IES

INTERNATIONAL ELECTRONICS SYMPOSIUM 2021 IN SURABAYA

SEPTEMBER 29-30, 2021

WIRELESS TECHNOLOGIES AND INTELLIGENT SYSTEMS FOR BETTER HUMAN LIVES

PROGRAM BOOK

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2021 International Electronics Symposium

September 29-30th 2021
Surabaya, Indonesia

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Program Book
2021 International Electronics Symposium (IES)

Politeknik Elektronika Negeri Surabaya - PENS
Surabaya, Indonesia, September 29-30th, 2021

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Foreword

Assalamualaikum Warahmatullahi Wabarakatuh

It is my great pleasure and honor as Director of Politeknik Elektronika Negeri Surabaya (PENS) to welcome all of you to the International Electronics Symposium (IES) 2021, which is held at Surabaya, Indonesia on September 29-30, 2021. Moreover, I would like to welcome all the keynote speakers and discussion panelists. I am sure you will find this conference to an excellent forum for innovative and technical discussion.

Since the first IES in 1998, this is the 23rd conference organized by PENS as an annual event. The conference is grew up year by year and this 2021 event is the eight year of IES to be an international symposium and we still maintain a great collaboration with Institute of Electrical and Electronics Engineers (IEEE) Indonesia section as technical sponsor. IES 2021 contains two tracks: International Electronics Symposium on Engineering Technology and Applications (IES-ETA) and International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC). Participants from all over Indonesia and our neighborhood countries will find the symposium a perfect venue.

This symposium would have not been possible without the contributions and hard works of the keynote and invited speaker, all the authors and reviewers, the advisory committee as well as chair persons, Technical Committee and Organizing Committee. Allow me to take this opportunity to express my sincere appreciation to all of you.

The symposium may become the "Bridge to the Future" for the participant for stepping advanced in science and technology with aiming at providing original concept and powerful methodologies for solving variety of social and industrial problems such as environment, energy, medical, security and etc. "Bridge to the Future" as stated in our institution’s slogan also means that we are the way for the people who headed to the future of advance technologies.

In conjunction with the symposium, we also held 2 workshops which are (1) Hands-on Workshop on Internet of Things, and (2) Hands-on Workshop on Artificial Intelligence, and 2 panel discussions which are (1) Panel Discussion on Internet of Things, and (2) Panel Discussion on Artificial Intelligence and 5D Systems.

I do expect this symposium will give essential contributions to the development on the aspects of researches, academics, and industries nationally and globally. I hope that all participants have fruitful and technical discussions and enjoy the symposium.

See you on next IES 2022.

Wassalamualaikum Warahmatullahi Wabarakatuh...

Surabaya, September 29-30, 2021

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

Welcome Message from General Chair of IES 2021

Assalamualaikum Wr. Wb.

On behalf of the 23nd International Electronics Symposium (IES) 2021, I would like to welcome you all to this prestigious and high-quality conference. IES is one of the primary IEEE forums in Indonesia for publication and technical exchange of the latest research and innovation and brings together academia and industry to share and evaluate the technology related to Electronic and Computer. In this opportunity, I would like to express my sincere gratitude to our honourable Keynote Speakers, Director of Politeknik Elektronika Negeri Surabaya, IEEE Indonesia Section representative, Advisory Committee, Technical Program Committee, Steering Committee, and Organizing Committee for their support and efforts so that this event can be successfully conducted. This year, IES 2021 is conducted in Surabaya, Indonesia, from September 29-30th, 2021. And in respect to the Covid-19 pandemic, IES 2021 is held on a hybrid conference, that is an on-site conference (physical presence) and an online option (virtual participation). As the same as before, IES 2021 also conducts two sub-conferences, namely International Electronics Symposium on Engineering Technology and Applications (IES-ETA) and International Electronics Symposium on Knowledge Creation and Intelligent Computing (IES-KCIC).

This year, we have prepared a comprehensive program consists of several keynote speeches delivered by Prof. Minoru Okada (Nara Institute of Science and Technology, Japan), Prof. Dr.-Ing. Ulrich Rueckert (Bielefeld University, Germany), Dr. Ir. Titon Dutono, M.Eng (Politeknik Elektronika Negeri Surabaya, Indonesia), Dr. Denny Setiawan, ST. MT. (Ministry of Communication and Information Technology, Republic of Indonesia), and Mr. Bayu Hanantasena (Indosat Oreedo, Indonesia). The conference has received 294 submitted papers. 69 papers for IES-ETA and 47 papers for IES-KCIC have been accepted by the committee for oral presentation. 29 papers are presented on-site (offline) and 87 papers are presented online. This means that the acceptance rate of this conference about 39%. The participant for IES 2021 are from Indonesia, Japan, USA, UK, Australia, South Korea, Morocco, India, and Thailand. All accepted and presented papers will be included within the IES 2021 Proceedings. These papers on various topics are divided into 8 parallel sessions in the conference.

Finally, I would also like to thank the management of Politeknik Elektronika Negeri Surabaya, and the IEEE Indonesia section for their great assistance and support. Without all of their support, IES 2021 would not have been possible. Enjoy IES 2021 and the heroic city of Surabaya.

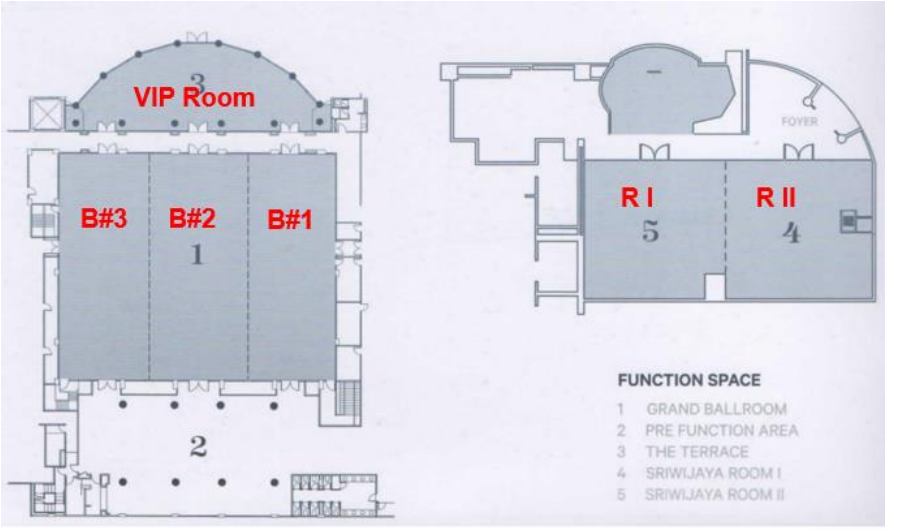
Wassalamualaikum Wr. Wb.
Mochammad Zen Samsono Hadi (IES 2021 General Chair)

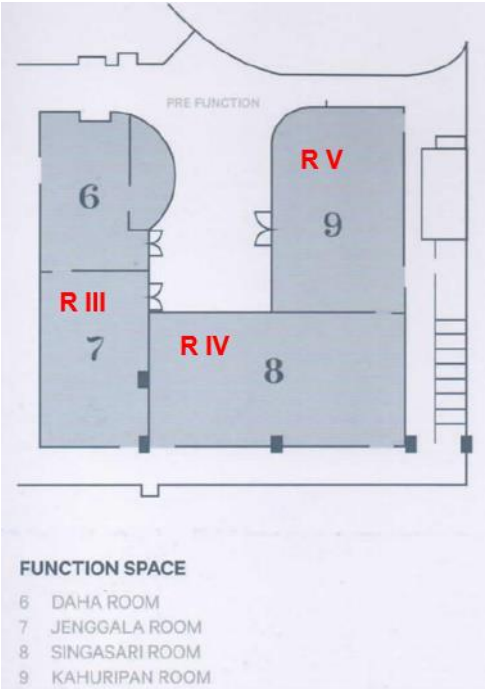
1. **Official Language**
   The official language of IES 2021 is English. All presentations including Q&A will be delivered in English.

2. **Guideline for Participants**
   - Conference Venue
     IES 2021 will be held on hybrid conference, that is on-site conference (physical presence) in Sheraton Hotel Surabaya and an online option (virtual participation) by using Zoom.
   - On-site Conference Venue
     On-site conference will be held in Sheraton Surabaya Hotel & Towers. Embong Malang Street Number 25-31, Kedungdoro, Tegalsari districts, Surabaya City, Jawa Timur 60261. Phone: (031) 5468000
   - Online Conference Venue
     Online conference will be held by using Zoom.
     ZOOM Event will be opened 30 minutes before the event (08.00 Western Indonesia Time, Jakarta Time). Link to join will be sent through email.
   - Registration
     Time of Registration: 08.00 – 08.30 (Local Time Jakarta, GMT + 7), Wednesday, September 29th 2021

3. **Guideline for Presenters and Session Chair/Moderator**
   - International Electronics Symposium (IES) 2021 will be held on hybrid conference, that is on-site conference (physical presence) in Sheraton Hotel Surabaya and an online option (virtual participation) by using Zoom.
   - Regarding this situation, the guidelines about how to do physical presentation and virtual presentation can be accessed in this link: https://ies.pens.ac.id/2021/guidelines-for-presenter/.
   - Author needs to attend both dry run and parallel session. Dry run and parallel session in virtual conference will be held using Zoom. Both dry run and Parallel Session, the IES Committee are using English Language and recoding during session progress.
   - During parallel session, 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 10 minutes presentation and leave 5 minutes for discussions. All presenters are requested to report their attendance to the session chair 10 minutes before the session begins.

Maps and Location for On-site Conference





Note:

- **Grand Ballroom (No.1) :** Opening Ceremony and Keynote Speaker – B#1,B#2,B#3
- **Pre Function Area (No.2) :** Lunch and Poster Session
- **Kalingga Room (No.3) :** VIP Room
- **Sriwijaya Room I (No.5) :** Paralel Session – Room 1
- **Sriwijaya Room II (No.4) :** Paralel Session - Room 2
- **Jenggala Room (No.7) :** Paralel Session – Room 3
- **Singasari Room (No.8) :** Paralel Session – Room 4
- **Kahuripan Room (No.9) :** Paralel Session – Room 5

- **No. 1 - 5: First Floor**
- **No. 6 - 9: Second Floor**

Conference Room IES 2021

A. Opening ceremony

Zoom Virtual Conference for Online Participants
Grand Ballroom (1), Sheraton Hotel for Offline Participants

B. Seminar Room

Wednesday, September 29th, 2021
Parallel Session 01 (Online)

Location	:	Room I
Moderator	:	Dr. Nu Rhahida Arini
Track	:	Power Engineering and Energy Technology
Topic	:	IES-ETA 1
Location	:	Room II
Moderator	:	Iwan Syarif, Ph.D.
Track	:	Electronics Systems and Electrics Technology
Topic	:	IES-ETA 2
Location	:	Room III
Moderator	:	M. Udin Harun Al Rasyid, Ph.D.
Track	:	Telecommunication Engineering Technology
Topic	:	IES-ETA 3
Location	:	Room IV
Moderator	:	Dr. Bima Sena Bayu Dewantara
Track	:	Robotics Technology and Control Systems
Topic	:	IES-ETA 4
Location	:	Room V
Moderator	:	Achmad Basuki, Ph.D.
Track	:	Knowledge Base and Engineering
Topic	:	IES-KCIC 1

Wednesday, September 29th, 2021
Parallel Session 02 (Online)

Location	:	Room I
Moderator	:	Dr. Nu Rhahida Arini
Track	:	Power Engineering and Energy Technology
Topic	:	IES-ETA 5
Location	:	Room II
Moderator	:	Dr. Arif Irwansyah
Track	:	Robotics Technology and Control Systems
Topic	:	IES-ETA 6
Location	:	Room III
Moderator	:	Dr. Mike Yuliana
Track	:	Telecommunication Engineering Technology
Topic	:	IES-ETA 7
Location	:	Ballroom #1
Moderator	:	Dr. M. Agus Zainuddin
Track	:	Computational Intelligence
Topic	:	IES-KCIC 2
Location	:	Ballroom #3
Moderator	:	Dr. Idris Winarno
Track	:	Applied-Computing Sciences
Topic	:	IES-KCIC 3

Conference Room IES 2021

Thursday, September 30th, 2021
Parallel Session 03 (Online)

Location	:	Room I
Moderator	:	Dr. Prima Kristalina
Track	:	Telecommunication Engineering Technology
Topic	:	IES-ETA 8
Location	:	Room II
Moderator	:	Dr. Reesa Akbar
Track	:	Robotics Technology and Control Systems
Topic	:	IES-ETA 9
Location	:	Room III
Moderator	:	Dr. Setiawardhana
Track	:	Robotics Technology and Control Systems
Topic	:	IES-ETA 10
Location	:	Room IV
Moderator	:	Dr. Tita Karlita
Track	:	Computational Intelligence
Topic	:	IES-KCIC 4
Location	:	Room V
Moderator	:	Dr. Rika Rohana
Track	:	Intelligent Multimedia Systems
Topic	:	IES-KCIC 5
Location	:	Ballroom #1
Moderator	:	Dr. Eng. Hary Oktavianto
Track	:	Applied-Computing Sciences
Topic	:	IES-KCIC 6
Location	:	Ballroom #2
Moderator	:	Riyanto Sigit, Ph.D.
Track	:	Applied-Computing Sciences
Topic	:	IES-KCIC 7
Location	:	Ballroom #3
Moderator	:	Sritrusta Sukaridhoto, Ph.D.
Track	:	Applied-Computing Sciences
Topic	:	IES-KCIC 8

Thursday, September 30th, 2021
Parallel Session 04 (Offline)

Location	:	Room I
Moderator	:	Dr. Prima Kristalina
Track	:	Power Engineering and Energy Technology
Topic	:	IES-ETA 11
Location	:	Room II
Moderator	:	Dr. Reesa Akbar
Track	:	Electronics Systems and Electrics Technology
Topic	:	IES-ETA 12
Location	:	Room III
Moderator	:	Dr. Setiawardhana
Track	:	Telecommunication Engineering Technology
Topic	:	IES-ETA 13
Location	:	Room IV
Moderator	:	Dr. Tita Karlita
Track	:	Telecommunication Engineering Technology
Topic	:	IES-ETA 14
Location	:	Room V
Moderator	:	Dr. Rika Rohana
Track	:	Robotics Technology and Control Systems
Topic	:	IES-ETA 15
Location	:	Ballroom #1
Moderator	:	Dr. Eng. Hary Oktavianto
Track	:	Computational Intelligence
Topic	:	IES-KCIC 9
Location	:	Ballroom #3
Moderator	:	Sritrusta Sukaridhoto, Ph.D.
Track	:	Applied-Computing Sciences
Topic	:	IES-KCIC 10

C. Registration and Information
Zoom Virtual Conference for Online Participants
Pre-Function Area (2), Sheraton Hotel for Offline Participants

Technical Program

Rundown of International Electronics Symposium 2021
Date: Wednesday, September 29th, 2021
Time Zone: Local Time Jakarta (GMT + 7)
Venue: Sheraton Hotel, Surabaya
Wireless Technologies and Intelligent Systems for Better Human lives

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<tr><th>Time</th><th colspan="4">Wednesday, September 29th 2021</th></tr>
<tr><td>08.00 - 08.30</td><td colspan="4">Registration</td></tr>
<tr><td>08.30 - 09.00</td><td colspan="4">Opening Ceremony :
IES General Chairman: Mochammad Zen Samsono Hadi, Ph.D.,
IEEE Indonesia Section: Dr. Ing. Wahyudi Hasbi,
PENS Director: Alirido Barakbah, Ph.D.</td></tr>
<tr><td>09.00 - 10.30</td><td colspan="4">Keynote Speech I :
Prof. Minoru Okada (Japan),
Dr. Titon Dutono, M.Eng. (PENS),
Mr. Bayu Hanantasena (Indosat)
Moderator: Dr. I Gede Puja Astawa</td></tr>
<tr><td>10.30 - 10.45</td><td colspan="4">Coffee Break</td></tr>
<tr><td rowspan="3">10.45 - 12.15</td><td colspan="4">Parallel Session 01</td></tr>
<tr><td>Room I
IES-ETA 1:
Online Oral Presentation
(4 papers)</td><td>Room II
IES-ETA 2:
Online Oral Presentation
(6 papers)</td><td>Room III
IES-ETA 3:
Online Oral Presentation
(5 papers)</td><td>Room IV
IES-ETA 4:
Online Oral Presentation
(5 papers)</td></tr>
<tr><td>Room V
IES-KCIC 1:
Online Oral Presentation
(5 papers)</td><td>Preparing Ballroom #1</td><td>Preparing Ballroom #2</td><td>Preparing Ballroom #3</td></tr>
<tr><td>12.15 - 13.15</td><td colspan="4">Lunch</td></tr>
<tr><td rowspan="2">13.15 - 15.15</td><td colspan="4">Workshop Session & Parallel Session 02</td></tr>
<tr><td colspan="2">Room IV
(Offline)
Workshop
Hands-on Artificial Intelligence with Huawei Cloud AI Develop Platform - Modelarts by PT. Huawei Indonesia
(Mr. Randal Wang Feng)</td><td>Room V
(Offline)
Workshop
Hands-on Internet of Things with Antares Platform by PT. Telekomunikasi Indonesia
(Mr. Ibnu Alinursafa)</td><td>Ballroom #2
Poster Session
(18 posters)</td></tr>
</table>

<table>
<tr><th>Time</th><th colspan="4">Wednesday, September 29th 2021</th></tr>
<tr><td></td><td colspan="2">Ballroom #1 (Hybrid)
Workshop Panel Discussion on Artificial Intelligence & 5D Systems;
Moderator: Amang Sudarsono, Ph.D;
Panelist:
Prof. Yasushi Kiyoki
(Keio Univ.),
Dr. Virach Sonlertlamvanich
(Thammasat Univ.),
Dr. Shiori Sasaki
(Musashino Univ.),
Yasuhiro Hayashi, Ph.D
(Musashino Univ.),
Dr. Maja Pusnik
(The University of Maribor),
Prof. Dadet Pramadihanto (PENS),
Wahjoe Tjatur Sesuluhatien, PhD.
(PENS),
Dr. Sritrusta Sukaridhoto (PENS),
Dr. Tita Karlita (PENS)</td><td colspan="2">Ballroom #3 (Offline)
Workshop Panel Discussion on Internet of Things;
Moderator: Dr. Reesa Akbar;
Panelist:
Teguh Prasetya, M.T.
(PT. Alita Praya Mitra),
Andri Yadi
(PT. DycodeX Teknologi Nusantara),
Dr. I Gede Puja Astawa (PENS),
Dr. Agus Indra Gunawan & teams
(PENS),
Dr. Rahardhita Widyatra Sudibyo
(PENS)</td></tr>
<tr><td>15.15 - 15.45</td><td colspan="4">Coffee Break</td></tr>
<tr><td rowspan="2">15.45 - 17.00</td><td>Room I
IES-ETA 5:
Online Oral
Presentation
(4 papers)</td><td>Room II
IES-ETA 6:
Online Oral
Presentation
(5 papers)</td><td>Room III
IES-ETA 7:
Online Oral
Presentation
(5 papers)</td><td>Room IV
Workshop
Hands-on AI
(Continued)</td></tr>
<tr><td>Room V
Workshop
Hands-on IoT
(Continued)</td><td>Ballroom #1
IES-KCIC 2:
Online Oral
Presentation
(5 papers)</td><td>Ballroom #2
Poster Session
(Continued)</td><td>Ballroom #3
IES-KCIC 3:
Online Oral
Presentation
(5 papers)</td></tr>
</table>

Note for offline participants:

Room I: Sriwijaya Room I
Room II: Sriwijaya Room II
Room III: Jenggala Room
Room IV: Singasari Room
Room V: Kahuripan Room
VIP Room: Kalingga Room

Rundown of International Electronics Symposium 2021
Date: Thursday, September 30th, 2021
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Venue: Sheraton Hotel, Surabaya
Wireless Technologies and Intelligent Systems for Better Human lives

Time	Thursday, September 30th 2021			
08.00 - 09.00	Registration			
09.00 - 10.30	**Parallel Session 03**			
	Room I IES-ETA 8: Online Oral Presentation (4 papers)	**Room II** IES-ETA 9: Online Oral Presentation (5 papers)	**Room III** IES-ETA 10: Online Oral Presentation (4 papers)	**Room IV** IES-KCIC 4: Online Oral Presentation (5 papers)
	Room V IES-KCIC 5: Online Oral Presentation (5 papers)	**Ballroom #1** IES-KCIC 6: Online Oral Presentation (5 papers)	**Ballroom #2** IES-KCIC 7: Online Oral Presentation (5 papers)	**Ballroom #3** IES-KCIC 8: Online Oral Presentation (5 papers)
10.30 - 10.45	Coffee Break			
10.45 - 12.15	**Parallel Session 04**			
	Room I IES-ETA 11: Offline Oral Presentation (5 papers)	**Room II** IES-ETA 12: Offline Oral Presentation (4 papers)	**Room III** IES-ETA 13: Offline Oral Presentation (5 papers)	**Room IV** IES-ETA 14: Offline Oral Presentation (5 papers)
	Room V IES-ETA 15: Offline Oral Presentation (3 papers)	**Ballroom #1** IES-KCIC 9: Offline Oral Presentation (4 papers)	**Ballroom #2** No Session	**Ballroom #3** IES-KCIC 10: Offline Oral Presentation (3 papers)
12.15 - 14.15	Lunch and Preparing Ballroom			
14.15 - 15.45	**Keynote Speech II :** Prof. Dr.-Ing. Ulrich Rueckert (Germany), Dr. Denny Setiawan, ST. MT. (Ministry of Communication and Information Technology, Indonesia) **Moderator**: Dr. Arif Irwansyah			
15.45 - 16.00	Coffee Break			
16.00 -16.30	Closing Ceremony (Best Paper Award)			

