Decision Tree (DT) outputs have an overall accuracy of 84%. This study’s findings also indicate the possibility for practical applicability to various case studies, such as conducting detections in forests, plantations, mining, and coastal environments.

Keywords: Landsat 8, NDBI, Random Forest, Remote Sensing, Urban Areas



Using of Kinship Terms in Pronoun Substitute and Address Terms in the Thai Language

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Abstract – This paper examines the usage of kinship terms in pronoun substitution and address terms within the Thai language. Kinship terms are commonly employed in Thai communication to convey genuine relationships between speakers and listeners. These terms play a vital role in expressing social hierarchy and status, influenced by factors such as age, gender, and familiarity. The analysis of a constructed corpus highlights the language phenomena associated with kinship terms in Thai conversations. By gaining insights into the usage of kinship terms, this research contributes to a deeper understanding of Thai address terms and facilitates the development of linguistic models for natural language processing in Thai.

Keywords: pronoun substitute, address term, kinship term, Thai language, corpus

Comparison of CNN-Based Design for Shrimp Seed Counting Machine

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Abstract – Vannamei shrimp is the main commodity for shrimp exports in Indonesia. One of the important processes in shrimp cultivation is the process of sowing the seeds. Among the crucial stages of shrimp farming, the initial step involves purchasing shrimp seeds from nurseries before commencing the seeding process. Currently, the most process of calculating shrimp seeds is still done manually, leading to reduced efficiency and inadequate accuracy. In this research, the authors propose an implementation of a shrimp seed counting machine to enhance the manual counting method. By utilizing a camera, the machine captured images of shrimp seeds to facilitate calculation. Therefore, the obtained image from the camera was processed in the Raspberry PI 4 processor using various CNN methods, i.e., Faster R-CNN ResNet50, Faster R-CNN ResNet101, and SSD MobileNetV2. The primary objective of this research to compare these three models. Based on the F1 score, it is found that ResNet101 achieved the best performance in detection compared to the other two methods. However, this method results in the longest executing time compared to Faster R-CNN ResNet50 and SSD MobileNetV2.

Keywords: vannamei shrimp seed, vision technology, convolutional neural network, shrimp seed detection, shrimp seed counting machine.



A Forest-fire Damage Estimation and Visualization Method for Time-series Multi-location Analysis

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Abstract – This paper presents a method for estimating and visualizing the extent and severity of forest-fire damage using time-series geographic information and satellite image data, and its application to multi-location analysis for the purpose of evaluating the impact of forest loss on the global environment. First, the Normalized Burn Ratio (NBR) of forests is calculated using multispectral satellite images before and after the forest fire. Second, using the NBRs before and after the fire, the difference (dNBR) is calculated to estimate the severity of the fire and its extent. Third, the size of fire-affected area is estimated from these results to compare among multiple locations using GIS. The accuracy of this method is verified by comparing the estimated affected area with the actual affected area. With serious forest fires occurring around the world in recent years, there is a growing demand for a method to accurately assess the impact of forest fires and the importance of forests in the urban and global environment. This study demonstrates the feasibility of our method and its potential contribution to “SDG15 monitoring” as a realization of time-series multi-location analysis and prediction of disaster-affected areas through case experiments on forest fires occurred in Australia, Indonesia, and Japan.

Keywords: Forest, vegetation, fire, SDGs, SDG15, satellite, GIS.



08. [IES-KCIC] Intelligent Multimedia Systems



Indoor Navigation Using Augmented Reality For PENS Postgraduate Building

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Abstract –The use of navigation systems is widespread in assisting individuals with finding their desired destination, visualizing the route, and measuring the distance traveled. In the specific context of navigating indoors, the postgraduate building at Politeknik Elektronika Negeri Surabaya lacks real-time digital directions, which can lead to confusion among users. To address this issue, we developed an Augmented Reality (AR) based navigation system that aims to provide a user-friendly solution and eliminate any potential confusion. Our research focuses on the development of an interior navigation system that leverages AR technology to enhance the user experience. We implemented QR codes to establish the initial position of each room, and conducted a confusion matrix test to validate the accuracy of scanning each QR code, resulting in a high accuracy rate of 96.6 percent. These findings confirm the reliability and effectiveness of our navigation system.

Keywords: augmented reality, indoor, navigation, QR code, 3d Object.

Versatile Vision: Innovation of a Node-RED-based Smart Surveillance System

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Abstract –Our study focuses on creating an adaptable surveillance system through visual programming in Node-RED. We have used a combination of Raspberry Pi 3B+, a camera module, and two mini servo actuators for our hardware framework, which provides flexible camera movement. The pan-tilt mechanism operated by mini servos gives greater control over camera positioning, resulting in a broader visibility range than traditional fixed-mount cameras, increasing versatility. Our research integrates computer vision techniques like contour-based object detection into the program blocks. We provide users to develop their programs independently. Through these methods, we aim to count objects within an area accurately. It is worth noting that our Node-RED-based adaptable surveillance solution has extensive applicability across various environments. To monitor object presence or quantity efficiently while considering all possible variations. One noteworthy aspect of this study is our proposed method's inherent ability to ease deployment. Our innovative solution combines adaptability with efficiency through automated monitoring mechanisms which activate alarms if necessary. This research highlights how Node-RED can be an essential aspect of future programmable surveillance system development that is key to enhancing security and efficient use of spaces.

Keywords: visual programming in Node-RED, Raspi surveillance system, pan-tilt mechanism, autonomous monitoring system, programmable surveillance system



09. [IES-KCIC]
Immersive Technology and Interactive Media



Improving Driver Loyalty through using Gamification Approach

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Abstract –Better staff motivation is believed enables to deliver better performances. Although it sounds essential, many companies have carried out unsuccessful program to do so. The article examines improving gamification design in Gojek app, a pioneer of ride hailing company, in Indonesia. Studies show the use of Gamification has proven to deliver many benefits and improve better performances in business. The article applies game design approach in Gojek app to improve driver's motivation as key factor to improve overall company performance. The article applies Maslow needs theory to guide the game design to improve overall drivers' motivation, loyalty, and achievements.

Keywords: Employee motivation and loyalty, Gamification, Ride Hailing.



Immersive Spaces for Creativity: Smart Working Environments

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Abstract – This paper presents an innovative approach to designing an immersive space that dynamically supports users (inter-)action based on users' behavior, voice, and mood, providing a personalized experience. The objective of this research is to explore how a space can communicate with users in a seamless, engaging, and interactive environment. Therefore, it integrates natural language processing (NLP), generative artificial intelligence applications and human computer interaction that utilizes a combination of sensors, microphones, and cameras to collect real-time data on users' behavior, voice, and mood. This data is then processed and analyzed by an intelligent system that employs machine learning algorithms to identify patterns and adapt the environment accordingly. The adaptive features include changes in lighting, sound, and visual elements to facilitate creativity, focus, relaxation, or socialization, depending on the user's topics and emotional state. The paper discusses the technical aspects of implementing such a system. Additionally, it highlights the potential applications of this technology in various domains such as education, entertainment, and workplace settings. In conclusion, the immersive creative space represents a paradigm shift in human-environment interaction, offering a dynamic and personalized space that caters to the diverse needs of users. The research findings suggest that this innovative approach holds great promise for enhancing user experiences, fostering creativity, and promoting overall well-being

Keywords: Virtual Reality, Artificial Intelligence, Large Language Models, Generative AI

Experience the Theory: New Perspectives Through VR Learning Environments for Photography Education

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Abstract – This paper presents an in-depth exploration of the development and application of a Virtual Reality (VR)-based photo studio, specifically designed for the education of photography. Given the inherent nature of photography, which necessitates finding suitable perspectives within a three-dimensional space, it was crucial to achieve a photorealistic implementation. This implementation encompasses aspects of spatial perception, lighting ambiance, and camera interactions. In addition to these technical aspects, the system integrates explanatory, motivational, and feedback systems. These additional features are pivotal in aiding learners in the acquisition of both technical proficiencies and creative skills, fostering a conducive environment for independent learning and self-directed activity. One of the key features of this VR-based photo studio is the real-time simulation of adjustable camera parameters. This includes a virtual camera and the visualization of their effects on image perception, such as the use of varying focal lengths and depths of field. These features provide learners with an immersive experience that allows them to gain practical knowledge and skills that can be applied to scenarios outside the virtual environment. This hands-on approach to learning not only enhances understanding but also promotes retention of knowledge and skills. The paper concludes with an initial user study, providing valuable insights into the effectiveness and potential areas of improvement for this innovative approach to photography education. This study serves as a stepping stone for future research and development in this field, paving the way for the evolution of VR in education.

Keywords: Virtual Reality, Learning, Photography, Education, Learning Analytics



Immersive Experience for Sustainable Tourism-The Potential of a Community-Based 3D Scanning Database App on the Example of South East Asia

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Abstract – Sustainable tourism focuses on minimizing the negative impact of tourism on the environment and cultural heritage sites, allowing future generations to enjoy tourism. Immersive experiences can support sustainable tourism further by allowing people to visit tourist places without physically being there. This helps to reduce negative impacts such as overcrowding, pollution, and damage to natural and cultural resources. An app that encourages people to create 3D scans of places they visit has the potential to contribute to virtual tourism. With modern technology, a wider range of people can contribute to a community-based 3D scan collection by sharing their photos and scans. This app can help to gain a more comprehensive and accurate understanding of various locations around the world and create a variety of virtual tours. This paper specifically focuses on Southeast Asia and provides guidelines for creating content and material for the app.