Note for offline participants:

Room I: Sriwijaya Room I
Room II: Sriwijaya Room II
Room III: Jenggala Room
Room IV: Singasari Room
Room V: Kahuripan Room
VIP Room: Kalingga Room

Session : Parallel Session 01
Location : Room I
Moderator : Dr. Nu Rhahida Arini
Date : Wednesday, September 29th 2021
Track : Power Engineering and Energy Technology
Topic : IES-ETA 1

No	Time	Paper ID	Paper Title	Authors
1	10.45 - 11.00	1570732253	The Analysis of Blade Vibrations at a High Pressure Steam Turbine during Thermal Power Plant Start-up Condition	Zulkifli Al Rasyid Sampoerna, Nu Arini and Achmad Bahrul Ulum (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.00 – 11.15	1570732273	Digital Implementation of Space Vector PWM for Three Phase Inverter with Simplified C-Block PSIM Utilization	Muhammad Rizani Rusli (PT. Garda Energi Nasional Indonesia, Indonesia); Mochamad Ari Bagus Nugroho (Garda Energi Nasional Indonesia, PT., Indonesia); Mentari Putri Jati (Universitas Negeri Yogyakarta, Indonesia); Angga Wahyu Aditya (Polytechnic State of Balikpapan, Indonesia); Melinda Badriatul Fauziah (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Handri Toar (Politeknik Negeri Batam & Politeknik Elektronika Negeri Surabaya, Indonesia); Taufik Taufik (California Polytechnic State University, San Luis Obispo, USA)
3	11.15 – 11.30	1570732775	Combining Stand Alone PV Rooftop, Small Scale PHS, Rainfall Storage Systems for Increasing Electric Power Production based on Hybrid Pumping Technique	Akhmad Musafa (Institut Teknologi Sepuluh Nopember, Indonesia & Universitas Budi Luhur, Indonesia); Ardyono Priyadi (ITS, Indonesia); Vita Lystianingrum, Margo Pujiantara and Sjamsjul Anam (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	11.30 – 11.45	1570739089	Modeling and Simulation of PV System with Self Adaptive Differential Evolution Based MPPT Under Partial Shading Condition	Muhammmad Dliaul Haq (Politeknik Elektonika Negeri Surabaya, Indonesia); Evi Nafiatus Sholikhah, Novie Ayub Windarko and Diah Yanaratri (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 01
Location : Room II
Moderator : Iwan Syarif, Ph.D.
Date : Wednesday, September 29th 2021
Track : Electronics Systems and Electrics Technology
Topic : IES-ETA 2

No	Time	Paper ID	Paper Title	Authors
1	10.45 - 11.00	1570745416	Homecare and Hospital Stroke Therapy comparison using EEG analysis	Mi'rojful Mei Hartanti, Adhi Dharma Wibawa and Mauridhi Purnomo (Institut Teknologi Sepuluh Nopember, Indonesia)
2	11.00 – 11.15	1570748935	Development of nitrogen fertilization dose prediction on rice field based on leaf color chart	Alima Fahmi Rahmawati (Politeknik Elektronika Negeri Surabaya, Indonesia); Hendhi Hermawan, Rika Rokhana (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570750410	Intelligent System of Natural Disaster Victim Detection using Naïve Bayes Classifier	Agiel Fahreza Aliek, Mochammad Zen Samsono Hadi and Nur Mubtadai (Politeknik Elektronika Negeri Surabaya, Indonesia); Ahmad Zainudin (Kumoh National Institute of Technology, Korea (South))
4	11.30 – 11.45	1570750588	Improvement of Smoker Prediction System Based on Hyperspectral Image with Hybrid Deep Learning Model	Annisa Nuraini (University of Indonesia, Indonesia); Adhi Harmoko Saputro (Universitas Indonesia, Indonesia)
5	11.45 – 12.00	1570750871	Smart Parking System Based on Haar Cascade Classifier and SIFT Method	Rahmat Fauzi Yulianto, Arif Irwansyah, Niam Tamami (Politeknik Elektronika Negeri Surabaya, Indonesia)
6	12.00 – 12.15	1570751047	Determining Global Position from Local Position in Military Force Position Tracking Application	Muhammad Refa Utama Putra (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry, Hary Oktavianto (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 01
Location : Room III
Moderator : M. Udin Harun Al Rasyid, Ph.D.
Date : Wednesday, September 29th 2021
Track : Telecommunication Engineering Technology
Topic : IES-ETA 3

No	Time	Paper ID	Paper Title	Authors
1	10.45 - 11.00	1570738683	Evaluation of the PTS PAPR Reduction Technique with the Hammerstein-Wiener Predistortion Model in Amplify-and-Forward (AF), Decode-and-Forward (DF) Relaying Systems over Asymmetric Channels	Muhammad Naufal Saniar and Nabila Primaswari Anggraini (Politeknik Elektronika Negeri Surabaya, Indonesia); Arifin Arifin, Yoedy Moegiharto (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.00 – 11.15	1570738991	Performance of Joint PAPR Reduction Iterative Clipping and Filtering (ICF) and Predistortion in OFDM Systems Using Software Defined Radio	Abdurrahman Syarif (Politeknik Elektronika Negeri Surabaya, Indonesia); Arifin Arifin, Nihayatus Sa'adah, I Gede Puja Astawa and Yoedy Moegiharto (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570740506	Optimized wideband steerable antenna array using an 8x8 Butler matrix	Nadia Chater (National School of Applied Sciences, Morocco); Tomader Mazri (University of Ibntofail & ENSA Kenitra, Morocco); Mohammed Benbrahim (University Ibn Tofail, Kenitra Morocco); Anas Charkaoui (University Mohamed Ben Abdellah, Morocco)
4	11.30 – 11.45	1570748656	Implementation and Analysis of IoT Communication Protocols for Crowdsensing and Crowdsourcing in Health Application	Ata Amrullah, M. Udin Harun Al Rasyid, Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	11.45 – 12.00	1570754100	Harmful Interference Mitigation in Sub-10 MHz Aeronautical Allocation Band	Titon Dutono (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 01
Location : Room IV
Moderator : Dr. Bima Sena Bayu Dewantara
Date : Wednesday, September 29th 2021
Track : Robotics Technology and Control Systems
Topic : IES-ETA 4

No	Time	Paper ID	Paper Title	Authors
1	10.45 - 11.00	1570724517	Fork agv: estimation of combined magnetic sensor with vision guide applied on automatic mobile transporter for navigation and accurate positioning	Mohamad Nasyir Tamara (Politeknik Elektronika Negeri Surabaya & EEPIS, Indonesia); Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.00 – 11.15	1570732882	Ball Position Transformation with Artificial Intelligence Based on Tensorflow Libraries	Setiawardhana Setiawardhana and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Rudy Dikairono (Institut Teknologi Sepuluh Nopember, Indonesia); Afis Asryullah Pratama (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570743761	ROS Based Multi-Data Sensors Synchronization for Robot Soccer ERSOW	Khoirul Anwar, Iwan Kurnianto Wibowo, Bima Sena Bayu Dewantara, Mochamad Mobed Bachtiar and Muhammad Abdul Haq (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.30 – 11.45	1570748851	Vision-Based Positioning Estimation on the ERSOW Robot Soccer by Utilizing Unique Landmarks in the Field with a Computational Process using GPU	Rohmad Rifai, Mochamad Mobed Bachtiar and Iwan Kurnianto Wibowo (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	11.45 – 12.00	1570749197	Detecting Human Attendance using 1-Dimensional Foot Signal from Laser Range Sensor	Muhammad Dafa Geraldine Putra Malik, Bima Sena Bayu Dewantara and Dadet Pramadihanto (PENS, Indonesia)

Session : Parallel Session 01
Location : Room V
Moderator : Achmad Basuki, Ph.D.
Date : Wednesday, September 29th 2021
Track : Knowledge Base and Engineering
Topic : IES-KCIC 1

No	Time	Paper ID	Paper Title	Authors
1	10.45 - 11.00	1570739003	Text Mining in Healthcare for Disease Classification using Machine Learning Algorithm	Ghulam Asrofi Buntoro (Institut Teknologi Sepuluh Nopember & Universitas Muhammadiyah Ponorogo, Indonesia); Adhi Dharma Wibawa (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
2	11.00 – 11.15	1570749948	TraEx: Traditional Arts & Crafts Event Recommendation System with Lifetime Experience for Regional Revitalization	Leo Urata and Shiori Sasaki (Musashino University, Japan)
3	11.15 – 11.30	1570752272	User Experience Design for Virtual Exhibition Platform Using Lean Startup Method	Verent Flourencia Irene, Umi Saadah and Desy Intan Permatasari (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.30 – 11.45	1570736984	Implementation of SUMO Simulation for Comparison of CVRP	Yohanes Yohanie Fridelin Panduman, Sritrusta Sukaridhoto and Muhammad Agus Zainuddin (Politeknik Elektronika Negeri Surabaya, Indonesia); Rizqi Putri Nourma Budiarti (Universitas Nahdlatul Ulama Surabaya, Indonesia)
5	11.45 – 12.00	1570738517	Performance Analysis of Driver Abnormal Behavior Classification System Using Enhanced Multi-Layer Perceptron	Rizki Rachmadi, Amang Sudarsono and Tri Budi Santoso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 02
Location : Room I
Moderator : Dr. Nu Rhahida Arini
Date : Wednesday, September 29th 2021
Track : Power Engineering and Energy Technology
Topic : IES-ETA 5

No	Time	Paper ID	Paper Title	Authors
1	15.45 – 16.00	1570739302	Optimal Generation Scheduling Considering Distributed Generator for Cost Minimization based on Adaptive Modified Firefly Algorithm	Sujono Sujono (Department of Electrical Engineering Institut Teknologi Sepuluh Nopember Surabaya, Indonesia); Ardyono Priyadi (ITS, Indonesia); Margo Pujiantara and Sjamsjul Anam (Institut Teknologi Sepuluh Nopember, Indonesia); Naoto Yorino (Hiroshima University, Japan); Mauridhi Purnomo (Institut Teknologi Sepuluh Nopember, Indonesia)
2	16.00 – 16.15	1570749472	A 5 Watts Magnetic Resonance Wireless Power Transfer with Enhanced Transmission Distance Capability	C. Bambang Dwi Kuncoro (National Chin-Yi University of Technology, Taiwan); Tunggul Nugroho (Institut Teknologi Harapan Bangsa, Indonesia); Arvanida Feizal Permana (National Chin-Yi University of Technology, Taiwan)
3	16.15 – 16.30	1570751107	Mapping Detection Of DC Series Arc Fault Based on Fast Fourier Transform	Mochammad Zulfikar Trysnawan Nashrulloh, Eka Prasetyono and Dimas Okky Anggriawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.30 – 16.45	1570751156	Analysis The Effect of Inlet Duct and Transition Zone Angle Variations on Flow Characteristics and Heat Transfer on Vertical Type Heat Recovery Steam Generator	Ikhsan Mahardhika Utama, Fifi Hesty, Rif'ah Amalia and Setyo Nugroho (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS))

Session : Parallel Session 02
Location : Room II
Moderator : Dr. Arif Irwansyah
Date : Wednesday, September 29th 2021
Track : Robotics Technology and Control Systems
Topic : IES-ETA 6

No	Time	Paper ID	Paper Title	Authors
1	15.45 – 16.00	1570750142	Forward Kinematics with 7-DoF Full-Arm Analysis on "T-FLoW" 3.0 Humanoid Robot	Wirayuda Dewandhana (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & Robotics and Intelligence System Center(RoISC), Indonesia); Kevin Ilham Apriandy (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & EEPIS Robotics Research Centre (ER2C), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
2	16.00 – 16.15	1570750474	Color Based Object Segmentation on Wheeled Goalkeeper Robot	Rifqi Amalya Fatekha, Bima Sena Bayu Dewantara and Hary Oktavianto (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	16.15 – 16.30	1570750645	Fuzzy Social Force Model for Healthcare Robot Navigation and Obstacle Avoidance	Akhmad Thalibar Rifqi (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia); Bayu Sandi Marta (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	16.30 – 16.45	1570750737	Improved Damped Least Squares Inverse Kinematics with Joint limits for 7-DOF "T-FLoW" Humanoid Robot Manipulator	Muhammad Ramadhan Hadi Setyawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Bayu Sandi Marta (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	16.45 – 17.00	1570750793	ERISA Robot's Walking Trajectory Control using Pixy CMUcam5 to Locate the Target Position	Mawaddah Sekar Rahmawati and Arif Irwansyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry (Politeknik Elektronika Negeri Surabaya & Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Novian Fajar Satria and Dwi Kurnia Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Room III
Moderator : Dr. Mike Yuliana
Date : Wednesday, September 29th 2021
Track : Telecommunication Engineering Technology
Topic : IES-ETA 7

No	Time	Paper ID	Paper Title	Authors
1	15.45 – 16.00	1570749442	Implementation of Fuzzy Tsukamoto Algorithm on Smart Node Sensors for Air Quality Monitoring	Nurul Istiqomah, Mike Yuliana and Tri Budi Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	16.00 – 16.15	1570750223	Design of Covid-19 Tracing System based on Bluetooth Low Energy	Mochammad Fahmi Ali, Mochammad Zen Samsono Hadi and Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia); Hendy Briantoro (Okayama University, Japan)
3	16.15 – 16.30	1570750638	Gender Classification Based Speaker's Voice using YIN Algorithm and MFCC	Mirza Ardiana, Titon Dutono and Tri Budi Santoso (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	16.30 – 16.45	1570751043	An Improved Indoor RSSI Based Positioning System Using Kalman Filter and MultiQuad Algorithm	Rafina Destiarti Ainul (University of Surabaya, Indonesia); Susilo Wibowo, Djuwari Djuwari and Martin Siswanto (Universitas Surabaya, Indonesia)
5	16.45 – 17.00	1570751188	Design and Implementation of Smartphone-Controlled Programmable Audio Equalizer	Andi Mei Prasetyo Isworo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Ardik Wijayanto, Hary Oktavianto (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Ballroom #1
Moderator : Dr. M. Agus Zainuddin
Date : Wednesday, September 29th 2021
Track : Computational Intelligence
Topic : IES-KCIC 2

No	Time	Paper ID	Paper Title	Authors
1	15.45 – 16.00	1570739329	Comparison of Optical Flow Methods: Study About Left Ventricular Tracking in Multi View Echocardiographic Images	Mohamad Walid Asyhari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Riyanto Sigit and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Anwar Anwar (Kementerian Ketenagakerjaan, Indonesia)
2	16.00 – 16.15	1570748654	Emotion Recognition from Speech using Convolutional Neural Network and Combination of Four Speech Features	Yulistia Khoirotul Aini, Tri Budi Santoso and Titon Dutono (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	16.15 – 16.30	1570748680	Blood Cells Classification for Identification of Acute Lymphoblastic Leukemia on Microscopic Images Using Image Processing	Shelly Oktia Heriawati, Tri Harsono and Mochamad Mobed Bachtiar (Politeknik Elektronika Negeri Surabaya, Indonesia); Yetti Hernaningsih (Dr Soetomo General Academic Hospital, Indonesia)
4	16.30 – 16.45	1570749675	Employing Machine Learning with Optimized SVM Parameter to Detect Water Pipe Leakage	Kurniawan Saputra (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	16.45 – 17.00	1570750029	Automatic Detection of Retinal Diseases in Optical Coherence Tomography Images using Convolutional Neural Network	Arinal Haq, Arna Fariza and Nana Ramadijanti (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Ballroom #3
Moderator : Dr. Idris Winarno
Date : Wednesday, September 29th 2021
Track : Applied-Computing Sciences
Topic : IES-KCIC 3

No	Time	Paper ID	Paper Title	Authors
1	15.45 – 16.00	1570732458	Improving the accuracy of predicting disease risk scores using SOM clustering based on noisy feature	Endang Sri Rahayu (Institut Teknologi Sepuluh Nopember & Universitas Jayabaya, Indonesia); Eko Mulyanto Yuniarno (Institut Teknologi Sepuluh November, Indonesia); I Ketut Eddy Purnama (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
2	16.00 – 16.15	1570732557	Identifying Precautionary Measures for High-Risk Disease from Doctor's Answer Text Using LDA	Safitri Juanita (Institut Teknologi Sepuluh Nopember, Indonesia & Universitas Budi Luhur, Indonesia); Diana Purwitasari and I Ketut Eddy Purnama (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
3	16.15 – 16.30	1570732851	Development of Sandbox English Conversation Training Applications with Atomic Design	Reza Fauzi Augusdi (Politeknik Elektronika Negeri Surabaya, Indonesia); Andhik Ampuh Yunanto (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Desy Intan Permatasari (Politeknik Elektronika Negeri Surabaya, Indonesia); Aliv Faizal Muhammad (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	16.30 – 16.45	1570739601	Public Perception of COVID-19 Vaccine by Tweet Sentiment Analysis	Xuanzhou Yang (Musashino University, Japan); Virach Sornlertlamvanich (Thammasat University, Japan & Musashino University, Japan)
5	16.45 – 17.00	1570745792	A Heterogeneous Hybrid Cloud Storage Service Using Storage Gateway with Transfer Acceleration	Jamal Abdul Nasyir and Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 03
Location : Room I
Moderator : Dr. Prima Kristalina
Date : Thursday, September 30th 2021
Track : Telecommunication Engineering Technology
Topic : IES-ETA 8

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570751223	Implementation of RSSI Generated Channel Probing for Air Quality Monitoring System Based on LoRaWAN	Farel Juliansyah, Mochammad Zen Samsono Hadi and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570751794	Key Agreement Algorithm for V2I Communication Based on Differential Technique	Rachmadani Yusuf Pratama (Politeknik Elektronika Negeri Surabaya & Nexwave, Indonesia); Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia); Aries Pratiarso (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
3	09.30 – 09.45	1570751861	Particle Swarm Optimization Based UHF Band Rectangular Loop Antenna for Unmanned Aerial Vehicle Application	Mohamad Ridwan (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Farida Gamar and Maretha Ruswiansari (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570736189	An Implementation of Secure Vehicle-to-Vehicle Communication Using Shared Key Generation with Kano Method	Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Room II
Moderator : Dr. Reesa Akbar
Date : Thursday, September 30th 2021
Track : Robotics Technology and Control Systems
Topic : IES-ETA 9

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570750826	Improvement of the Processing Speed of The Robot's Vision System Using Robot Operating System	Erna Alfi Nurrohmah, Iwan Kurnianto Wibowo, Mochamad Mobed Bachtiar and Muhammad Mukhtarul Lathief (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570750884	A Development of Mobile Robot Based on ROS2 for Navigation Application	Phuwanat Phueakthong and Jittima Varagul (Suranaree University of Technology, Thailand)
3	09.30 – 09.45	1570750917	Walking Gait Learning for T-FLoW Humanoid Robot Using Rule-Based Learning	Faiz Ulurrasyadi (PENS, Indonesia); Raden Sanggar Dewanto (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
4	09.45 – 10.00	1570751038	Quadruped Robot Balance Control For Stair Climbing Based On Fuzzy Logic	Alvin Teguh Budi Antok, Adytia Darmawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Ali Husein Alasiry, Hendhi Hermawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Aldifa Julian and Ibnu Kresno Wibowo (Politeknik Elektronika Negeri Surabaya); Eko Henfri Binugroho, Bayu Sandi Marta and Andre Faqih Ilham Suparman (Politeknik Elektronika Negeri Surabaya, Indonesia)

No	Time	Paper ID	Paper Title	Authors
5	10.00 – 10.15	1570751094	Implementation of IMU-based Balanced Motion using ROS for EROS Humanoid Soccer Robot	Muhammad Yahya Indranuddin Muhammad Yahya Indranuddin and Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Eru Puspita, Ali Husein Alasiry, Choirul Anwar Maulana and Rizky Alfadin (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Room III
Moderator : Dr. Setiawardhana
Date : Thursday, September 30th 2021
Track : Robotics Technology and Control Systems
Topic : IES-ETA 10

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570751136	FLoW-Vision: Object Recognition and Pose Estimation System based on Three-Dimensional (3D) Computer Vision	Vardyansyah Cahya Pratama Harsetya Putra (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & Robotics and Intelligent System Center (RoISC), Indonesia); Kevin Ilham Apriandy (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & EEPIS Robotics Research Centre (ER2C), Indonesia); Dadet Pramadihanto and Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570751183	Walking Trajectory Control for Humanoid Dancing Robot ERISA based on Field Guardrail	Prishandy Hamami Amrulloh, Ali Husein Alasiry and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Ardik Wijayanto, Novian Fajar Satria and Dwi Kurnia Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	09.30 – 09.45	1570751979	Position and Orientation Control of Three Wheels Swerve Drive Mobile Robot Platform	Eko Henfri Binugroho and Yudha Sadewa (Politeknik Elektronika Negeri Surabaya, Indonesia); Prishandy Hamami Amrulloh and Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570752184	Wall Following and Obstacle Avoidance Control in Roisc-v1.0 (Robotic Disinfectant) using Behavior Based Control	Yudha Sadewa and Eko Henfri Binugroho (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto, Achmad Fauzi and Agung Purwanto (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Room IV
Moderator : Dr. Tita Karlita
Date : Thursday, September 30th 2021
Track : Computational Intelligence
Topic : IES-KCIC 4

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570750627	Mobile Based Offline Handwritten Signature Forgery Identification using Convolutional Neural Network	Lu'lu'il Ayunin Fakhiroh, Arna Fariza and Arif Basofi (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570750974	Smart Odontogram: Dental Diagnosis of Patients Using Deep Learning	Excel Daris Fadhillah, Pravasta Caraka Bramastagiri, Riyanto Sigit, Sritrusta Sukaridhoto and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Arya Brahmanta (Universitas HangTuah Surabaya, Indonesia)
3	09.30 – 09.45	1570750977	Intersection Cylindrical Feature Recognition Algorithm for Counterbore and Countersink Geometry Application	Yogi Muldani Hendrawan (Politeknik Manufaktur Bandung); Rian Muttaqin, Andri Pratama and Herman Budi Harja (Politeknik Manufaktur Bandung, Indonesia); M. Udin Harun Al Rasyid and Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570751002	Recognition of Food Material and Measurement of Quality using YOLO and WLD-SVM	Bima Sena Bayu Dewantara, Azifah Devy, Mochamad Mobed Bachtiar and Setiawardhana Setiawardhana (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	10.00 – 10.15	1570751241	Multi-Class Image Classification Based on MobileNetV2 for Detecting the Proper Use of Face Mask	Rika Rokhana (Politeknik Elektronika Negeri Surabaya, Indonesia); Wiwiet Herulambang (Universitas Bhayangkara Surabaya, Indonesia); Rarasmaya Indraswari (Institut Teknologi Sepuluh Nopember, Indonesia)

Session : Parallel Session 03
Location : Room V
Moderator : Dr. Rika Rohana
Date : Thursday, September 30th 2021
Track : Intelligent Multimedia Systems
Topic : IES-KCIC 5

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570747989	Design And Development of Human Anatomy Learning Platform for Medical Students Based On Augmented Intelligence Technology	Evianita Dewi Fajrianti 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); Ilham Achmad Al Hafidz and Naufal Adi Satrio (Politeknik Elektronika Negeri Surabaya, Indonesia); Ardiman Firmanda (Politeknik Elektronika Negeri Surabaya & Politeknik Negeri Batam, Indonesia)
2	09.15 – 09.30	1570749355	Animation of Mathematics Learning For Vocational High School About Geometry Transformation Using Participatory Design	Elisa Willy Santoso, Widi Sarinastiti and Irma Wulandari (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	09.30 – 09.45	1570749426	PIECES Framework Method To Measure The Effectiveness Of Obesity Explainer Animation Videos	Zakiyyatul Miskiyyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Widi Sarinastiti and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570750630	A Color and Composition-based Image Retrieval System by Image-Query Drawing Method with Color-Impression Database	Himawari Otsuka, Yasuhiro Hayashi and Yasushi Kiyoki (Musashino University, Japan)

No	Time	Paper ID	Paper Title	Authors
5	10.00 – 10.15	1570750850	Design of Collaborative WebXR for Medical Learning Platform	Ilham Achmad Al Hafidz and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Rizqi Putri Nourma Budiarti, Rachma Rizqina Mardhotillah and Rizki Amalia (Universitas Nahdlatul Ulama Surabaya, Indonesia); Evianita Dewi Fajrianti and Naufal Adi Satrio (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Ballroom #1
Moderator : Dr. Eng. Hary Oktavianto
Date : Thursday, September 30th 2021
Track : Applied-Computing Sciences
Topic : IES-KCIC 6

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570745894	Development of Vulnerable Web Application Based on OWASP API Security Risks	Muhammad Idris (Politeknik Negeri Batam, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Idris Winarno (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570748970	Classification of Colon Polyp on Endoscopic Image Using Support Vector Machine	Nova Angelia Eriyanti, Riyanto Sigit and Tri Harsono (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	09.30 – 09.45	1570749343	Classification of Brain Tumor on Magnetic Resonance Imaging Using Support Vector Machine	Uswatun Hasanah, Riyanto Sigit and Tri Harsono (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570749762	Data Analytics for Medical Record Data of Covid-19 Patient with Descriptive & Predictive Mining	Alvintha Maharani Hanafiah and Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia); Tita Karlita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Tri Hadiah Muliawati (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	10.00 – 10.15	1570749955	Source-Oriented POV Visualization for Multidimensional Analysis of International Conflicts and Terrorist Incidents with 5D World Map System	Shiori Sasaki and Yuto Miyamoto (Musashino University, Japan)

Session : Parallel Session 03
Location : Ballroom #2
Moderator : Riyanto Sigit, Ph.D.
Date : Thursday, September 30th 2021
Track : Applied-Computing Sciences
Topic : IES-KCIC 7

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570749961	Implementation of Liquid Animation Techniques for Developing Renewable Energy Motion Graphics	Anisa Rayinda Sari, Hestiasari Rante and Nu Arini (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570750109	Animated Video Using Duik Bassel Rigging Toolset on Tuberculosis Education	Gallan Romansyah Putra, Hestiasari Rante and Moh Hasbi Assidiqi (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	09.30 – 09.45	1570750199	Formalin Fish Detection System Based on Digital Image Processing	Ika Roikhanah, Tri Harsono and Heny Yuniarti (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	09.45 – 10.00	1570750200	Glaucoma Detection Based on Cup-to-Disc Ratio in Retinal Fundus Image Using Support Vector Machine	Dinda Ayu Yunitasari, Riyanto Sigit and Tri Harsono (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	10.00 – 10.15	1570750231	Animated Company Profile Video Using Puppet Pin Rigging for Character Movement	Winalda Rachmawan, Hestiasari Rante and Muhammad Agus Zainuddin (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Ballroom #3
Moderator : Sritrusta Sukaridhoto, Ph.D.
Date : Thursday, September 30th 2021
Track : Applied-Computing Sciences
Topic : IES-KCIC 8

No	Time	Paper ID	Paper Title	Authors
1	09.00 - 09.15	1570750646	Portable Device-Based Medical Service System for DICOM To PNG Conversion	Yudha Dewansyah Putra, Riyanto Sigit and Heny Yuniarti (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	09.15 – 09.30	1570750787	Action Recognition with Spatiotemporal Analysis and Support Vector Machine for Elderly Monitoring System	Mahaputra Ilham Awal, Luqmanul Hakim Iksan, Rizky Zull Fhamy, Dwi Kurnia Basuki and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); Kazuyoshi Wada (Tokyo Metropolitan University, Japan)
3	09.30 – 09.45	1570750840	Media Information of Generalized Anxiety Disorder in Adolescent Through Animation Explainer	Sherina Kusuma Putri and Widi Sarinastiti (Politeknik Elektronika Negeri Surabaya, Indonesia); Citra Murdaningtyas (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
4	09.45 – 10.00	1570750889	Vulnerability Mapping of Toddler Pneumonia in East Java, Indonesia, Using the K-medoids Clustering Algorithms	Linda Lailatus Sa'idah (Politeknik Elektonika Negeri Surabaya, Indonesia); Arif Basofi and Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	10.00 – 10.15	1570751187	Spatial Mapping of Tubercolusis Vulnerability in Tuban District, Indonesia, Using Hierarchical Clustering	Amalia Kusumaningtyas, Arif Basofi and Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 04
Location : Room I
Moderator : Dr. Prima Kristalina
Date : Thursday, September 30th 2021
Track : Power Engineering and Energy Technology
Topic : IES-ETA 11

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570732546	Modified Critical Trajectory Algorithm to Determine the Critical Clearing Time for Unbalanced Fault	Isa Hafidz (Institut Teknologi Sepuluh Nopember, Indonesia); Ardyono Priyadi (ITS, Indonesia); Margo Pujiantara and Sjamsjul Anam (Institut Teknologi Sepuluh Nopember, Indonesia); Naoto Yorino (Hiroshima University, Japan); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
2	11.00 – 11.15	1570750224	Numerical Study Analysis of The Effect of Trailing Edge Thickness of Low-Pressure Steam Turbine Stator on Steam Condensation	Gilang Muhammad, Lohdy Diana and Achmad Bahrul Ulum (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570750426	Thermal Characteristics of Tube Economizer with Serrated Fin	Aldila Sukarno Putri, Rif'ah Amalia (Politeknik Elektronika Negeri Surabaya, Indonesia); Teguh Hady Ariwibowo, Fifi Hesty (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.30 – 11.45	1570750664	Design of Steam Power Plant Condenser Machine Maintenance Using RCM (Reliability Centered Maintenance) Methods with RCPS Implementation	Alif Wahyu Syahnanda and Prima Dewi Permatasari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Hendrik Elvian Gayuh Prasetya (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	11.45 – 12.00	1570750844	Experimental Analysis of Artificial Equilateral Triangle Solar Air Heater Using Zig-zag Channel	Arrad Ghani Safitra, Lohdy Diana, Fifi Hesty and Cantika Putri Rahayu (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 04
Location : Room II
Moderator : Dr. Reesa Akbar
Date : Thursday, September 30th 2021
Track : Electronics Systems and Electrics Technology
Topic : IES-ETA 12

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570751224	Numerical Analysis of a Shell and Tube Heat Exchanger Using Computational Fluid Dynamics Software	Rudi Gustian Simangunsong (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Rif'ah Amalia (Politeknik Elektronika Negeri Surabaya, Indonesia); Dendy Satrio (Institut Teknologi Sepuluh Nopember, Indonesia)
2	11.00 – 11.15	1570739178	Early Detection of Cow Pregnancy Based on Volume Control of Cow Urine Using Fuzzy Logic Method	Novita Isnainin Darma Arshad (Politeknik Elektronika Negeri Surabaya, Indonesia); Kemalasari M Syah (Indonesia, Indonesia); Eru Puspita (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
3	11.15 – 11.30	1570749515	Electronic Speed Controller with Fuzzy Logic and Load Cell for Electric Skateboard	Zainul Abidin and Taufik Soesilo (Universitas Brawijaya, Indonesia); Rusmi Ambarwati (University of Brawijaya, Indonesia)
4	11.30 – 11.45	1570749829	Covid-19 Symptom Detection System in Public Area using Fuzzy Logic Method	Abdillah S. Nursam (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 04
Location : Room III
Moderator : Dr. Setiawardhana
Date : Thursday, September 30th 2021
Track : Telecommunication Engineering Technology
Topic : IES-ETA 13

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570739030	High Gain Microstrip Square Patch Array Antenna 4 x 4 Elements 2.3 GHz for 5G Communication in Indonesia	Budi Aswoyo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Anggara H Putra (Trenggalek, Indonesia)
2	11.00 – 11.15	1570739039	Application of Joint PAPR Reduction and Predistortion Technique in AF Relaying System with Relay Selection Strategy	Annisa Anggun Puspitasari, Ummi Ainun Nadhiroh, Mareta Dwi Nor Habibah and Galuh Setya Palupi (Politeknik Elektronika Negeri Surabaya, Indonesia); Mohamad Ridwan, Yoedy Moegiharto (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570739094	Performance of a Joint PAPR Reduction Clipping and Filtering (CF) Scheme and Predistortion Techniques in Amplify and Forward (AF) Relaying System with Relay Selection Strategy	Mareta Dwi Nor Habibah, Galuh Setya Palupi, Annisa Anggun Puspitasari and Ummi Ainun Nadhiroh (Politeknik Elektronika Negeri Surabaya, Indonesia); Mohamad Ridwan, Yoedy Moegiharto (Politeknik Elektronika Negeri Surabaya, Indonesia)
4	11.30 – 11.45	1570739593	Analysis of Key Generation Which Extracted from RSS for Handover System in V2I Communication	Isna Yaumirrahma Saniyyah and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia); Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
5	11.45 – 12.00	1570750023	Students Trajectory Pattern Finding Scheme Based on RSSI Geolocation as a Part of Smart Campus	Restry Ridha Hastari and Mike Yuliana (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 04
Location : Room IV
Moderator : Dr. Tita Karlita
Date : Thursday, September 30th 2021
Track : Telecommunication Engineering Technology
Topic : IES-ETA 14

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570751955	Network Performance Evaluation of Container Server-based LoRaWAN IoT for Field Worker Monitoring System	Gerda Iswari, Rahardhita Sudibyo and Haryadi Amran Darwito (Politeknik Elektronika Negeri Surabaya, Indonesia); Md Manowarul Islam (Jagannath University, India)
2	11.00 – 11.15	1570751957	Design of Weight and Height Measurement System Based Wireless Communication	Sifaul Warohmatulilla (Politeknik Elektronika Negeri Surabaya, Indonesia); Haniah Mahmudah (EEPIS, Indonesia); Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570751970	A Smart Water Reservoir Control System for IoT Smart Environment	Farah Maulidina, Haryadi Amran Darwito and Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia); Mohamad Ridwan (Politeknik Elektronika Negeri Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia)
4	11.30 – 11.45	1570751110	Wireless Sensor Network for Battery Monitoring Uses Head Clustering Method and Sleep Scheduling	Muhammad Adamu Islam, Mochammad Zen Samsono Hadi and Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
5	11.45 – 12.00	1570751104	Energy Efficiency with Sleep Schedule for SAR Team Communication	Mohammad Alfi Rizzi and Mochammad Zen Samsono Hadi (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 04
Location : Room V
Moderator : Dr. Rika Rohana
Date : Thursday, September 30th 2021
Track : Robotics Technology and Control Systems
Topic : IES-ETA 15

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570730971	Simulation of Robot Swarm Cooperation using V-REP Simulator: Case Study Mobile Trash Bin Robot	Bima Sena Bayu Dewantara, Setiawardhana Setiawardhana and Bayu Sandi Marta (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.00 – 11.15	1570744399	3D Object Detection and Recognition Based on RGBD Images for Healthcare Robot	Ikmalil Birri (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS) & Robotics and Intelligence System Center (RoISC), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
3	11.15 – 11.30	1570750547	Development of Visual Data Acquisition Systems of Household Objects	Muhammad Attamimi (Institut Teknologi Sepuluh Nopember, Indonesia); Kelvin Liusiani (Institute Technology of Sepuluh Nopember, Indonesia); Astria Nur Irfansyah, Djoko Purwanto and Rudy Dikairono (Institut Teknologi Sepuluh Nopember, Indonesia)

Session : Parallel Session 04
Location : Ballroom #1
Moderator : Dr. Eng. Hary Oktavianto
Date : Thursday, September 30th 2021
Track : Computational Intelligence
Topic : IES-KCIC 9

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570740212	BiLSTM-CNN Hyperparameter Optimization for Speech Emotion and Stress Recognition	Agustinus Bimo Gumelar (Institut Teknologi Sepuluh Nopember, Indonesia); Eko Mulyanto Yuniarno (Institut Teknologi Sepuluh November, Indonesia); Derry Pramono Adi (Universitas Narotama, Indonesia); Adri Gabriel Sooai (Universitas Katolik Widya Mandira, Indonesia); Indar Sugiarto (University of Manchester, United Kingdom (Great Britain)); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
2	11.00 – 11.15	1570748841	Performance Enhancement of Multi-Camera Handoff Scheme using ANFIS Method	Atik Apprinda Paramita (Politeknik Elektronika Negeri Surabaya, Indonesia); Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia)
3	11.15 – 11.30	1570749500	Comparison of Neural Network and Random Forest Classifier Performance on Dragon Fruit Disease	Anita Jaquiline Lado and Adri Gabriel Sooai (Universitas Katolik Widya Mandira, Indonesia); Paulina Aliandu (Widya Mandira Catholic University, Indonesia); Yovinia Siki, Natalia Magdalena Rafu Mamulak, Paskalis Andrianus Nani, Sisilia Mau, Patrisius Batarius, Frengky Tedy, Emerensiana Ngaga, Alfry Aristo Jansen SinlaE and Emiliana Metan Meolbatak (Universitas Katolik Widya Mandira, Indonesia); Yulianti Paula Bria (Monash University, Australia); Nurul Zainal Fanani (Politeknik Negeri Jember, Indonesia); Umi Laili Yuhana and Agustinus Bimo Gumelar (Institut Teknologi Sepuluh Nopember, Indonesia)

No	Time	Paper ID	Paper Title	Authors
4	11.30 – 11.45	1570750880	Monitoring Violations of Social Distancing COVID-19 On Standing Queues with Euclidean Distance Method	Indira Ayu Puspita and Reesa Akbar (Politeknik Elektronika Negeri Surabaya, Indonesia); Arif Irwansyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)

Session : Parallel Session 04
Location : Ballroom #3
Moderator : Sritrusta Sukaridhoto, Ph.D.
Date : Thursday, September 30th 2021
Track : Applied-Computing Sciences
Topic : IES-KCIC 10

No	Time	Paper ID	Paper Title	Authors
1	10.45 – 11.00	1570752016	Design and Implementation of Real-time Pothole Detection using Convolutional Neural Network for IoT Smart Environment	Ilham Dwi Pratama (Politeknik Elektronika Negeri Surabaya, Indonesia); Haniah Mahmudah (EEPIS, Indonesia); Rahardhita Sudibyo (Politeknik Elektronika Negeri Surabaya, Indonesia)
2	11.00 – 11.15	1570748937	Development of Text Classification Based on Difficulty Level in Adaptive Learning System using Convolutional Neural network	Imamah Imamah (Institut of Technology Sepuluh Nopember, Indonesia); Arif Djunaidy and Umi Laili Yuhana (Institut Teknologi Sepuluh Nopember, Indonesia); Mauridhi Hery Purnomo (Institut of Technology Sepuluh Nopember, Indonesia)
3	11.15 – 11.30	1570752117	Distributed Online Computer-Based Test System for English Exam	Muhajirin Ida Ilyas (Politeknik Elektronika Negeri Surabaya & PT. Digital Entropy Venture, Indonesia); Wiratmoko Yuwono, Idris Winarno and Akhmad Alimudin (Politeknik Elektronika Negeri Surabaya, Indonesia)

Poster Exhibition Session IES 2021

Location: Ballroom #2, Sheraton Hotel

No	Author	Title
1	Andi Afief Akbar Ashariansyah, Nu Rhahida Arini, Achmad Bahrul Ulum	Numerical Analysis of Centrifuge Pump Impellers to Improve the Feedwater Pump Efficiency
2	Anggara Hadhy Putra, Budi Aswoyo	High Gain Microstrip Square Patch Array Antenna 4x4 Elements 2.3 GHz for 5G Communication in Indonesia
3	Dimas Okky Anggriawan, Endro Wahjono, Indhana Sudiharto, Aji Akbar Firdaus, Dianing Novita Nurmala Putri, Anang Budikarso	Identification of Short Duration Voltage Variations Based on Short Time Fourier Transform and Artificial Neural Network
4	Dimas Okky Anggriawan, Mochammad Zulfikar T. Nashrullah, Eka Prasetyono	Mapping Detection of DC Series Arc Fault Based on Fast Fourier Transform
5	Luqmanul Hakim Iksan, Mahaputra Ilham Awal, Rizky Zull Fhamy, Dwi Kurnia Basuki, Sritrusta Sukaridhoto, Kazuyoshi Wada	Action Recognition Platform for Monitoring Elderly Dementia Patients
6	Elisa Willy Santoso, Widi Sarinastiti, Irma Wulandari	Animation of Mathematics Learning for Vocational High School About Geometry Transformation Using Participatory Design
7	Haniah Mahmudah, Okky Puspitorini, Ari Wijayanti, Nur Adi Siswandari	Activity Detection System for Driving Safety Support Intelligent Transportation System
8	Hestiasari Rante, Cahya Miranto	Development of Interactive Virtual Reality Platform for Batik Exhibition
9	Indra Ferdiansyah, Era Purwanto, Arif Sudaryanto, HANAMOTO Tsuyoshi	V/Hz SVPWM Inverter for Speed Control AC Motor Drive
10	Khoirul Anwar, Iwan Kurnianto Wibowo, Bima Sena Bayu Dewantara, Mochamad Mobed Bachtiar, Muhammad Abdul Haq	Multi-Data Sensors Synchronization in Robot Soccer ERSOW
11	Mochamad Mobed Bachtiar, Fernando Ardilla, Abdi Alghifara Felinanda	Simple Communication UAV Using GCS Android Based
12	Moh. Zikky, Kholid Fathoni, Miftakhul Firdaus, Ashafidz Fauzan Dianta	Virtual Reality Simulator for Cardiopulmonary Resuscitation (CPR) as Lifesaving Method in Many Emergencies Patients
13	Nofria Hanafi, Ni'am Tamami, Eko Budi Utomo	Design of Talon V Tail Unmanned Aerial Vehicle Earo PENS for Optimizing Maneuvering of UAV Aircraft on 8 Trajectory Model

No	Author	Title
14	Novita Astin, Andika adinul Yahya, Elvina Faisa Rahma	Development of Digital Advertisement Console
15	Rahardhita Widyatra Sudibyo	Pothole Detection System for Roads with LoRa Communication for Smart Cities
16	Verent Flourencia Irene, Umi Sa'adah, Desy Intan Permatasari, Maulidan Bagus Afridian Rasyid	User Experience Design for Virtual Exhibition Platform Using Lean Startup Method
17	Ari Wijayanti, Okkie Puspitorini, Nur Adi Siswandari, Haniah Mahmudah	Automatic Ship Queue Management System To Support Intelligent Ports Based on IoT (Internet of Thing)
18	Rosiyah Faradisa, Moh Hasbi Assidiqi, Dwi Susanto	Evaluating User Experience of Enterprise Technology Hybrid Online Learning (ETHOL) using System Usability Scale (SUS) and User Experience Questionnaire (UEQ)

Keynote Speaker 1

Prof. Minoru Okada

Graduate School of Information Science,
Nara Institute of Science and Technology
Nara, Japan.