Keywords: Sustainable Tourism, Immersive Experiences, Virtual Tourism, 3D Community, 3D Scanning Guidelines



Gamification Interaction Design for *Membatik* Application in Mixed Reality

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Abstract – Batik is an Indonesian traditional craft that has high artistic value. Indonesian society, especially the younger generation such as students, plays an important role in preserving Indonesian culture such as batik to ensure it remains attached to Indonesia and does not disappear. However, the interest and enthusiasm of students in preserving batik is still lacking, so new strategies are needed to increase their interest and enthusiasm in preserving batik. One of the new strategies is utilizing immersive technology such as Mixed Reality (MR) with the implementation of gamification interaction to enhance students' interest because learning is done as if playing a game. MR technology can provide users with a more complex experience by using MR glasses. The *Membatik* application is a batik-making simulation application using MR technology where users can simulate with hand gestures and there are quizzes at each stage with a point system as a gamification implementation. The application has been tested with initial user testing. During the testing phase, users were asked to try the application and provide feedback on the overall user experience. The outcomes demonstrated that the MR application might raise students' interest in and involvement in their study. The users also found the quiz feature to be interactive and challenging, which added to their learning experience. By combining gamification elements with MR technology, the application has the potential to improve learning outcomes and increase student motivation.

Keywords: Batik, Cultural Heritage, Education, Gamification, Mixed Reality

A Scenario Selection for Tourism Promotions Serious Game Based on Player Expectations

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Abstract – Serious game is one of the promotional media for tourist destinations. In the tourism promotion serious game, a system for selecting tourist destination scenarios is needed to make it easier for potential tourists to determine what suits their expectations. In this study, we propose using TOPSIS (Technique for Other Reference by Similarity to Ideal Solution) as a scenario selection method based on the user's criteria weight assessment input. Decision-making using the dynamic weighted TOPSIS technique considers alternatives, criteria, and criteria weights. Based on input responses to questions concerning criteria in the form of weather, visitor volume, tourist locations, entrance fees, and public amenities, fourteen alternative tourist attractions are processed. According to the user's expectations for the game to be played, the user's criteria are given weight, and one alternative of game scenarios is produced. The test results show that the scenario selection system has an accuracy value of 77%

Keywords: Serious game, tourism promotion, scenario selection, player expectation, TOPSIS

Exploring Art in the Digital Era: Creating and Deploying an Immersive Virtual Gallery Experience

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Abstract –Art galleries play a vital role in preserving and promoting artistic heritage, but the current state of art galleries in Indonesia, particularly in attracting the younger generation, raises concerns. However, unfortunately, the general public, especially the younger generation, has shown a lack of interest in visiting art galleries, particularly in Indonesia. In light of these challenges, it becomes imperative to explore alternative approaches to engage the younger generation in the realm of art. Developing a virtual gallery platform that offers immersive and interactive experiences can help bridge the gap between the digital preferences of the younger generation and the traditional art world. By leveraging technology, this platform can provide a convenient and accessible avenue for the younger generation to explore, appreciate, and interact with art, thus revitalizing their interest in the artistic heritage of Indonesia. This research explores the current state of art galleries in Indonesia and highlights the lack of interest among the younger generation in visiting physical art galleries. To counter this trend, a virtual gallery platform is developed to engage the younger generation and stimulate their interest in art. The platform offers an immersive experience, replicating the gallery environment virtually. Through software testing and initial user testing, the platform's performance and usability are evaluated. The findings demonstrate its potential in revitalizing the younger generation's interest in art. The webbased platform provides accessibility and convenience, allowing users to explore and appreciate art from anywhere

Keywords: Serious game, tourism promotion, scenario selection, player expectation, TOPSIS



Determining Mathematics Subject Materials For Learning Media Using Fuzzy Mamdani Based on Initial Evaluation Criteria

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Abstract – The amount of government funding for education has not been able to increase the knowledge skills of Indonesian students in mathematics and science. Using game technology as a learning medium can improve students' abilities. This study proposes learning media for geometric mathematics educational games that run on mobile phone applications equipped with initial evaluations for players as an alternative learning media that adapt students' initial abilities. We use the fuzzy Mamdani method to select math material based on the player's initial ability score. Testing performs function tests in games using the black box method. The black box test results show that the supporting and main functions have a 100% pass rate.