Profile:

Minoru Okada received B.E. degree in communications engineering from the University of Electro-Communications, Tokyo, Japan, in 1990. He received the M.E and Ph.D. degrees in communications engineering from Osaka University, Osaka, Japan, in 1992 and 1998, respectively. From 1993 to 2000, he was a Research Associate at Osaka University. From 1999 to 2000, he was a Visiting Research Fellow at the University of Southampton, U.K. In 2000, he joined the Graduate School of Information Science, Nara Institute of Science and Technology, Nara, Japan, as an Associate Professor and became a Professor in 2006. His research interest is wireless communications, including WLAN, digital broadcasting, and satellite communications. Dr. Okada is a member of the Institute of Image, Information, and Television Engineers of Japan (ITEJ), the Institute of Television Engineers of Japan, the Institute of Electrical, Information, and Communication Engineers of Japan (IEICE), and the Information Processing Society of Japan (IPSJ). He received the Young Engineer Award from IEICE in 1999.

Keynote Speech:

Title:
Wireless Power Transfer (WPT) for future vehicle and transportation systems

Abstract:
Users can share private and public transportation services for mobility instead of using personally provided transportation services. Thus, it could solve the current transportation problems such as traffic congestions and CO2 emissions. Wireless power transfer (WPT) and IoT (Internet of Things) are keys to establishing MaaS (Mobility as a Service). WPT is capable of providing contact-less power supply to (Internet of Things) IoT devices and battery charging for moving electric vehicles (EV). However, current WPT systems based on near-field coupling have problems in their limitation in the receiver positions and the power transfer efficiency. This presentation introduces WPT with multiple transmitters and receivers, or a multiple-input-multiple-output (MIMO) WPT system for solving the mobility and efficiency problems in the current WPT systems. Since the proposed MIMO-WPT system deploys multiple transmitters over the area of interest, it can expand the mobility limitation. On the other hand, WPT using multiple transmitters and receivers could reduce the power transfer efficiency due to mutual coupling. We can solve this mutual coupling problem by optimizing the impedance-matching circuit. As a result, the proposed MIMO-WPT system achieves higher power transfer efficiency than the conventional single transmitter and receiver-based WPT systems.

Keynote Speaker 2

Prof. Dr.-Ing. Ulrich Rückert

Bielefeld University
Faculty of Technology
Cognitronics and Sensor Systems

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Profile:

Ulrich Rückert received the Diploma degree in Computer Science and a Dr.-Ing. degree in Electrical Engineering from the University of Dortmund, Germany, in 1984 and 1989, respectively. From 1985 to 1992 he worked on microelectronic implementation of neural networks at the Faculty of Electrical Engineering (University of Dortmund). From 1993 to 1994 he was Professor at the Technical University of Hamburg-Harburg, Germany, heading a research group on Microelectronics. In 1995 he joined the Heinz Nixdorf Institute at the University of Paderborn, Germany. As a Full Professor he was head of the research group ''System and Circuit Technology''. The group was working on innovative circuit design and development of microelectronic systems for massive-parallel and resource-efficient information processing. From 2001 to 2014 he was Adjunct Professor of the Faculty of Information Technology, Queensland University of Technology, Brisbane, Australia. In 2008 he received the first Innovation Award of Northrhine-Westphalia, Germany (together with his colleague Prof. Noé). Since 2009 he is Professor at Bielefeld University, Germany. His research group "Cognitronics and Sensor Systems" is member of the "Cognitive Interaction Technology – Cluster of Excellence". His main research interests are now neuromorphic nano-architectures, embedded systems, and cognitive robotics. He has authored or coauthored more than 250 journal and conference publications.

Keynote Speaker 2

Keynote Speech:

Title:
Cognitronics: Resource-efficient Architectures for Cognitive Systems

Abstract:
Abstract: Mapping brain-like structures and processes into electronic substrates has recently seen a revival with the availability of deep-submicron CMOS technology. The basic idea is to exploit the massive parallelism of such circuits and to create low power and fault-tolerant information-processing systems. Aiming at overcoming the big challenges of deep-submicron CMOS technology (power wall, reliability, and design complexity), bio-inspiration offers alternative ways to (embedded) artificial intelligence. The challenge is to understand, design, build, and use new architectures for nanoelectronic systems, which unify the best of brain-inspired information processing concepts and of nanotechnology hardware, including both algorithms and architectures. This talk will give an overview of our experiences in designing brain-inspired architectures for nanoelectronics.

Keynote Speaker 3

Dr. Ir. Titon Dutono, M.Eng

Department of Telecommunications Engineering,
Politeknik Elektronika Negeri Surabaya
Surabaya, Indonesia

Profile:

Titon Dutono was born in Surabaya, Indonesia, in 1960. He received a B.S. degree in telecommunication engineering from Sepuluh Nopember Institute of Technology, Surabaya, Indonesia in 1985, Master and Doctor of Engineering degrees in electrical engineering and computer science from Kumamoto University, Kumamoto, Japan in 1994 and 1997, respectively. From 2002 to 2008, he was a Principal of the Electronics Engineering Polytechnics Institute of Surabaya (EEPIS). From 2008 to 2016, he has been appointed as Deputy Director-General for Spectrum Policy and Planning, Ministry of Communication and Information Technology, Republic of Indonesia. He also in charge as the head of the Indonesian delegation during the ITU regulatory meeting in Genève and other venues. Since 2017 he came back to the campus as an associate professor in the Electrical Engineering Department of EEPIS. He is a member of IEEE – Education Society. He is also very active in International Amateur Radio Union (IARU) as the coordinator of the radiofrequency monitoring system IARU Region 3. His topics of interest are signal processing, radio communication, telecommunication regulation, and teaching methodology.

Keynote Speech:
Title:
Harmful Interference Mitigation in Sub-10 MHz Aeronautical Allocation Band

Abstract:
Wireless telecommunication needs spectrum frequency to convey information ubiquitously. Meanwhile, during a radio communication system deployment, harmful interference is a matter that should be avoided or at least to be mitigated because it causes degradation of the radio performance. Each particular spectrum frequency band has the thread of interference that comes from neighborhood service emitting radio waves based on improper manner. The interference sources could come from intentional activity or unintentional activity. In this paper, we will discuss an acute case of interference in sub-10 MHz of the Aeronautical Allocation Band that is pirated by traditional fishermen during their fishing activity in the Java sea in which an area of high density traditionally fishery activity. In this discussion, we propose a fundamental mitigation action to the Administration to avoid more destructive results, by giving a system called two ways radio simplex by using a 5.2 MHz/VHF-UHF crossband radio communication system. The Administration agrees to carry out POC (Prove of Concept) activity by this fiscal year.

Keynote Speaker 4

Dr. Denny Setiawan, ST. MT.

Deputy Director General for Spectrum Policy and Planning,
Ministry of Communication and Information Technology,
Republic of Indonesia

Profile:

Denny Setiawan, born in Ciamis, West Java (1971), holds the position of Director of Spectrum Policy and Planning, Directorate General of Resources and Standard, Ministry of Communications and Informatics since January 2018.

Dr. Denny Setiawan graduated from Bandung Institute of Technology (ITB, 1994), majoring in Electronic Telecommunication Engineering, MSc of Telecommunication Engineering from University of Indonesia in 1999, and Doctor of Engineering from University of Indonesia in February 2013.

Since joining the office in 1995, Dr. Setiawan has involved in various cooperative relationship which includes satellite and frequency co-ordination, and also international forum. Moreover, he has been also involved in the group on formulating the spectrum policy and planning of 5G, IoT, Satellite, Wireless Broadband and Digital Broadcasting in Indonesia. In international forum, he successfully led the Indonesian Delegation in WRC-19 in Sharm el Sheik, Egypt to extend the regulatory period of 3 satellite filings in Indonesia.

In organization activities, since year 2015 Dr. Setiawan is becoming a Vice Chair of Policy and Regulation Section on BKE PII (The Institution of Engineers Indonesia, Electro Technic Section) and Vice Chair of Government Relations on IEEE Indonesia Section. Since year 2017, he is becoming a Vice Chair of Government Relations on IAE ITB (Electrical Alumnae League Bandung Institute of Technology).

Dr. Setiawan is also has becoming lecture in University Mercu Buana on policy and regulation of telecommunication issues since year 2013. He has been a guest lecturer in postgraduate telecommunications management at University of Indonesia year 2013-2017.

Keynote Speaker 4

Keynote Speech:
Title:
Policies and Regulations in Digital Transformation Era

Abstract:
The world today has been transformed by the fast growing of digital technologies which affects in almost all aspects of life. This transformation brings many positive impacts on people's lives. Wireless technology is one the important technologies enabling digital transformation. The emerging wireless technologies of 5G and IoT is expected to boost the digital transformation. Being one the priority agenda of the Government of The Republic of Indonesia, Indonesia has prepared Indonesia's Digital Roadmap for 2021-2024 in 4 strategic sectors: Digital Infrastructure, Digital Government, Digital Economy, and Digital Society. Several new policies and regulations on digital infrastructure have been issued to support the success of the digital transformation in Indonesia. This presentation will give an overview on the new policies and regulations, also the ongoing effort of the Ministry of Communications and Informatics in providing the required policies and regulations.

Keynote Speaker 5

Bayu Hanantasena

Chief Business Officer
Indosat Oreedo
Indonesia

Profile:

Mr. Bayu Hanantasena was appointed as the Chief Business Officer of Indosat Ooredoo in February 2020. He currently also serves as President Director of PT. Artajasa Pembayaran Elektronis (2017-present).

Mr. Hanantasena started his career in Indosat in 1993 and over the years has held various senior management positions, including positions in Technology Strategy Development, Business Strategy, Corporate Planning, Investor Relations, Head of Region as well as National Commercial Operations. From 1996-2000, he also served as member of the Secretariate of the Board of Commissioners of PT Telekomunikasi Selular (Telkomsel). In 2014, he was appointed as Director of Business of PT Artajasa Pembayaran Elektronis (Indosat Group), advancing his career in the Company to his current position as President Director.

Mr. Hanantasena earned his Bachelor's Degree in Electrical Engineering from Institut Teknologi Sepuluh Nopember (ITS), Indonesia and his Master degree in Management of Technology from Sloan School of Management, MIT, United States. He also holds a Diploma in Telecommunication Management from C&W College, United Kingdom

Keynote Speech:
Title:
Collaboration on IoT Solution for Better Human Lives

Abstract:
Wireless technology is advancing rapidly and 5G roll out have been started in Indonesia. Meanwhile, intelligent system or artificial intelligence have been implemented by many industries to elevate operational efficiency. The combination of wireless technology and artificial intelligence enables Internet of Things (IoT) as solution for enterprises and consumers. IoT has potential applications in manufacturing, government, transportation, healthcare, mining, retail and many others. Indosat with a vision to become a leading digital telco hereby invites all stakeholders from academia, regulators, industry, media and communities to collaborate in developing IoT solutions to have better efficiency and productivity as well as improving human lives.

01. [IES-ETA]

Power Engineering and Energy Technology

The Analysis of Blade Vibrations at a High Pressure Steam Turbine during Thermal Power Plant Start-up Condition

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Abstract –A high pressure turbine (HPT) is the first stage of the thermal energy conversion in a steam power plant. The operational condition of HPT which extracts high pressured steam causes a high possibility for vibration to occurs. When vibration exceeds the material design limit, it can damage and leads to structural failure. One form of the failures that can happen is fatigue failure. HPT is a vital component inside a thermal power plant therefore it is expected not to fail during its operation. When the HPT fails, then there will be a possibility that the power plant would trip. The aim of this research is to provide an approach to monitor and reduce the vibration level at the HPT in one of the power plant in Indonesia by applying an analytical method through a vibration analysis. The vibration analysis is carried out using Fast Fourier Transform algorithm in GNU Octave version 5.2.0. The resulting calculations in this research show that the steam turbine's efficiency reaches 40.966%, the turbine withstand 11.1394 MPa of normal stress and 93.456 MPa of thermal stress from its operational condition, and its calculated remaining lifetime is 27.456 years.

Keywords: High pressure turbine, vibration, fatigue failure, Fast Fourier Transform, GNU Octave.

Digital Implementation of Space Vector PWM for Three Phase Inverter with Simplified C-Block PSIM Utilization

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

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

Modified Critical Trajectory Algorithm to Determine the Critical Clearing Time for Unbalanced Fault

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Abstract –The transient stability assessment in the power grid has a vital role in ensuring system security. However, other conditions regarding the imbalance fault need to be studied further. Therefore, it is necessary to calculate the critical clearing time, which can calculate the generator stability accurately and quickly for multi-machine systems. The transient electric power system stability analysis was carried out using a modified critical trajectory method on the reference generator. The critical trajectory calculation time calculation will stop when it has reached the lost and lost condition. The power plan that is used 4 generators 9 bus, and 7 generators 57 bus. From the result, this method is accurate, with faster processing time than the conventional time-domain simulation method.

Keywords: Critical Clearing Time, Modified Critical Trajectory, Multi-machine System, Transient Stability, Unbalanced Fault.

Combining Stand Alone PV Rooftop, Small Scale PHS, Rainfall Storage Systems for Increasing Electric Power Production based on Hybrid Pumping Technique

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Abstract –This paper proposed modified of the standalone PV-small scale PHS system design and operational method based on hybrid pumping technique in high rise building application. The objective of the proposed design and operational method are to increase the electric power production of the PV-small scale PHS system. Modification of the PV-small scale PHS system is carried out on the upper reservoir which is designed to have a rainfall storage system. SOC operations can be carried out with this design by combining the pumping process with PV power (when sunny or cloudy conditions) and PHS generator power (when rainy conditions or night). All components are modeled, and confirmation this design using a simulation program. The feasibility analysis of this design will be evaluated using the Loss Power Supply Probability (LPSP) method. Based on the system design, three pumping techniques can be combined and six methods of filling the upper reservoir. The simulation result shows that the PV-PHS system can increase the production of stored power about 22.44% and electric energy about 35.53% (daily simulation) and 45.69% (weekly simulation). For electrical energy generated increased by 35.53% (daily simulation) and 56.59% (weekly simulation).

Keywords: PV rooftop system, pumped hydro storage, rainfall storage system, hybrid pumping technique, small scale.

Modeling and Simulation of PV System with Self Adaptive Differential Evolution Based MPPT Under Partial Shading Condition

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Abstract –The development of renewable energy has become massive, especially the implementation of solar panels. Even so, solar panels highly depends on irradiation levels and temperature conditions. The partial shading condition is also affects the solar panel output power. In order to get the solar panel maximum power, MPPT method can be used. This research suggests MPPT method with Self Adaptive Differential Evolution (SADE) algorithm. The PV system uses 3 large 100 Wp solar panels connected in series and a buck converter. The MPPT SADE system uses PSIM software so to test the MPPT SADE performance in order to get the maximum power output from PV Array and compared to the HPO and PSO algorithm. The results are shown that by MPPT SADE is able to do GMPP tracking in partial shading condition with average tracking accuracy and tracking period 99.99% and 0.24 seconds.

Keywords: buck converter, MPPT, partial shading condition, photovoltaic system, self adaptive differential evolution.

Optimal Generation Scheduling Considering Distributed Generator for Cost Minimization based on Adaptive Modified Firefly Algorithm

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Abstract –The increasing load and the decreasing availability of non-renewable energy sources have encouraged the development of renewable energy utilization. This condition increases the complexity of the power system. Distributed generator (DG) connection causes a significant change in power flow. On the other hand, the load on the power system is dynamic, so it is necessary to adjust the power generation. Proper scheduling of generating units to improve the reliability of the power system is crucial. Scheduling optimization is the key in power system operation planning and control to achieve optimal power system operation, with minimal cost and power loss. This paper presents the optimization of generating unit scheduling by applying the Adaptive Modified Firefly Algorithm (AMFA). The performance of AMFA in optimizing generator scheduling for minimal generation costs and power losses is tested by using a modified IEEE 30-bus system. The simulation results show that AMFA has a better performance than the firefly algorithm (FA), with a convergence speed of 4 times faster. Additionally of optimization by applying a distributed generator shows an improvement in the condition of the bus voltage in the system, lower costs, and power losses. In a system without DG which is loaded with 130% baseload, the optimization results indicate that 67% of the buses are under voltage, the generation cost is 1458.702 $/hour and the power loss is 23.345 MW. The integration of DG into the system is able to improve the system where only 3% of the buses are under voltage, the cost of generating 1143.111 $/hour, and power loss 1333.521 MW.

Keywords: modified firefly, scheduling, distributed generation, optimization, power flow

A 5 Watts Magnetic Resonance Wireless Power Transfer with Enhanced Transmission Distance Capability

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Abstract –A The Wireless power transfer (WPT) technology and application are becoming popular in recent years. It is a re-emerging technology to allow simple, easy to use and convenient techniques to propagate electrical energy from input power to an electrical load over a distance with no electrical cord. This paper presents one method to extend the transmission distance of wireless power transfer. This study is essential to achieve the maximum power transfer due to one of the WPT limitations is power efficiency. A WPT system based on the magnetic resonance method was developed. It works at the resonance frequency of 140kHz in the maximum transmission range of 30cm and achieving maximum power delivery of 5W at 10cm transmission range. The experiment result shows that this method can achieve a power transfer efficiency of around 50%. The use of high-quality electronic components for the resonator circuit has to be considered in the design process to address the problem of resonance frequency tuning between transmitter and receiver coils.

Keywords: wireless, wireless power, magnetic resonance, loosely coupling, resonator

Numerical Study Analysis of The Effect of Trailing Edge Thickness of Low-Pressure Steam Turbine Stator on Steam Condensation

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Abstract –Steam turbines work in complex operating conditions that sometimes involve two-phase flow, especially in the final stage region where the turbine works in saturation conditions which are characterized by the appearance of water droplet condensation in the steam flow. The condensation that occurs in the steam turbine affects the overall performance decrease compared to when working in dry steam conditions, this loss is called moisture loss. In this research, flow modeling on a low pressure steam turbine stator will be carried out using a Computational Fluid Dynamics (CFD) numerical study approach. In addition, variations were made to the thickness of the trailing edge of the stator with values of T = 2.72 mm, T = 2.02 mm, T = 1.32 mm, and T = 0.62 mm. Condensation that occurs in the stator blade is known through the parameters of static pressure, nucleation rate, droplet radius, droplet distribution per unit volume. Based on the results obtained, it can be seen that the thickness of the trailing edge of the stator influences the vapor condensation process. Furthermore, the highest efficiency value is 99.17% at the trailing edge thickness variation T = 0.62 mm, and the lowest efficiency is 98.34% at the trailing edge thickness variation T = 2.72 mm, which indicates with the smaller the thickness of the trailing edge stator, the greater the efficiency of the stator.

Keywords: Computational Fluid Dynamic, steam turbine, steam condensation, stator blade efficiency.

Thermal Characteristics of Tube Economizer with Serrated Fin

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Abstract –A This works present Computational Fluid Dynamics model of serrated fin on tube economizer for thermal performance. One of the parameters that affect the heat transfer in the fin is turbulence. Increased turbulence can enhance heat transfer. In serrated fins, more turbulence than that of the solid fin. Generally, fin pitch could contribute to thermal performance. In this works, the serrated fin variations are pitch at 2.623 mm, 3.623 mm, 4.623 mm, 5.623 mm, and 6.623 mm. Solid fin is utilized as the benchmark of serrated fin performance improvement. The research method is carried out by using software ANSYS Fluent. The results show that the temperature distribution on the modified geometry of the serrated fin is better than the initial geometry of the solid fin. The serrated fin can increase the turbulence of the flue gas flow and make flue gas flows into the gap in the serrated fin, increasing the heat transfer that occurs. The effectiveness of the fins on serrated fins is higher than solid fins. In serrated fin, the fin effectiveness value is 2.77 at 2.623 mm fin pitch, while the fin effectiveness value on the solid fin is 2.46 at 2.623 mm fin pitch. In addition, the temperature distribution and fin effectiveness will decrease with increasing fin pitch.

Keywords: Economizer, Fin, Effectiveness, CFD

Design of Steam Power Plant Condenser Machine Maintenance Using RCM (Reliability Centered Maintenance) Methods with RCPS Implementation

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Abstract– Reliability Centered Maintenance (RCM) is a maintenance analysis method used to improve a maintenance system that focuses on increasing the reliability of a machine. The condenser is a heat exchange that is used to change the gas fluid phase into a liquid by cooling it. In steam power plant the condenser is used to condense the steam coming out of the steam turbine into air condensate and maintain low pressure conditions on the turbine output side so that the work produced by the turbine is maximized. Because it is very important in the steam power plant cycle, it is important to maintain the reliability of the condenser engine if the condenser reliability decreases it will result in a decrease in production and overall generation efficiency. Therefore, a research is needed to plan maintenance intervals for critical components of the condenser engine so that it can increase engine reliability. The results obtained from this study is an interval schedule design to improve the reliability of the condenser engine and recommendations. The results of the analysis using the RCM method get interval schedule planning, namely at certain time intervals with 80% reliability and proper maintenance recommendations on 3 critical components in the condenser operating unit. Of the 3 components, there are 2 components that are suitable for preventive maintenance and 1 component for corrective maintenance based on the percentage increase in reliability and the rate of damage to each component.

Keywords: Maintenance, RCM, Reliability, Preventive Maintenance, Condenser

Experimental Analysis of Artificial Equilateral Triangle Solar Air Heater Using Zig-zag Channel

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Abstract–The sun has an abundant amount of energy. Solar radiation energy can be used for various purposes. For example, Solar Air Heater (SAH). Solar Air Heater has a very simple working principle by absorbing solar thermal energy using an absorber plate. This study compared the performance of SAH in three conditions. The first is flat plate, second is triangle plate with one pass through all the triangle shape, third is triangle plate with zig-zag flow for the dark pass and light pass. The radiation source came from halogen lamps and had been constantly set at 950 W/m2. The experimental result showed that a 60° folded angle produced useful energy 25,34 kW and has the highest thermal efficiency value of 55,591%. This is because the higher the velocity of the fluid flowing in the collector channels, the higher the mass flow rate. As the mass flow rate increases, the absorbed heat energy will be greater, so the thermal efficiency will increase. It is also due to some reflected and absorbed radiation reached the absorber. The 60° zigzag shape has a significant advantage of absorbing more solar radiation than another variation.

Keywords: solar air heater, zig-zag, temperature, absorber, efficiency.

Mapping Detection of DC Series Arc Fault Based on Fast Fourier Transform

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Abstract –The increasing use of photovoltaic systems as renewable energy is also required to increase safety due to the hazards posed, one of which is DC arc fault. An arc is a spark caused by the release of energy from a conductive wire. DC arc fault generates heat that can damage the insulation of the wire so that it can create a fire hazard and damage the photovoltaic (PV) and surrounding objects. Limitations in monitoring all wiring routes are an obstacle in early detection of arc faults. Series arc interference is characterized by a high frequency component in the signal system. Fast Fourier Transform (FFT) is used to convert signals in the time domain to the frequency domain. The results of this FFT calculation detect the appearance of high frequency components in the system flow, then the data of each magnitude is used to identify the disturbance and determine its location. This research is built on PSIM simulation with 4 PV 200 Wp where the system is connected in series using a resistive load. The controlled voltage is used as a component of the arc generator. FFT analysis was carried out on Matlab software so that harmonic values were obtained when there was a DC series arc fault at different locations. This harmonic value is observed so that it is used as a parameter to determine the location of the disturbance.

Keywords: DC series arc fault, identification, location, magnitude, simulation, Fast Fourier Transform

Analysis The Effect of Inlet Duct and Transition Zone Angle Variations on Flow Characteristics and Heat Transfer on Vertical Type Heat Recovery Steam Generator

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Abstract –The components that determine the shape of the flow in Heat Recovery Steam Generator (HRSG) are the inlet duct and the transition zone. After passing through the inlet duct, flue gas is expected to have uniform axial velocity and temperature distribution, with the aim of optimizing pressure drop and reducing residual gas turbulence due to its high velocity. Turbulence can cause uneven flow temperature because there is heat concentrated at a certain point so that it can reduce heat transfer that occurs between flue gas and steam. Thus, an effort is needed so that the flow coming out of the inlet duct has a uniform flow profile and temperature distribution. In this study, researchers will conduct a numerical study in the form of a 2-dimensional simulation using Computational fluid dynamics (CFD) regarding the effect of angle variations on the vertical type HRSG inlet and transition zone on the flow and heat transfer characteristics. Variations of inlet duct angle (β) and transition zone angle (α) in this study there are 5 variations, variation 1 (α=35°, β=15°), variation 2 (α=35°, β=25°), variation 3 (α=35, β=30°), variation 4 (α=30°, β=25°), variation 5 (α=45°, β=25°). From the simulation results it can be known that inlet duct angle and transition zone affect the flow and heat transfer of gas flue in vertical type HRSG, the greater the angle of α cause the flow separation, the greater the angle of β cause the velocity of gas flue flow to be faster. In this simulation, variation 2 (α=35°, β=25°) had the best flow velocity and distribution with an average gas flue velocity of 4.27 m/s, while the highest total heat transfer also occurred at a variation of 2 (α=35°, β=25°) with a total heat transfer of 190.2057 MW.

Keywords: HRSG, Inlet Duct, Transition Zone, Flow Characteristics, Heat Transfer, CFD

Numerical Analysis of a Shell and Tube Heat Exchanger Using Computational Fluid Dynamics Software

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Abstract –The condenser is a shell and tube-type heat exchanger that functions to condense the turbine output steam. To improve the performance of the condenser can by changing the tube size in the condenser design. This study, modeling with variations in tube diameter is carried out to determine its effect on condenser performance, such as heat transfer coefficient, effectiveness, and distribution of speed, pressure, and temperature. The study was simulated on CFD software using four variations of STHE tube diameter sizes. The highest temperature value on the cold fluid side obtained is 332.34 K at the variation of l = 600 mm; d = 25 mm, and the lowest cold fluid temperature value is 311.07 K at variation l = 600 mm; d = 10 mm. The highest heat transfer coefficient value of cold fluid is obtained at 1547.17 (W/m2K) at a variation of l = 600 mm; d = 25 mm, and the lowest heat transfer coefficient value of cold fluid is obtained 667.85 (W/m2K) at variation l = 600 mm; d = 10 mm. The highest effectiveness value was obtained at 0.2156 at variation l = 600 mm; d = 25 mm and the lowest effectiveness value is 0.0738 at variation l = 600 mm; d = 10 mm. From the research, it can be concluded that the addition of the width to the diameter of the tube has an impact on a more significant decrease in speed, a greater pressure drop, and a more significant temperature distribution. In addition, it also affects increasing the value of the heat transfer coefficient and effectiveness.

Keywords: Maintenance, Condenser, Shell and Tube Heat Exchanger (STHE), Computational Fluid Dynamics (CFD), Power Plant

02. [IES-ETA]

Electronics Systems and Electrics Technology

Early Detection of Cow Pregnancy Based on Volume Control of Cow Urine Using Fuzzy Logic Method

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Abstract –The demand for beef consumption in Indonesia is increasing along with the increase in the human population. One of the ways to increase the cow population is through Artificial Insemination (IB) and Natural Mating Intensification (INKA). So, there is need for early identification of cow pregnancy so that the breeders can take further action more quickly. One of the fast methods to detect pregnancy in cows is using sulfuric acid. However, this method requires a high level of precision and discipline when using sulfuric acid because it is hard and can injure the skin. So, this paper presents about how to control of volume of sulfuric acid based on fuzzy logic to be applied in a detection tool of cow pregnancy using its urine. This research was conducted with the purpose of helping breeders to detect pregnant cows safely, efficiently, and easy to use. This test was carried out on CV. KARUNIA Kediri with 11 samples of cow urine. In this system there is an ultrasonic sensor to read the volume of urine in the reaction glass and keypad to enter the time of urine collection after IB. Both inputs are processed by microcontroller ATMEGA 2560 which is integrated with fuzzy logic system to activate the peristaltic pump where the length of time the peristaltic pump works determines the volume of sulfuric acid. The results showed that the application of fuzzy on volume control of sulfuric acid gave good performance. This tool works on urine volume of at least 60 ml and a maximum of 100 ml with a minimum urine collection time of 3 weeks and a maximum of 6 months after IB. Using fresh cow urine with a maximum storage limit of 1 hour after urine collection. The urine of pregnant cows will change color to purplish with a voltage value of 4.25-4.35 volt which is read by the infrared sensor. From the test result obtained, the duration of the cow pregnancy detection process is ±2.5 minutes with 100% accuracy which has been compared with rectal palpation.

Keywords: cow, pregnancy detection, urine, sulfuric acid, fuzzy logic, microcontroller

Homecare and Hospital Stroke Therapy Comparison Using EEG Analysis

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Abstract –According to WHO data, stroke ranks second as a non-communicable disease that causes death, and ranks third as a cause of disability. Stroke causes serious neurological disorders, such as reduced motor skills of limbs and muscles, cognitive, visual and coordination significantly. The process of monitoring motor coordination function in stroke rehabilitation is generally in the form of observing movement abilities. This technique has lower quantifiable accuracy. Therefore, it is important to use objective approaches to obtain the appropriate diagnosis for effective rehabilitation process. Recently EEG has been used as a tool for monitoring stroke rehabilitation especially for motor coordination functions. Moreover, due to COVID-19 pandemic, it was reported by WHO that there was a significant decrease in visits of stroke patients to hospitals. Delay in the stroke therapy process could increase patient morbidity and mortality. Based on those reasons, home care stroke therapy then becomes an alternative solution. This research evaluates the effectiveness of home care stroke therapy compared to hospital care by using EEG. In order to determine the effectiveness of one therapy, a hypothesis T-test was calculated between the two methods. The EEG from C3 and C4 channels of 6 stroke patients when performing 8 times of rehabilitation program were compared. The motion that was tested is shoulder flexion extension on the affected upper limb from each patient. EEG preprocessing was done by applying Infinite Impulse Response for band pass filter and then Automatic Artifact Removal and Independent Component Analysis for artifact removal. Standard deviation (STD) values were calculated and analyzed for every patient in each rehabilitation program. The result shows that the STD value from home care therapy shows more increase compared to those who did the therapy at the hospital. The t-statistical value of the low alpha amplitude between homecare and hospital therapy also shows that there is a significant difference in the results of therapy carried out at home compared to in the hospital. From this result we conclude that stroke home care therapy in the new normal era is more effective compared to hospital care therapy for stroke patients.

Keywords: Stroke rehabilitation monitoring, EEG, Stroke Homecare therapy, Stroke hospital care therapy

Development of nitrogen fertilization dose prediction on rice field based on leaf color chart

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Abstract –Nitrogen (N) is one of the main nutrients for plant growth, as a major component of chlorophyll and proteins closely related to leaf color, growth, and crop yield. The efficiency of nitrogen fertilization is needed to increase rice productivity. Adequacy of N nutrient can be observed in the leaf's color. The use of Leaf Color Chart (LCC) is one way to analyze the need for nitrogen fertilizer in the rice field. This research proposed the development tool to determine the greenish scale of rice leaves automatically and to give advice on the appropriate and optimal dose of nitrogen fertilizer to the rice field. In this study, Arduino Uno is functioned as a Processing Unit and integrated with TCS3200 color sensor as an input component to detect the greenish level of rice leaf color. By using this tool, the prediction of the needs of nitrogen in the rice field can be determined more effectively, not depending on one's perception of the leaf's color scale or different light intensity. The measurements show that the system has an average scale misidentification of 2%, therefore this system can be used as an alternative to determining the dose of nitrogen fertilizer according to the conditions of the plants and the desired harvest target can be achieved optimally.

Keywords: leaf color chart, nitrogen fertilizer, rice field, TCS3200 color sensor

Electronic Speed Controller with Fuzzy Logic and Load Cell for Electric Skateboard

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Abstract - Electric vehicles (EVs) are replacing conventional vehicles (CVs) in long run because fossil fuel is non-renewable. Electric skateboard as the one of EVs, has low price and relatively small shape, so it can be carried easily. Brushless DC (BLDC) motor is commonly used in electric skateboard. In order to control the speed of the BLDC, Electronic Speed Controller (ESC) with remote controller is required. Holding remote controller while driving electric skateboard may cause high risk of accident. In this paper, the ESC equipped with load cell sensors as input and fuzzy logic is proposed and evaluated. From experimental results, the proposed ESC can achieve the target from a determined set point and produce output suitable with the fuzzy logic control calculation. The proposed ESC can change the speed according to load cell sensors slowly, so that sudden acceleration and braking can be avoided. It needs 22.55 seconds to reach maximum speed and 9.863 seconds to stop the BLDC motor.

Keywords: electric skateboard, brushless DC motor, electronic speed controller, load cell, fuzzy logic.

Covid-19 Symptom Detection System in Public Area using Fuzzy Logic Method

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Abstract - During this Covid-19 pandemic, to prevent the spread of the Corona virus, an optimal and effective body temperature checking system is needed. To support an optimal body temperature checking system in classifying a person's health condition, we propose a system that can detect fever symptoms in a person when in a public area using the Fuzzy Logic method. The Fuzzy Logic algorithms can classify the user's health condition, namely healthy, fever, or hyperthermia only with body temperature and environmental parameters that have been read by the sensor device. Raspberry Pi is used as a system microcontroller. As a monitoring function, all information data will be stored in the MySQL database automatically so that it can be monitored at any time through the website. The results show that the proposed system works properly. The Naïve Bayes method has higher computational time, the average time 8.5688 ms, than Fuzzy Logic, Fuzzy Naïve methods. However, for reliability in decision making, the three algorithms are very good with accuracy results above 95%.

Keywords: Covid-19, Fuzzy Logic, Body Temperature, Raspberry Pi.

Intelligent System of Natural Disaster Victim Detection using Naïve Bayes Classifier

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Abstract - A natural disaster is a natural event that can occur suddenly and cannot avoid. Natural disasters can result in property loss and loss of life. After the occurrence of a natural disaster, the evacuation process by the SAR team (search and rescue) must carry out immediately to increase the chances of victim evacuation safely or alive. However, finding victims after natural disasters is not an easy task. It is because the victims are challenging to see with the naked eye by the SAR team. This study aims to produce a prototype device capable of detecting victims of natural disasters and providing information on the location of victims to the base station. The prototype of this device uses thermal sensors as parameters to see the victim. The sensor that focuses on finding good victims is by detecting body temperature. This device is also equipped with a GPS receiver. In decision making, this device prototype uses the Naive Bayes algorithm. The decision result is determined by the Naive Bayes method. The victim's location from the GPS receiver will be sent to the base station via the LoRa communication system. This study shows that the classification output of the naive Bayes algorithm detects humans up to a distance of 100 cm. On the GPS receiver used, the difference between the distance with the GPS on the smartphone is about 5 meters. In sending and receiving data at a distance of 20 meters, the average delay is 0.935 seconds. This system is still not optimal for actual application because the detection range is still very close.

Keywords: Disaster, Wireless Sensor Network, Naïve Bayes, LoRa Communication, Victim Detection.

Improvement of Smoker Prediction System Based on Hyperspectral Image with Hybrid Deep Learning Model

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Abstract - The tongue image classification system has been widely used in medical interests and health diagnoses. This research emphasizes improving classification accuracy performance in the Smoker prediction system based on the location analysis of the smoker melanosis distribution on the tongue image. The tongue diagonalization technique developed is a non-invasive method based on hyperspectral imaging (HSI). Various considerations and In-depth architecture learning have been proposed to overcome the analysis of HSI data and have obtained relatively high classification completion. This study uses the Convolutional Neural Network (CNN) architecture in the spectral-spatial configuration used for feature extraction and classification. CNN to do some testing. Researchers classified it as Single CNN and Hybrid-CNN. In the Single CNN algorithm, there are two architectures created, namely CNN-Autoencoder and CNN-Alex net. In the Hybrid-CNN algorithm, two architectures are designed, namely Proposed Hybrid-CNN with one branch and Hybrid-CNN-Resnet18 with eight branches. Learn more about the kernel in each different subject segmentation and look at the kernel classification. Therefore, the Hybrid-CNN model is proposed to be able to make hybrid architecture and hybrid convolution scale. The approved Proposed Hybrid-CNN model, supported about Lateral A can reach 90,60%, Lateral B reaches 86,5%, and Doctor Perception reaches 99,2%. In the CNN-Resnet18 Hybrid model obtained, Lateral A can reach 89,4%, Lateral B gets 84,6%, and Doctor Perception reaches 97,4%. In general, the results of the completion of the approved model have achieved better performance.

Keywords: hyperspectral imaging, hybrid deep learning, smoker melanosis, convolutional neural network.

Smart Parking System Based on Haar Cascade Classifier and SIFT Method

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Abstract - Parking is a non-temporary state of motion of a vehicle. Motorcycles are the most common type of vehicle in the parking area. The rate of motorcycle use in developing countries from year to year are constantly increasing. In Indonesia, motorcycle use from 2000 to 2018 has been increased by approximately 20% with an average increase of about 204 million per year. Parking systems in Indonesia are mostly still using security system which is quite fragile, one of which is by recording the license plate of the vehicle as a ticket for the conditions when exiting the parking lot. With the use of the system, the level of security from the parking lot is still very low and will trigger a crime in the vehicle, namely motorcycle theft. Therefore, a solution is needed to improve and assist the entrance and exit systems of the parking area, in order to create a safe parking space. Through this work, an intelligent parking system based on RFID E-KTP (Electronic Identity) and Vision Processing are designed to improve the security of the parking area. Haar Cascade is used to detect and capture the picture of motorcycle license plates and then SIFT method (Scale Invariant Feature Transform) is implemented for the matching process of the image. In addition, it is also equipped with RFID which is used to retrieve E-KTP Id data from motorcycle users who will enter the parking area. Both data are used as a condition to be able to exit and enter the parking area. The success rate of the appliance at the entrance is 89% with an average time processing of 13.25 seconds, while at the exit has a 100% success rate with an average time of 19.75 seconds.

Keywords: parking area, image processing, Haar Cascade Classifier, E-KTP, RFID, SIFT

Determining Global Position from Local Position in Military Force Position Tracking Application

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Abstract - Integrated Command and Control System (ICCS) in military terms is a system that has friendly forces position tracking to avoid friendly fire. Global Navigation Satellite System (GNSS) that commonly used to acquire position data sometimes have a trouble locking the satellites. This paper discusses how the trilateration is used as a backup system to determine the global position in case the GNSS data is invalid. The system consists of 4 nodes, where 3 nodes act as an anchor and 1 node act as a tag. All nodes equipped with GNSS so the anchor can move to other position. When the GNSS module doesn't send a valid data to a node, the node will act as a tag node and do the trilateration by measuring distance using ultrawideband with time-of-flight method to the 3 other nodes that acting as anchors. Based on the tests, position from the trilateration and the position from GNSS are 2.5 meters apart. Distance measurement has an average error below 0.5 meters. The trilateration position error is up to 1.414 meters without the effect from the anchor's GNSS position error, and the average error is up to 12 meters with the influence from the anchor's GNSS position error.

Keywords: trilateration, time-of-flight, ultra-wideband, GNSS, ICCS, position tracking, local position, global position.

03. [IES-ETA]

Telecommunication Engineering Technology

An Implementation of Secure Vehicle-to-Vehicle Communication Using Shared Key Generation with Kano Method

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Abstract - Vehicle-to-vehicle (V2V) communication assigned for security and safety in the vehicles communication currently becomes much more interesting, in such it is able to reduce traffic accidents such as collision among vehicles. In this system, the possibility of error shared key when obtaining received signal strength (RSS) between a pair communicating vehicles often occurs. Moreover, the possibility of stealing personal data of drivers and passengers and even controlling take over by adversaries can be happened as well. Hence, in this case, it should have reciprocity without error such that shared key between two participating vehicles is matched. Because attacking activities may happen frequently, thus a security system using shared secret key to protect these personal data in the wireless network should be mandatory. In this paper, a scenario of secure shared secret key generation in V2V communication using Raspberry Pi through 2.4 GHz WiFi connection is implemented. To increase reciprocity, Kalman Filter and BCH error code are adopted. Performance evaluation is evaluated by varying vehicle speed from 20 km/h to 60 km/h with ping interval 7 ms, 10 ms, and 20 ms, respectively. The evaluation result showed that in 20 km/h with 10 ms time interval has the highest correlation 0:99 and the lowest one 0:91 in 40 km/h with 20 ms time interval. Meanwhile, Aono quantization works properly for the scenario 60 km/h with 7 ms time interval for 2881-bit of 3000 data input with key disagreement rate (KDR) 0 in 20 km/h with 10 ms time interval.