Keywords: Math, Education, Game, Fuzzy Mamdani



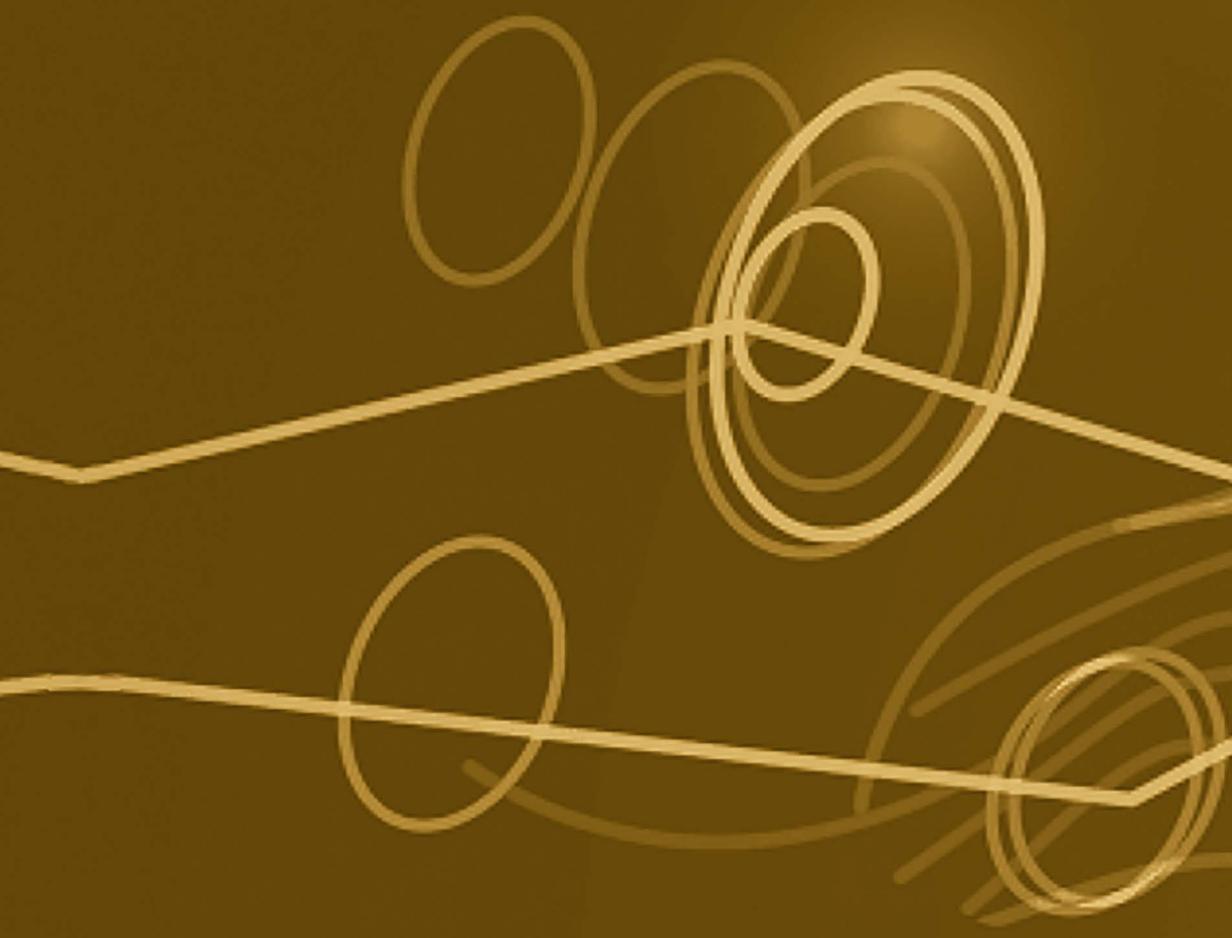
Interactive 3D Software Development with Integrated Bike Data for Virtual Cyclinssg Experience

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Abstract – Cycling is considered one of the thirteen important sports that offer numerous benefits for maintaining a healthy body. However, in Indonesia, cycling has garnered less interest among the public due to the requirement of a large land area for this sport. Additionally, the density of motorized vehicles has contributed to the lack of public interest in cycling due to the resulting high levels of air pollution, making outdoor cycling activities uncomfortable. To foster public interest in cycling, innovative developments are necessary. The cost of indoor static bicycle exercise equipment poses a significant obstacle to exercising. Consequently, an indoor bicycle simulator has been developed as a solution. The objective is to generate public interest in cycling while also providing a means for training and entertainment. In this research, a virtual bicycle simulator has been designed, incorporating various devices such as bicycle platforms, propulsion units, sensing units, and display units. The control system implemented receives signals from the sensing unit to regulate the movement of the actuation unit. This enables real-time calculation and construction of a virtual environment, resulting in a diverse cycling experience across different models.

Keywords: Health, Virtual Bike, 3D Model, Simulation, Actuation



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