Keywords: received signal strength, V2V communication, Kalman filter, Aono quantization, shared secret key generation.

Evaluation of the PTS PAPR Reduction Technique with the Hammerstein-Wiener Predistortion Model in Amplify-and-Forward (AF), Decode-and Forward (DF) Relaying Systems over Asymmetric Channels

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Abstract - In this paper, we propose and evaluate the joint PAPR reduction with Partial Transmit Sequence (PTS) scheme and predistortion technique at source in cooperative communication systems based Amplify-and-Forward (AF), Decode-and-Forward (DF) protocol over asymmetric channel. The cascade connection Wiener-Hammerstein model is used as the predistortion-memory nonlinear High-Power Amplifier (HPA) model. The system's performance will be represented in Bit Error Rate (BER) values and are simulated for three scenarios. These scenarios represent the condition at our campus. From the simulation results can be evaluated that the predistortion technique improve the BER performance of both AF and DF protocol. And the BER performance of AF and DF protocol are depend on the environmental or channel conditions, including the distance and path loss exponent values of channel models.

Keywords: Cooperative Communication, Amplify-and-Forward, Decode-and-Forward, Predistortion, Wiener-Hammerstein model.

Performance of Joint PAPR Reduction Iterative Clipping and Filtering (ICF) and Predistortion in OFDM Systems Using Software Defined Radio

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Abstract - OFDM technique is a multicarrier technique which has the bandwidth efficient. The OFDM can overcome multipath fading effects and inter symbol interference (ISI). However, OFDM has several weaknesses, one of them is a high peak-to-average power ratio (PAPR) and the high PAPR value can result the non linear distortions when is passed through a non linear power amplifier. The joint system of the PAPR reduction and the predistortion technique can be used remove the non-linear distortions. In this paper we use the iterative clipping and filtering (ICF) method as the PAPR reduction technique and Hammerstein model as the predistortion technique for Wiener model of the non linear HPA. To evaluate the performance of the system we do the experiment using USRP Software Defined Radio (SDR), and supported by the LabView and Python softwares. From the experiment results can be shown that the ICF technique reduce PAPR value of 6.06 dB. The predistortion technique can linearize the AM/AM transfer function curve of HPA, and remove the non linear distortion by representing the symbols constellation and the power spectral density.

Keywords: OFDM, PAPR, ICF, USRP, Predistortion, Hammerstein Mode.

High Gain Microstrip Square Patch Array Antenna 4 x 4 Elements 2.3 GHz for 5G Communication in Indonesia

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Abstract - This paper presents the design and realization microstrip square patch array antenna with 4x4 elements operates on a frequency of 2.3 GHz, to be exact at 2.345 GHz for 5G communication in Indonesia. Antenna material use: PCB FR-4 Epoxy, in which there is a dielectric substrate with dielectric constant (εr = 4.75, tan = 0.02), height h = 1.6 mm. This antenna is designed to have a gain greater than 10 dBi. In the This antenna design study, there are three stages. First, single element microstrip patch antenna design with gain 1.65 dBi, then a 2x2 array element with a gain of 7.18 dBi, and then an array of 4x4 elements with a gain of 12.15 dBi. All antenna simulation design process using CST Microwave Studio. Based on the design results above, the microstrip square patch array antenna with 4x4 elements with a gain of 12.15 dBi is selected, then fabricated into a prototype and its characteristic size in the anechoic space. Then measurement results are analyzed and compared with simulation results. Based on the results of the simulation design square microstrip patch array antenna with 4x4 elements for center frequency of 2.345 GHz, it is found that S11 of -12.20 dB or 1.26 VSWR with 61.7 MHz bandwidth, and gain of 12.15 dBi. Meanwhile, from the measurement results from the antenna prototype obtained S11 of -11.45 dB or VSWR 1.55 with a bandwidth of 58.2 MHz, and a gain of 12.08 dBi. This antenna is expected to be used as a alternative antenna for 5G communication in Indonesia at 2.3 GHz (S band) with gain above 10 dBi.

Keywords: microstrip square patch array antenna, microwave measurement, 5G communication.

Application of Joint PAPR Reduction and Predistortion Technique in AF Relaying System with Relay Selection Strategy

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Abstract - In this paper, we investigate the joint of PAPR reduction and predistortion technique implemented to amplify and forward (AF) relaying system with a relay selection strategy. OFDM has a major drawback which is the high peak power value. Then, a joint reduction technique with the Selective Mapping (SLM) scheme and Hammerstein model as a predistorter is applied to overcome this problem. Those joint techniques can reduce the PAPR value while increasing the linear region of the system. So the nonlinear distortion does not occur when the signal enters the nonlinear high power amplifier (HPA) at the source. The Rapp model is used as memoryless nonlinear PA at relays, and the inverse of the Rapp model is used as the predistortion technique. The use of relays as virtual antennas in cooperative communication systems can be implemented for 4G or 5G networks in future research, but it requires a large bandwidth. So by implementing a relay selection strategy, bandwidth efficiency will increase because only the best-selected relay will forward information from the source to destination. The system's performances are expressed in bit error probability or BER. The simulation results show that in the joint technique, the predistortion technique further improves the BER performance, while the SLM PAPR technique has no significant impact on the BER performance. The application of both the predistortion techniques at source and relay results in the best performance, at BER 10-5, the system improved by 1.8 dB compared to implementation at source only, 6.2 dB compared to implementation at relay only, and 7.2 dB compared to without implementation of predistortion technique.

Keywords: PAPR, SLM, Predistortion, Hammerstein-Wiener, Amplify-and-Forward, Relay Selection.

Performance of a Joint PAPR Reduction Clipping and Filtering (CF) Scheme and Predistortion Techniques in Amplify and Forward (AF) Relaying System with Relay Selection Strategy

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Abstract - The joint PAPR reduction and predistortion technique is the one solution to remove the nonlinear distortions of nonlinear high-power amplifier (HPA) and to increase the power efficiency. This paper can be used as a reference for the development of LTE network in future research. In this paper, we implement this joint technique at source and the predistortion technique at relay to improve the performance of cooperative communication networks amplify and forward (AF) relaying system from nonlinear distortion which are produced by HPA at source. And the relay selection strategy is used when the system is implemented in multy relay scheme. Iterative Clipping and Filtering (ICF) scheme and the cascade connection of Wiener-Hammerstein is used as the PAPR reduction and the predistortion-HPA model at source to build the joint technique. To improve the system's performance at the relays are implemented the predistortion technique to compensate the nonlinear characteristics of memoryless non-PA with Rapp model. The system's performance is expressed in bit error probability. From simulation results are shown that the ICF PAPR technique decreases BER performance if its CR value is low, while the predistortion technique in the joint scheme at source gives an improvement system's performance about 4,35 dB or 15,82% at BER 10-5. Besides the predistortion technique at source, implementation of the predistortion technique at relay also gives improvement to the system's performance and the implementation of predistortion technique both at source and at relay is shown give the best performance. Also, the applications of the relay selection strategy in more relay numbers give better performances.

Keywords: PAPR, ICF, Wiener-Hammerstein, Predistortion, Relay Selection.

Analysis of Key Generation Which Extracted from RSS for Handover System in V2I Communication

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Abstract - Vehicle-to-infrastructure (V2I) communication is intended for vehicles making connections with roadside units (RSUs) to exchange information. This paper will design a secret key generation scenario for secure V2I communication using a Raspberry Pi 3 and WiFi connection 2.4 GHz. One of the main challenges of V2I communication is authentication. Due to wireless communication can intercept by someone who is not responsible. With the possibility of attack, then the system needs to be added security for data protection on wireless communication channels using a secret key. Communication is based on received signal strength measurements within a certain distance to generate a secure key. The parameters to be tested in this research are node speeds between 20 km/h, 30 km/h, or 40 km/h and time intervals between 20 ms, 15 ms, 10 ms. The test results from the maximum number of keys generated is 3 keys. The average time it takes to generate a key in one scenario is about 2.5 seconds.

Keywords: V2I, Received Signal Strength, Secret Key Generation, Raspberry Pi.

Optimized Wideband Steerable Antenna Array Using an 8x8 Butler Matrix

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Abstract - This paper presents a wideband planar steerable antenna array. The structure is composed of an 8x8 Butler matrix connected to an 8x1 antenna array. It is fabricated on an FR-4 substrate and operates at 3GHz. The disadvantage of the 8x8 Butler matrix is the small bandwidth. Therefore, this paper introduces the development of wideband components to enlarge the bandwidth of the structure resulting in a bandwidth of 1.26GHz. Moreover, the 8x8 Butler matrix to be presented in this work is special in comparison to the existing works in the literature because it permits reusing the 4x4 Butler matrix in the design. This operation is valuable in the industry since it reduces the effort and the cost of the production. The final structure uses wideband and miniaturized components on a single layer substrate which results in an economical, small size and wideband steerable antenna array.

Keywords: steerable antenna array, Butler matrix, wideband, miniaturized.

Implementation and Analysis of IoT Communication Protocols for Crowdsensing and Crowdsourcing in Health Application

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Abstract - In the last decade, the era of the Industrial Revolution 4.0 began. Technology played a major role in almost all industrial revolutions. So, computers and manufacturing systems will be able to collaborate. One of the pillars of the fourth Industrial Revolution is crowdsensing. Several experiments in the fields of society, infrastructure, agriculture, and health have used it. Crowdsensing in the health sector can help gather a substantial source of data on general public health conditions. However, most crowdsensing techniques rely on only one communication protocol. This method can cause problems if a system failure occurs. Besides that, another consideration is that the crowdsensing users consist of several communication protocols. As a result, we present a multi-communication protocol gateway architecture for crowdsensing that addresses the aforementioned issues by combining two communication protocols, such as HTTP and MQTT, into a single gateway. This gateway serves to receive data from sensor nodes before transmitting it to an IoT platform on a cloud server. The test results show that the MQTT protocol has better performance than the HTTP protocol in the delay test. The MQTT protocol delay reaches 0.113 seconds and the HTTP protocol delay is 0.717 seconds. In addition, the gateway is also able to receive data properly even though both protocols are run simultaneously.

Keywords: Crowdsensing, Crowdsourcing, Internet of Things, Multi-Communication Protocol, MQTT, HTTP.

Implementation of Fuzzy Tsukamoto Algorithm On Smart Node Sensors for Air Quality Monitoring

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Abstract - In this modern era, there are more and more industrial centers in urban areas as well as the development of various transportation. This is causes air pollution that can affect human, animal, plant life. The initial study of the application of the Fuzzy Tsukamoto algorithm on smart sensor node system for air quality monitoring described in this paper. The air parameters used are CO, CO2, and CH4. The data used were obtained from previous studies. This data is used to test the accuracy of the fuzzy model using two rule bases and two types of fuzzy. The results show that the accuracy value of Fuzzy Tsukamoto using the second rule base is better, namely 92.4 percent. The classification results are in the form of warning alerts that are combined in one frame with other data on the raspberry pi. The data are sent to the PC server using LoRa transceivers. From indoor and outdoor testing, the results show that the system can work well. In indoor conditions, the results of the air classification are Good with CO concentrations of not more than 0.9 ppm, CO2 concentrations of 293-402 ppm and CH4 concentrations of 0.5 ppm. In outdoor conditions, the results obtained are Moderate air classification with CO concentrations of not more than 1.0-1.1 ppm, CO2 concentrations of 707-915 ppm, and CH4 concentrations of 1.6-2.3 ppm.

Keywords: Fuzzy Tsukamoto, Air Quality, Sensor Node, LoRa.

Students Trajectory Pattern Finding Scheme Based on RSSI Geolocation as a Part of Smart Campus

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Abstract - Smart campus refers to supporting facilities for activities that are integrated using information technology. Various events or problems in the campus environment can be identified and well-tracked. In this paper, student trajectory patterns will be determined as a passive step in verifying the legality of smartphone users on campus. The Receive Signal Strength Indicator (RSSI) data obtained from the Wireless Access Point will be processed to determine the location of students using the Fingerprinting Indoor Localization method. The K-Nearest Neighbor algorithm is used as the basis for determining the user's position with the Manhattan metric and k = 1, the model accuracy is 81%. The simulation result shows that in the testing phase of the test set, the average position error obtained was 12.39 meters, with a building prediction accuracy of 98% and a floor prediction accuracy of 88%.

Keywords: RSSI, indoor localization, fingerprinting, K-Nearest Neighbor.

Design of Covid-19 Tracing System based on Bluetooth Low Energy

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Abstract - Prevention of the spread of disease is the most critical effort before the domino effect occurs. One way to prevent its spread is to practice social distancing. Prevention of the spread of covid-19 can be easier by doing Contact Tracing. Contact tracing is done to find out who is infected. This paper proposes an accurate and energy-efficient tracing system based on an android application by utilizing Bluetooth Low Energy (BLE) signals from smartphones to automatically detect possible contacts between users. Using BLE level signals, each app estimates its distance to its opponent. However, calculating the approximate distance with a BLE level signal cannot yield a sufficiently accurate number. Therefore, the prototype of the contact tracing system implements zoning based on the signal level. The results show that the Received Signal Strength Indicator (RSSI) threshold at one meter is accurate for tracing, provided that the devices share the same chipset. Moreover, it is pretty energy-efficient to be installed on a user's Android smartphone because it only requires 14.17 mAh for 6 hours of operation or the equivalent of 2.14 mAh per hour.

Keywords: Bluetooth low energy, Covid-19, contact tracing, proximity, smartphone, Android.

Gender Classification Based Speaker's Voice using YIN Algorithm and MFCC

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Abstract - Nowadays, gender classification using voice has been implemented, for a case in the security sector. The voice of each individual has a unique character, because of the diversity in the sound spectrum, frequency, and amplitude between individual. So, the option of technical features to determine specific characteristics to identifying gender came the major issue in classifying. In this study proposed two parameters to determine gender classification based speaker's voice. There was a fundamental frequency of the YIN algorithm and the cepstrum coefficient of the Mel Frequency Cepstral Coefficient (MFCC) with the classification of Euclidean Distance and Mahalanobis Distance. Based on the data analyzed, it has classified the data test of females on the YIN algorithm with 100% accuracy. Meanwhile, in the male data test, there were several steps to process data that was still misclassified. The first step with the YIN algorithm got an accuracy of 47.5%, then with a combination of YIN and MFCC-Euclidean Distance, the accuracy had raised to 98%. Then continued the Mahalanobis Distance classification to the combination of YIN and MFCC-Euclidean Distance, the accuracy had come 100%. So it can be concluded the parameters applied to determining gender classification based speaker's voice affect the process and results of the classification.

Keywords: YIN, MFCC, euclidean distance, mahalanobis distance.

An Improved Indoor RSSI Based Positioning System Using Kalman Filter and MultiQuad Algorithm

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Abstract - The object position plays an important role in many applications of wireless sensor network (WSN) and Internet of Things (IoT). Hence, positioning system is the main concern of many researchers to achieve the highest accuracy especially in indoor environments. However, RSSI-based indoor positioning system can be easily affected by physical obstacle of the environment which can make it unstable and fluctuate. High instability of RSSI is directly influenced to the estimated position performance obtained from distance calculation with path loss exponent (PLE) value. In this paper, we propose improved indoor positioning system using Kalman filter (KF) for reducing inconsistent of RSSI transmission from Bluetooth low energy (BLE) as the wearable device in each unit of time and MultiQuad algorithm formed by multilateration and quadratic weighted combination as the estimated position determination. Using a combination of KF and MultiQuad algorithms is capable proven to increase the accuracy of estimated position up to 90.32% with mean square error (MSE) 1.15 m. This combination algorithm has capability to reduce error of estimated position compared with only using conventional multilateration reached high error estimation up to 6.99 m.

Keywords: Indoor Positioning System; RSSI; KF; MultiQuad, MSE.

Energy Efficiency with Sleep Schedule for SAR Team Communication

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Abstract - Recently, Wireless Sensor Network (WSN) technology is developing very rapidly. The application of this technology has been implemented everywhere. Some of those are in rice fields, the environment, even in disaster areas. This research will apply WSN technology in disaster areas with a focus on the two-dimensional environment. In natural disaster areas, the node needs the efficiency of the battery power. Therefore, this topic will discuss energy efficiency so that the End device stays on long and prolongs the battery life. By multi-hop communication and sleep scheduling methods, the End devices can save power consumption. The sleep schedule method is set based on a predetermined duty cycle and the awake sleep mechanism. Meanwhile, it has a multi-hop function on the Leader Node side with two communication modules, Zigbee and LoRa. Based on the experiment results, the communication devices with a 10% duty cycle or sleep schedule for 54 seconds are more energy-efficient than others with the distance of each node 100 meters.

Keywords: Wireless Sensor Network, Multihop, Sleep Schedule, Zigbee, energy efficiency.

Wireless Sensor Network for Battery Monitoring Uses Head Clustering Method and Sleep Scheduling

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Abstract - Nowadays, wireless sensor networks (wsn) have many implementations in agriculture, animal husbandry, education, and many more. To support the lifetime of wsn nodes to achieve battery-saving protocol, we propose the head cluster method. This protocol will reduce the power consumption in data transmission by using the concept of head cluster and cluster member. In this method, communication using the cluster head is only carried out by the group head to save energy consumed. Based on the simulation results, the network lifetime with the cluster head method can be increased compared to a single hop.

Keywords: wireless sensor network, head cluster, save energy.

Design and Implementation of Smartphone-Controlled Programmable Audio Equalizer

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Abstract - Most common hardware-based audio equalizer uses sliders to adjust the gain on a fixed frequency band. If the required frequency is not on that equalizer, then another equalizer must be purchased. This paper proposes a real-time implementation of a parametric equalizer that allows the user to adjust the gain, to modify the bandwidth, and to shift the frequency band. The parametric equalizer consists of 5-bands cascading bi-quad Infinite Impulse Response (IIR) filters for each channel. The STM32F407VGT6, as the processing core, is connected to the audio codec AK4556 via (Inter IC-Sound) I2S communications with a sampling rate of 48 kHz. The user freely adjusts the gain, bandwidth, frequency band, or selects a preset using the developed application written on the Android smartphone. The ESP32 microcontroller was used to connect the smartphone with the STM32F407VGT6 microcontroller via Wi-Fi or Bluetooth communications. By implementing 2nd order of 5-bands cascading bi-quad IIR filters for each channel, the system takes 12,667 microseconds to calculate the parametric equalizer algorithm which consumes 61.67% of the real-time time limit.

Keywords: Parametric equalizer, IIR Filter, ESP32, STM32F407, AK4556.

Implementation of RSSI Generated Channel Probing for Air Quality Monitoring System Based on LoRaWAN

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Abstract - Air pollution is considered an important problem that happens in urban cities around the world. Air pollution is mostly caused by population explosion, economic growth, and industrial activities. Air pollution gives a huge contribution to the global warming issue. Therefore, Air quality monitoring is needed to monitor air pollution. With the PM2.5 and PM10 Particulate Matter parameters, air quality could be defined. In this research, an air quality monitoring system is developed with nodes consist of a Particulate Matter sensor to measure PM2.5 and PM10 parameters. Usage of LoRa has been considered since LoRa could cover a massive area with less energy used, in data rate performance as a major trade-off, but decent enough to transmit sensor-measured data from nodes to a gateway. This research also analyzes Pearson correlations generated from the RSSI value on LoRaWAN nodes and gateway with different Spreading Factor parameters and test locations. From tests that have been conducted, average Pearson correlations resulting from indoor measurements were about 0.2 and from outdoor measurements were around 0.3 to 0.4. The implementations of the 5-second interval between Pings are also quite effective in reducing the average error per delivery in outdoor testing up to half during Line-of-Sight positions.

Keywords: Air quality monitoring, Particulate matter, WSN, LoRa, RSSI, Channel probing.
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Key Agreement Algorithm for V2I Communication Based on Differential Technique

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Abstract - Sometimes, in spreading messages over wireless channels, vehicle-to-infrastructure (V2I) communication is very prone to spying and improper message modification. Generating secret keys to scramble messages that transmitted over a wireless channel is a promising means of safe V2I communications. Wireless communication is a technology that has been widely used by almost all levels of society, especially in the V2I communication field, of course, this situation raises new problems, namely information security. Therefore, in this paper, a secure communication scheme that is called secret key generation will be carried out by utilizing the uniqueness of the Received Signal Strength (RSS) value on the wireless network. We use differential technique methods to reduce thepercentage value of the bit difference. The parameters to be tested in this research are node speeds between 20 km/h, 30 km/h, or 40 km/h and ping intervals between 20 ms, 15 ms, 10 ms. From the experimental results, it can be seen that the percentage value of the bit difference tends to be small in all speed scenarios. Even some scenarios with variations in small fluctuations values have KDR-Q of 0. Overall, it can be said that RSU-1 tends to produce higher KGR-U and more keys when compared to RSU-2. The highest number of keys obtained is 2 with the length of each key is 128 bits.

Keywords: V2I, RSS, Differential technique, Secret key generation.
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Particle Swarm Optimization Based UHF Band Rectangular Loop Antenna for Unmanned Aerial Vehicle Application

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Abstract - This paper presented a study of a rectangular loop antenna design using Particle Swarm Optimization (PSO) algorithm in UHF band (433 MHz) for Unmanned Aerial vehicle (UAV) application. According to the result, it can be seen that PSO has done successfully to find the appropriate parameters of a rectangular loop antenna. The results show that the best parameters are 0.1345 m in length, 0.5939 m in width, and 0.0033 m in thickness with cutoff frequency of 433 MHz and 6.5 MHz in bandwidth. The designed has been analyzed using radiation pattern and S-parameter value. It is obtained that the maximum directivity power of the antenna is 4.835 dB when the azimuth (φ) is 90^0 and the elevation(ɵ) is 306^0. At this condition, the VSWR value reaches about 1.0103 while the return loss is -45.7795 dB.

Keywords: antenna, rectangular loop antenna, PSO, UHF, UAV .

Network Performance Evaluation of Container Server-based LoRaWAN IoT for Field Worker Monitoring System

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Abstract - In Indonesia, the issue of occupational accidents is still frequently ignored. This condition potentially causes losses and negatively impacts the company's productivity. Our previous work on a field worker monitoring system requires a LoRaWAN server to receive the data. In this paper, we propose container server-based LoRaWAN IoT to collect and analyze the data. The process of deploying web applications on the server, implement container-based virtualization technology of Docker. Several experiments have shown using containers reduces memory usage significantly when compared to virtual machines.

Keywords: Monitoring, Virtualization, Container, Docker, LoRa.

Design of Weight and Height Measurement System Based Wireless Communication

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Abstract - In the midst of technology that is developing rapidly, many innovations need to be made in various fields, especially health field. The existing measurement scales weight and height still need the help of others in using it. This research aims to get the value of human body weight and height, then others can monitor the measurement results on the website. The two values are also processed to obtain BMI values that can classify someone's nutritional status. The data will be sent to the MySQL database using wireless communication. The data will be displayed on the website and LCD screen. These results are indicated by the average percentage error for weight detection, which is 0.52% and 0.5% for height. Then the percentage value of the success of appearing on the LCD is 100%, while on the website it is 99.99%. Therefore, the system can work properly.

Keywords: Internet of Things, Detection, Weight anad Height, Wireless.

A Smart Water Reservoir Control System for IoT Smart Environment

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Abstract - The rapid development of technology and science has contributed to several evolutions of the human mindset, resulting in various kinds of innovations that can help and facilitate human work, both in the industrial sector and in the smart home. A controller system in the reservoir is necessary because water filling in the reservoir used for engine cooling is still done manually. To fix the problem, the author presents a smart water reservoir system based on Nodemcu. The control system's effectiveness was confirmed by several evaluations using different water levels, water turbidity conditions, and water temperatures.

Keywords: Water Control, Temperature, Water Level, Turbidity.

Harmful Interference Mitigation in Sub-10 MHz Aeronautical Allocation Band

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Abstract - Wireless telecommunication needs spectrum frequency to convey information ubiquitously. Meanwhile, during a radio communication system deployment, harmful interference is a matter that should be avoided or at least to be mitigated because it causes degradation of the radio performance. Each particular spectrum frequency band has the thread of interference that comes from neighborhood service emitting radio waves based on improper manner. The interference sources could come from intentional activity or unintentional activity. In this paper, we will discuss an acute case of interference in sub-10 MHz of the Aeronautical Allocation Band that is pirated by traditional fishermen during their fishing activity in the Java sea in which an area of high density traditionally fishery activity. In this discussion, we propose a fundamental mitigation action to the Administration to avoid more destructive results, by giving a system called two ways radio simplex by using a 5.2 MHz/VHF-UHF crossband radio communication system. The Administration agrees to carry out POC (Prove of Concept) activity by this fiscal year.

Keywords: Harmful Interference, Sub-10 MHz, Crossband, HF, VHF-UHF.

04. [IES-ETA]

Robotics Technology and Control Systems

Fork AGV : Estimation Of Combined Magnetic Sensor With Vision Guide Applied On Automatic Mobile Transporter For Navigation And Accurate Positioning

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Abstract - The project creates a Fork AGV robotic navigation system that aims to increase the speed of goods mobilization and effectiveness at operational costs and reduce the high level oferror in the world of warehousing and industry then replaceit with the creation of an automatic integrated navigation and control system of AGV robots. This AGV robot prototype using navigation with a combination of lIDAR sensor for localization and environmental mapping processes, cameras to detect objects that will be targeted by robots and magnetic sensor pins that will be used by Fork AGV robot to estimate and accurate position of robots that will become a guide to the operational motion of the Fork AGV robot. The use and development of the sensor can make a Fork AGV robot has better and more stable capabilities and performs an expansion and improvement of the system from an existing AGV robot.

Keywords: Fork AGV robot, Visual guidance, Navigation and Estimation control.

Simulation of Robot Swarm Cooperation using V-REP Simulator: Case Study Mobile Trash Bin Robot

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Abstract - This paper discusses the coordination system of two mobile robots when working together to complete a task. The system is built using a realistic 3D simulator called V-REP, where the two robot models in the simulator are controlled using two separated API-based programs in the same computer that are developed under Robotic Operating System (ROS) framework. The two program modules carry out the function of controlling navigation and communication. The two modules are connected to each other using a socket data communication model that has been packaged in a ROS node. Based on the results of the experiments that have been carried out, the two robots can work together well to complete the given tasks.

Keywords: coordination, simulator, robotic operating system, navigation, communication.

Ball Position Transformation with Artificial Intelligence Based on Tensorflow Libraries

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Abstract - Research on wheeled soccer robots has been carried out by several researchers. This is due to the existence of national and international competitions. Previous research was to create a ball position transformation system with a modified method of neural network architecture. This research was developed by building an intelligent transformation system with the Tensorflow library. This transformation system aims to be able to directly measure the distance of objects in real terms without first changing the environmental image from an omni field to a flat plane with conventional camera calibration techniques. This process can replace manual calibration with a variety of field size changes The system can transform with mean error 0.0000026 on epoch 10000 using "conda-tensorflow neural network" libraries. It can transform the position of the ball from the omni space to the cartesian space. This system was implemented on wheeled soccer robot as keeper.

Keywords: wheeled soccer robots, neural network, transformation, tensorflow.

ROS Based Multi-Data Sensors Synchronization for Robot Soccer ERSOW

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Abstract - Autonomous robots that have an important role in several sectors in humans life, one of them is RoboCup competition. ERSOW robot soccer from Politeknik Elektronika Negeri Surabaya that participated in the Indonesian Wheeled Robot Soccer Contest, has many abilities such as object detection & image classification, control & navigation system, and the abilities to communicate and set a team strategy. This research focused on ROS Middleware to synchronize all multiple-input data sources into ERSOW robot system. TimeSynchronizer algorithm was used to form a single dataset callback at one time by looking at the timestamp data header from all published topics. With this proposed system, ERSOW robot could make an effective decision system to save the CPU workload. The result showed that out proposed synchronization system using ROS Middleware has a relatively small about 3.9 % and could save the CPU workload up to 4.05 %.

Keywords: ERSOW Robot Soccer, ROS Middleware, Synchronization, TimeSyhchronizer.

3D Object Detection and Recognition based on RGBD Images for Healthcare Robot

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Abstract - Lately, during the COVID-19 pandemic, hospitals experienced an increase in the number of patients due to the rapid spread of the virus. The need for services in hospitals has increased compared to normal days. Therefore Healthcare Robot is needed that can help the service of patients and medical personnel in the hospital. The robot must be able to detect and recognize existing objects and put them in the expected place. The sensor itself here uses a camera depth or stereo camera. The input results are in the form of RGB-D Image, which we then convert to point cloud to get 3D information. Then the 3D information will be segmented and clustered to get the object to be detected using a RANSAC and Euclidean Cluster. Then feature extraction uses the Viewpoint Features Histogram (VFH) descriptor to get the characteristics of the object. Then the matching with the dataset using the Artificial Neural Network continued with Labelling and visualization of the result. With this system, the robot can detect and recognize objects around the hospital so that the robot can take action on these objects. At the end of this project, nine datasets and three scenes resulting from capture by the writer were tested. The results show an average accuracy of 90.77% for testing three multi-object scenes and 98.73% for testing one object.

Keywords: 3D, Object, Detection, Recognition, Pointcloud, RGBD.

Vision-Based Positioning Estimation on the ERSOW Robot Soccer by Utilizing Unique Landmarks in the Field with a Computational Process using GPU

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Abstract - Robot soccer is an autonomous robot capable of playing soccer. ERSOW is the name of a soccer robot that was researched by the Surabaya State Electronics Polytechnic which took part in the Indonesian Wheeled Soccer Robot Contest (KRSBI Wheeled). All the rules in the KRSBI Wheeled match follow the RoboCup rules. One of the abilities that a soccer robot must have is determining the position (x, y, θ) of the robot in the field or known as localization. Previously, the localization method on the ERSOW robot only used odometry sensors and IMU sensors, but this method has a high percentage of error due to the slip movement of the rotary encoder when the robot is maneuvering in the field so that the target coordinates that should be targeted are shifted. This shift is known as the odometric error shift. From these problems, we propose a Localization self-positioning estimation on the ERSOW robot while maneuvering in the field. Self-positioning estimation on the ERSOW Robot utilizes the vision camera sensor by estimating its position (x, y) against unique landmarks in the field. The unique landmarks that are used as references are the foot of the goalposts, the white field line in the x-axis direction, the white field line in the y-axis direction, and 2 points where the circular lines meet in the middle of the field. As for the heading position (θ) using the IMU sensor. The goalpost detection uses the tiny Yolov4-Radial Search Lines method and the line detection in the field uses the Radial Search Lines method. Robot Operating System (ROS) is used to process data for each robot's work process. Vision data processing is handled directly by the GPU to improve the computing process. The results of using this GPU system are able to detect the goal with a processing speed of 58.39 FPS and 62.60 FPS for the detection of circular line meeting points. This system succeeded in estimating the approximate coordinates of the robot (x, y, θ) to the field with a success of 94.93% with an error of 5.17%. Errors in the estimation of coordinate positions are caused by less than optimal landmark detection. However, when the robot is on the line, the estimated position of the robot (x, y, θ) is 100% in accordance with real conditions.
accordance with real conditions.

Keywords: ERSOW Robot Soccer, Self-positioning estimation, Localization, Landmark, Radial Search Line, ROS, GPU, IMU.

Detecting Human Attendance using 1-Dimensional Foot Signal from Laser Range Sensor

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Abstract - Detecting dynamic and static objects is one of the important abilities for a mobile robot, including a healthcare mobile robot. As long as the robot carries out its duties, it will often encounter objects, both dynamic and static. Therefore, recognizing the dynamic and static objects is crucial. In this paper, the existence of human as an example of dynamic objects is obtained using a Laser Range Finder (LRF), since it can work faster than ordinary cameras. To recognize human data obtained from LRF, a sliding window process is applied to get the signal data of human feet which will then be classified using the Support Vector Machine (SVM). Meanwhile, to overcome the difference in the size of the human foot signal caused by the distance changes, a pyramid scanning process is also applied. Based on the experimental results obtained, human can be detected from a range of distances 1 up to 4.25 meter within 73 msec.

Keywords: laser range finder, support vector machine, sliding window, pyramid scanning, human foot signal.

Forward Kinematics with Full-Arm Analysis on "T-FLoW" 3.0 Humanoid Robot

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Abstract - This paper develops and analyzes a set of arm and hand mechanical system of the T-FLoW Humanoid Robot, which consists of a 7 Degree of Freedom (DoF) Arm and a 6 Degree of Freedom (DoF) Hand. With Kinematic calculations, mathematical modeling of the arm can be obtained using rotational matrices and translational matrices based on the rotational frame at each joint of the robotic arm and hand. Forward Kinematic (FK) analysis requires a combination of homogeneous matrices obtained from the rotation frame of each joint and the distance of each joints. From the results of Forward Kinematic, it can be used as a robot modeling in Matlab visualization by comparing robot's hand and arm model on V-REP so that the original pose of the arm and hand of the Humanoid T-FLoW robot can be known.

Keywords: Kinematics, T-FloW Humanoid Robot, homogeneous matrices, Forward Kinematics.

Color Based Object Segmentation on Wheeled Goalkeeper Robot

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Abstract - The ball detection system is a basic ability that must be possessed by soccer player robots, including goalkeeper robots. With the ball detection system, the robot can find out the position of the ball on the field. The position of the ball relative to the goalkeeping robot and the direction of its motion can affect the decisions and movements that will be made by the robot. In other words, the ball detection system has an important role for the goalkeeper robot in blocking the ball that threatens the goal. The problem that is often encountered with this detection system is, the system will detect all objects of the same color in the image even outside the field. This causes the robot to process the wrong information. To overcome this error, an elimination process is carried out on the area outside the field in the input image. This paper presents an object segmentation and detection system. To get the position of the object, it is done by calculating the moment of the contour. After doing some experiments, the result obtained that system successfully eliminates some areas outside the field from the image. This system also only detects the ball and robot in the field, with an average of processed frames per second (fps) is 31 fps.

Keywords: color, segmentation, contour, moment, robot, ball.

Development of Visual Data Acquisition Systems of Household Objects

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Abstract **-** What is most needed in the development of intelligent robots is visual information. Especially, Domestic Service Robots (DSR) in carrying out their duties in a complex and dynamic environment such as a household. To accomplish the task given in such environment, various kinds of recognition including household object recognition are necessary. The first step in object recognition is object learning, which one of the processes needs visual information. This information is provided by a visual sensor such as a second version of Microsoft Kinect (Kinect V2). Kinect V2 provides data such as, color information, depth information, and near infrared information. To make the object learning process simple and trackable, the development of object data acquisition systems is needed. In general, the captured data will be incorporated with labels such as the name of household object and the corresponding pose. To facilitate the object labeling, we develop smartphone applications to enable simple user interaction. To capture visual information in several poses, we make a turntable that can rotate synchronously during the data acquisition process. To extract the visual information of the object autonomously, an object extraction is inevitable. To this end, we propose an object extraction based on combination of information captured from Kinect V2. Our proposed method using a probabilistic method which integrates several Gaussian Mixture Models (GMM). Evaluation of proposed systems has been done through several experiments. Based on conducted experiments, our systems can capture the household object with size specifications greater than 3 *cm* × 3 *cm* × 2 *cm*, smaller than 28 *cm* × 28 *cm* × 30 *cm*, and with a weight not exceeding 800 *g*. In addition, the proposed systems can extract 40 objects (each of which covered 40 poses) with the F1-score of 76.43%.

Keywords**:** data acquisition, household objects, visual information, object extraction, Kinect V2.

Fuzzy Social Force Model for Healthcare Robot Navigation and Obstacle Avoidance

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Abstract - Autonomous navigation is one of the important functions of the Healthcare Robot to produce obstacle-free movements in the social environment inhabited by humans. In carrying out its duties, the robot will do a lot of navigation from the origin to the destination. Healthcare Robot uses a Laser Range Finder to detect objects around the robot. The results of detection are distance and angle data from the object. Then, the data is used as input for the Fuzzy Inference System (FIS) process to produce an appropriate gain value to control static and dynamic force of the Social Force Model (SFM). The parameters of the SFM influence the robot's response to the detected object. To obtain the optimal gain value, the FIS is used to change the parameters adaptively. Adaptive parameters are used to prevent the robot from making unexpected navigational behavior that may be dangerous, threatening to others, and potentially self-destructive. From the tests carried out in two conditions, the robot successfully navigated from its initial position to the goal and was able to respond to objects around it with the percentage of success in all scenes was 77.75%.

Keywords: Autonomous Navigation, Object Detection, Fuzzy Inference System, Social Force Model.

Improved Damped Least Squares Inverse Kinematics with Joint limits for 7-DOF "T-FLoW" Humanoid Robot Manipulator

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Abstract - The manipulator robot on the humanoid robot has functioned as an arm to grasp objects. The end-effector position of the robot is must first be known to perform the grasping task. Therefore, using the kinematics solution to find the robot end effector position in the Cartesian space. This research paper presents the inverse kinematics of the 7-DOF TFLoW humanoid robot manipulator using the Improved Damped Least Squares method with joint limits to avoid mechanical limitations. Forward Kinematics with the Homogeneous Transformation Matrix is used in the solution to find the current position of the end-effector in the Cartesian space. This research using the DLS method because it can avoid kinematic singularities and performs better than pseudoinversebased formulations. The experiment results show that the improved solution is more robust in performing joint limitation and generating more natural motion than the original DLS.

Keywords: Inverse Kinematics, Damped Least Squares Method, Joint Limits, Redundant Manipulator, Humanoid robot.

ERISA Robot's Walking Trajectory Control using Pixy CMUcam5 to Locate the Target Position

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Abstract - The robot contest is one of the fascinating events that drive innovation in robotics research and development. ERISA is a humanoid robot dancing developed by EEPIS students to participate in such a contest. ERISA robot is designed to be able to dance traditional Indonesian dances with agile and attractive movements. ERISA robot has a mission to dance and move from the Start Zone to the Finish Zone. Unfortunately, it is hard to make the ERISA robot stop at the desired zone without rigorous tuning because the walking trajectory in ERISA still uses an open-loop control. Since each field zone in the game field has a different color characteristic, it can be used as the robot's guidance to assist its walking trajectory. In this research, the Pixy CMUcam5 camera will detect the Finish Zone in the game field and marked it as the target position. Since the robot heading is changing during its movement, an Inertial Measurement Unit (IMU) sensor is used to correct the projection of the target position. Thus, the location is processed in the form of (X, Y) coordinates, which are used as the reference to control the robot walking trajectory. As a result, the robot can walk towards the target accurately.

Keywords: Humanoid robot, ERISA, Pixy CMUcam5, walking trajectory.

Improvement of the Processing Speed of The Robot's Vision System Using Robot Operating System

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Abstract - This Research presents the improvement of the processing speed of the vision system at Robot ERSOW using Robot Operating System. In Mobile robot Soccer ERSOW to perform the ability to find the ball, kick the ball, avoid the obstacles, and shooting the ball into the goal, accurate supporting data is required. There are 3 objects that have been detected by this vision system, that is ball detection, robot detection, and obstacles detection. Based on the number of objects detected, vision systems in ERSOW robot require large computations and processing times. Therefore, by using Robot Operating *System (ROS),* the speed of the object detection process in the ERSOW robot vision system can increase rapidly. In addition, using ROS and the upgraded detection concept will consume less memory computing. In this research, the result of ball detection average FPS will increase by ±17.19% and the average computation of the ball detection will decrease by ±16.67% with the average speed processing ±18 ms. For obstacle detection using ROS, the average FPS will increase by ±32.92% and the average computation will decrease by ±16.10% with the average speed processing ±13 ms. And for the detection of robots using ROS, the average FPS will increase by ±19.07% and the average computation will decrease by ±13.78% with the average speed processing ±26 ms.

Keywords: ERSOW robot soccer, Robot Operating System, Ball Detection, Robot Detection, Obstacle Detection.

A Development of Mobile Robot Based on ROS2 for Navigation Application

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Abstract - This paper proposes an automatic navigation mobile robot using Robot Operating System2 (ROS2) with lowcost embedded hardware. Utilizing Data Distribution Service (DDS) in ROS2 makes the ROS2 more safe and reliable than ROS1. Cartographer and Navigation2 projects in ROS2 are used for Simultaneous Localization and Mapping (SLAM) with 2D LIDAR and navigation, respectively. Micro-ROS which utilizes DDS for eXtremely Resource-Constrained Environments microXRCE-DDS is used for communication between main embedded computer and microcontroller replaces ROS serial communication which is less reliable. The experiments prove that the robot can perform mapping and navigation tasks. A robot can generate a global trajectory in a static map to the goal point, can re-plan the local path in the local map area to avoid coming dynamic obstacles during the mission and navigate itself to reach the goal.

Keywords: *ROS2*, navigation, autonomous mobile robot, micro-ROS, SLAM.

Walking Gait Learning for T-FLoW Humanoid Robot Using Rule-Based Learning

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Abstract - This work presents the fast and simple learning algorithm for humanoid robot walking gait cases. The standard method of reinforcement learning takes too much time to learn a stable walking gait. Thus, we propose rule-based learning method that has never been used in this kind of walking gait learning cases. We implement our method in simplified T-FLoW humanoid robot model in simulation software CoppeliaSim. The result shows by using our proposed method, T-FLoW humanoid robot is able to walk for 200 steps after taking learning process for about 800 episodes and has a better walking performance compared to the classical pattern generation for planning a walking gait motion.

Keywords: T-FLoW, humanoid robot, learning, walking gait, CoppeliaSim.

Quadruped Robot Balance Control for Stair Climbing Based on Fuzzy Logic

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Abstract - Robots are a tool that is widely developed today, such as Humanoid, Animal, and others. In this study we discussed about animal robots. One such type of robot is Quadruped Robot. The problem that often arises in quadruped robots is that when performing stunts to be able to walk up or climb a ladder, the robot will not be able to walk with the posture adjusting the slope in the arena. This is due to the effect of earth's gravitational force that results in robots always being attracted to earth. This results in the robot's body losing balance and can accelerate damage to the servo motor due to the robot's unbalanced load. With this problem, this paper makes the control system with Fuzzy Logic place the load position in the middle of the COG (center of gravity) to balance the robot on the trajectory. The balance of the robot uses the IMU (Inertia Measurement Unit) position sensor reference with the reference derived from the angle slope (Yaw, Pitch and Roll) which is processed to adjust changes in the x, y and z axes, so that the robot can adapt to the trajectory of the stairs.

Keywords: Quadruped Robot, Body Balance, Fuzzy Logic, Gait Algorithm, Inverse Kinematic.

Implementation of IMU-based Balanced Motion using ROS for EROS Humanoid Soccer Robot

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Abstract - Humanoid robots are robots formed based on the human body and capable of interacting with equipment and environments made for humans. In designing a humanoid robot, the balance of the robot is a fundamental thing to carry out various activities. The control establishment runs on the ROS platform with the target of getting stable running. The system construction design is carried out to connect the ROS platform with the robot. The design of software construction starting from virtual robot visualization can be done by creating a simulator that contains dynamic parameters. The humanoid robot movement can be tried many times until the robot movement is robust with the simulation. A simulator containing dynamic z parameters can be created by applying the URDF Model to the Gazebo simulator and supported by the ROS framework. Feedback in the form of position and torque is needed to determine the difference between simulation and reality. The feedback is also to find out the truth of the virtual robot visualization. Simulations can be carried out without cost, risk, and most importantly mimic the real robot soccer environment and tested in real conditions.

KeyWords: Walking Control, Humanoid Robot, ROS, balancing robot, Gazebo simulator.

FLoW-Vision: Object Recognition and Pose Estimation System based on Three-Dimensional (3D) Computer Vision

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Abstract - This paper presents a three-dimensional computer vision-based object recognition on FLoW-Vision in RoISC (formerly ER2C) has entered its second phase. Previously, the robot had a basic vision that was used to replicate 'human-like' visual skills using 2D computer vision. As a result of the above discussion, we proposed the design and implementation of an object recognition and pose estimation system based on three-dimensional computer vision to handle object recognition and pose estimation tasks in real-world environments simultaneously. In the object recognition process, a point-cloud segmentation method is used to obtain possible object clusters before starting the calculation of feature description. Then, a keypoints-based two-stage matching process is performed to speed up the computation of finding correspondences between the object clusters of the current scene and a colored point cloud model of an object. Next, a Hough voting algorithm is employed to filter out matching errors in the correspondence set and estimate the initial 3D pose of the object. Last process process the pose estimation from clustered object using RANSAC to search the largest surface as Z surface. Experimental validate the object recognition can work correctly with percentage 100% and pose estimation accuracy of the proposed system can work correctly with percentage 60% in a complex realworld scene.

Keywords: Computer Vision, 3D Image Processing, 3D Object Detection, RGB-D Image, Point Cloud

Walking Trajectory Control for Humanoid Dancing Robot ERISA based on Field Guardrail

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Abstract - Humanoid robots are robots that resemble humans. ERISA robot is a robot made by EEPIS participating in the KRI robot competition in the humanoid dancing robot division. This robot has a mission to walk and dancing in predetermined game field zones. While dance, the walking trajectory may drift outside the desired zone since there is no feedback for the robot to correct its trajectory. In this research, a VL53L0X rangefinder sensor and an IMU MPU6050 sensor are deployed in the system to measure the robot position against the fence installed in the game field. The sensor is mounted on the side sole in one of the robot legs. The sensor will give the relative distance from the robot to the fence and its absolute heading angle. The footstep distance will be calculated using odometry by using the robot steps and its angle heading. By using walking-trajectory control the robot can move in the desired trajectory relative to the fence, which is used as the guardrail, while the robot walks to the target zone in the game field.

Keywords: Humanoid robot, heading angle, rangefinder, IMU, walking trajectory.

Position and Orientation Control of Three Wheels Swerve Drive Mobile Robot Platform

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Abstract - Drive technology for mobile robots is currently developing very quickly, especially for the type of wheeled driven platform. The driving models such as Ackermann steering, DDMR, and Omni-wheel robots have been widely implemented as mobile robot platforms. However, to answer the challenges in the robot contest where the competition is getting tougher, research is needed on a mobile platform that is more efficient, faster, and more precise. In this research, the design and fabrication of a mobile robot platform with a swerve drive model will be carried out. Swerve drive has independent driving and steering at each wheel. This model can provide a higher speed and freedom of maneuver for the robot compared to the DDMR, Ackermann steering, and Omni wheel drive models. However, swerve drive requires a higher number of motors as well as a more complex control algorithm in regulating the speed of the wheel drive motor and the steering angle on each independent wheel to be further controlled simultaneously in moving the robot to the target position and orientation. In terms of the control system, a multi-level control will be made where the low-level control will regulate the speed of the wheel drive and its relative direction to the robot's body. Meanwhile, high-level control will be used to coordinate the movement of each wheel so that the results can make the robot to move according to the given trajectory.

Keywords: Mobile Robot, Holonomic Motion, Swerve Drive, Multi-level Control, Position and Orientation Control.

Wall Following and Obstacle Avoidance Control in Roisc-v1.0 (Robotic Disinfectant) using Behavior Based Control

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Abstract - A robot that can move independently is an essential aspect towards replacing humans in hazardous work conditions. This paper shows the development of a mobile robot called ROISC-v1.0 (Robotic Disinfectant), which executes the sterilizing procedure in the room using UV light with a wavelength of 222nm. The goal of this study is to create a wall-following navigation system with obstacle avoidance capabilities. The modeling of the behavior-based control method is used in the application of a navigation system, including wall following and obstacle avoidance so that the mobile robot can modify linear and angular speeds based on the course of motion. Behavior-based control is used to eliminate the robot's reliance on its work area conditioning. To identify the distance between the robot and the wall, as well as the existence of obstacles in the robot's work area, the ROISC-v1.0 robot uses array of 12 Lidar sensors type VL53L0X. As a result, the robot navigates successfully to follow the contours of the wall and avoiding static and dynamic obstacles. When there are no obstacles in the way, the ROISC-v1.0 robot can perform optimally and efficiently in a 4.5m × 2.8m work area with an average robot travel time of 73.4 seconds and an average robot distance of 880.4 cm. With an average travel time of 109 seconds and a distance of 1052.4 cm, the robot can perform optimally and efficiently in regions where there are obstacles. The VL53L0X ToF sensor, which uses light waves in the transmission process and has an average inaccuracy of 0.7cm, allows the robot to read bright objects more accurately. The ROISC-v1.0 robot is hoped to aid medical professionals as the result of this research, minimizing the impact of virus dissemination caused by the sterilization process..

Keywords: Behavior-Based Control, Obstacle Avoidance, Omniwheel Mobile Robot,Potential Field, Wall Following.

05. [IES-KCIC]
Knowledge Base and Engineering

Text Minig in Healthcare for Disease Classification using Machine Learning Algorithm

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Abstract - The development of information technology and smartphones has caused production of many data around us. In every second million of new data is created in the form of text, audio, image and even videos. This environment then has triggered big data analytics demand. One of big data that is produced daily is data on the history of healthcare services in hospitals. Important new information can be retrieved through this huge dataset, especially concerning the patient symptoms, drug usage and new diseases report. In this study, text processing technique is applied on text data of patient medical record data from public hospital during 2017 till 2019 regarding the patient symptoms and the disease classification. Naïve Bayes Classifier and Random Forest algorithms are used to classify diseases in medical record data with 19 diseases in preprocessing data. A list of modified Indonesian stop words was used to filter the symptom sentences. The result indicates that the Random Forest classification algorithm can achieve the highest accuracy of around 99.9%, better and more accurate than the Naïve Bayes classification algorithm. This experiment shows that our proposed method provides a robust system and good accuracy for classifying medical record data with many diseases.

Keywords: Text Mining, Healthcare, Disease, Naïve Bayes, Classification, Random Forest.

TraEx: Traditional Arts & Crafts Event Recommendation System with Lifetime Experience for Regional Revitalization

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Abstract - In this study, we present a design of a traditional arts & crafts event recommendation system with users' preference and experiences, named TraEx. The aim of this study is to promote a regional revitalization in manufacturer/provider sides and a lifetime value increase in customer sides. The proposed system TraEx acquires information of a user's current preference for traditional arts & crafts and the user's location and time, extracts events or workshops related to traditional crafts that can be participated from the user's current spatiotemporal conditions, and recommends available events and E-Commerce sites for the user to purchase related products to the user. In addition, detailed information such as start and finish time, place and cost of the recommended events, related products, EC sites, manufacturers and high-valued knowledge of cultural and historical background will be displayed on the user interface of TraEx, aiming to increase various intellectual information for users, which will lead to user's lifestyle-change and regional revitalization. This study focuses on social implementation of SDG 11 and 12.

Keywords: Spatiotemporal Database, Culture, Art, Recommendation, Event, Preference, Visualization, Map.

User Experience Design for Virtual Exhibition Platform Using Lean Startup Method

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Abstract - The MICE (Meeting, Incentive, Convention, and Exhibition) industry plays an essential role in increasing Gross Domestic Product (GDP) revenue in Indonesia. The Covid-19 pandemic has resulted in the shift of MICE events from offline to online. As a result, the demand for virtual exhibition products is very high. On the other hand, Virtual exhibition has a reasonably broad user segment, causing the User Experience (UX) of virtual exhibition products to be very complex. This complexity requires several iterations to get accurate results. This study proposes a UX design for virtual exhibition products with a Lean Startup approach and User Research. The case studies used are several online events that have been held through the SimHive platform developed by a team from PT. Maulidan Creative Technology. Since the first iteration of SimHive, every data collected is processed to produce a suitable UX for the Indonesian market. We tested the web from the visitor feature on the desktop in three iterations. Each iteration got NPS values of 14.74%, 43.74% and 15.44%, with confidence values of 88.95%, 85.94% and 64.73%. Meanwhile, web testingfor the visitor feature on mobile is carried out in two iterations. The NPS value of each iteration is NPS 54.23% and 100%, with a confidence value of 85.08% and 29.33%. The NPS and confidence values that are always positive in each iteration indicate that the UX model applied to SimHive can be accepted by various user segments in Indonesia.

Keywords: Virtual Exhibition, Lean Startup, User Research, User Experience, Net Promoter Score.

06. [IES-KCIC]
Computational Intelligence

Implementation of SUMO Simulation for Comparison of CVRP

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Abstract - With the rapid increase in human density, development, and mobility in urban areas, the need for logistics distribution systems is increasing which is an important part of connecting industries with their consumers. Thus, route planning is an important thing for the industry. Therefore, this paper proposes a comparison of several vehicle routing problems algorithms and test the routes that have been obtained on a simulation system based on real conditions. Our proposed algorithm consists of Mixed Integer Linear Programming (MILP), Clarke-Wright and Reinforcement Learning algorithm using Markov Decision Process. Digital maps, customer data and route planning results will be converted into a SUMO simulation. We compare the performance of the algorithm with parameters consisting of the number of routes, distance traveled, computation time and simulation time. The experimental results show that the MILP algorithm has the best performance with the most optimal route results, but other algorithms have a lower computation time.

Keywords: Maximum Power Point Tracking, Artificial Neural Network, Incremental Conductance, Short Circuit Current of Solar Panel.

Performance Analysis of Driver Abnormal Behavior Classification System Using Enhanced Multi-Layer Perceptron

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Abstract - Traffic accident is one of the contributing factors of the death that happened around the world. From various types of drivers that are usually found in the traffic, motorcycle drivers have a relatively higher risk compared with other types of drivers. Therefore, there is a need for a system that is capable to detect dangerous behavior from the driver and gives an alert when abnormal behavior is detected. To develop it, we choose the 2 basic sensors to detect the movement from a driver, which are Accelerometer and Gyroscope. These sensors have been integrated into a smartphone. For the classification process, we proposed an Enhanced Multi-Layer Perceptron (MLP). The complexity of the model is reduced to ensure that our proposed system will be able to work in real-time conditions and in a limited-resources environment. In our model, we use the combination of ReLU and Softmax function, two of the famous Activation function, to enhance the performance of our model. The level of accuracy of our model achieved 97.5% with an average computational time of 45 ms. This proved that our model works better than the previous research with the same dataset.

Keywords: Traffic Accident, Multi-Layer Perceptron, Activation Function, ReLU Function, Softmax Function.

Comparison of Optical Flow Methods: Study About Left Ventricular Tracking in Multi View Echocardiographic Images

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Abstract - The purpose of tracking the left ventricle on multi view echocardiographic images is to determine the condition of the heart by assessing the size of the cavity from systole to diastole. But the assessment is currently still using manual measurement methods, so it requires a high level of concentration. So to track the left ventricle in multi view echocardiographic images, there are two tracking methods, which are optical flow farne back and optical flow lucas kanade. A direct comparison between the performance of optical flow farne back and optical flow lucas kanade is important for determining more accurate tracking. This paper uses 40 datasets with 10 picture frames in each data. The results of the experiment obtained the accuracy of optical flow farne back is 79.17% with a sensitivity of 87.23%. In comparison, the accuracy of the optical flow lucas kanade is 83.27% with a sensitivity of 91.51%. From these results, the optical flow method lucas kanade has a higher level of accuracy than optical flow farne back. Lucas kanade optical flow method has an accuracy rate of 83.48% with a sensitivity of 89.21%.

Keywords: Echocardiography, Heart, Optical Flow, Performance, Lucas Kanade, Farne Back.

BiLSTM-CNN Hyperparameter Optimization for Speech Emotion and Stress Recognition

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Abstract - The most automated speech recognition (ASR) systems are extremely complicated, integrating many approaches and requiring a high variety of tuning parameters. Deep understanding and experience of each component are required to achieve optimal performance in ASR, confining the development of ASR systems to the experts. Hyperparameters are crucial for machine learning algorithms because they directly regulate the behavior of training algorithms and have a major impact on model performance. As a result, developing an effective hyperparameter optimization technique to optimize any given machine learning method would considerably increase machine learning efficiency. This work investigates the use of Random Forest and Bayesian to automatically optimize BiLSTM-CNN systems. We built the ASR based on the BiLSTM-CNN model and customized its hyperparameters value to heed our low-hardware specification during optimization. Furthermore, we gathered 1,000 clips of speech data from various movies, classifying them according to emotion and stress classes. In pursuit of contextual-level understanding in our ASR, we transcribed our speech data and used the bigram textual feature. Our Random Forest-optimized BiLSTM-CNN model ultimately reaches 84% of accuracy result and learning runtime in under 17 seconds.

Keywords: Automatic Speech Recognition, Hyperparameter Optimization, BiLSTM-CNN, Random Forest, Bayesian Optimization.

Emotion Recognition from Speech using Convolutional Neural Network and Combination of Four Speech Features

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Abstract - Along with technological developments, interaction based on speech does not only occur between humans but also occurs between humans and computers, known as Human-Computer Interaction (HCI). Most HCI system applications focus on contextual information. Whereas in a conversation, emotions are also important information in communication. This study combined the differential MFCC with other features, namely MFCC, chroma, and mel frequency spectrogram. The highest accuracy results in the SER data test were obtained from the test when only using one feature, namely the MFCC of 95.24%. The second-best accuracy is when using delta MFCC with an accuracy of 90.18%. And the use of 4 features (MFCC, Delta MFCC, Chromagram, and Mel Spectrogram) has the lowest accuracy compared to the others, 87.58%. In addition, the use of four features also has a longer computing time.

Keywords: Human-Computer Interaction, Speech Emotion Recognition, Speech Features, CNN.

Blood Cells Classification for Identification of Acute Lymphoblastic Leukemia on Microscopic Images Using Image Processing

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Abstract - Acute lymphoblastic leukemia (ALL) is a type of leukemia (cancer of the white blood cells) that generally occurs in children. ALL have 3 sub-types, namely L1, L2, and L3. Microscopic examination to classify ALL subtypes are still done manually by hematologists through visual identification under a microscope, it is difficult to classify ALL subtypes because the characteristics of each subtype are almost the same. This paper proposes a system that is able to detect and classify subtypes of Acute Lymphoblastic Leukemia blood cells using Image Processing. The classification method using K-Nearest Neighbor (K-NN) algorithm based on geometrical and statistical features. In cell object detection, the pre-processing step is used to improve the image quality before going further to the segmentation step using threshold and watershed algorithms. 73 K-NN Dataset from all subtypes of ALL image features were generated to calculate the similarity between new unseen data. In testing results, our proposed classification system achieves 80 % overall accuracy. Each subtype's accuracy was 75 %, 73.33 %, and 93.33 % for the L1 subtype, L2 subtype, and L3 subtype.

Keywords: Acute Lymphoblastic Leukemia, ALL Subtypes, Image Processing, Classification, K-Nearest Neighbor.

Performance Enhancement of Multi-Camera Handoff Scheme using ANFIS Method

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Abstract - The multicamera system aims to monitor a human target for surveillance activity in wide-area observation. The monitoring task will be done by the cameras using a handover process among them, following the moving target. The most important thing for the handover scheme is the execution time to do the decision-making process by the server. The slower the execution time of the handover decision, the slower the target is handled by other cameras. The consequence of this case is there is the possibility that the target will escape from the monitoring system. This paper provides a development technique for hand-offering human targets in the multicamera system based on the fuzzy logic decision-making process. An Adaptive Neuro-Fuzzy Inference System (ANFIS) method is proposed as a decision-making process to decide whether a human target should be handed over from one camera to another camera or not. The performance of the proposed method was examined by comparing it with the Cascaded-FIS method. The simulation result shows that the computation time to make the handover process has been reduced up to 62.88 % by utilizing the proposed method, faster than the Cascaded-FIS method.

Keywords: Handover Scheme, Multicamera System, ANFIS, Human Target, Decision-Making.

Comparison of Neural Network and Random Forest Classifier Performance on Dragon Fruit Disease

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Abstract - Measuring the performance of several classifiers in the modeling process, based on datasets with certain criteria, becomes important. It used to determine which classifier is more reliable for a particular task. Neural network will be compared its performance against Random Forest using dragon fruit datasets. Consisting of 41 images of healthy and sick fruit and leaf, it is divided into four classes, both classifiers were used in two comparing experiments. The validation used is 10-fold cross-validation. The results obtained are not much different from the prediction accuracy in the range of 70% to 82.9% for both classifiers.

Keywords: Neural Network, Random Forest, Dragon Fruit Datasets, Classifier Performance, Modeling.

Employing Machine Learning with Optimized SVM Parameter to Detect Water Pipe Leakage

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Abstract - Most products, such as drinking water, oil, gas, and other petrochemical products, are distributed through pipe lines which are considered economical and safe. Regardless the fact, pipe line distribution is susceptible to leakage that could bring about loss to business institutions and pollution to surrounding environment. This study is focusing on the detection of water pipe leak using flow rate parameter. Testing is carried out on dataset format, both using direct data and already processed data format using volume balance method in detecting leakage. The teaching of machine learning needs to highlight some critical phases such as pre-processing, normalization method, and the applied kernel function method that enable to improve the prediction accuracy performance of both size and location of pipe leak. The data collected shows that size accuracy of leak of SVM model for raw dataset is 96.07% at minmax normalization, and for processed dataset is 69.71% at minmax normalization. For location classification, on the other hand, leak accuracy for raw dataset is 84.5% without normalization, and for processed dataset is 75.24% at z-score normalization. The use of optimized kernel function at z-score normalization has shown accuracy improvement in both size and location classification. The accuracy of leak size for raw dataset has improved to 98.25% and for processed dataset to 89.7%. For location classification, the improvement shows 88.96% for raw dataset and 74.42% for processed dataset respectively.

Keywords: Pipe Leak, Volume Balance, Support Vector Machine.

Automatic Detection of Retinal Diseases in Optical Coherence Tomography Images using Convolutional Neural Network

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Abstract - Some of leading causes of vision impairment and blindness in the world are retinal diseases, namely Age-Related Macular Degeneration (AMD) and Diabetic Retinopathy that can lead to Diabetic Macular Edema (DME). Detecting these diseases from Optical Coherence Tomography (OCT) images is required expert analysis to avoid misdiagnosis. In this study, we propose the automatic detection system to detect OCT images into four conditions (Choroidal Neovascularization (CNV), Diabetic Macular Edema (DME), Drusen, and Normal condition) using Convolutional Neural Network (CNN) with batch normalization (BN) for classification layer. The proposed CNN model was developed using transfer learning on several state-of-the-art CNN architectures in image classification and object detection using ImageNet dataset, including ResNet, Inception, and ResNeXt. The model development is carried out using several approaches, such as modification in the classification layer. The performance for each model is evaluated to obtain the best model, which has best performance. The best model from model evaluation is inceptionv3_bn, a modified model using batch normalization in classification layer with InceptionV3 architecture, that can achieve 99.793% accuracy, 99.794% sensitivity, and 99.931% specificity. The good performance that has been achieved show that the CNN model developed can be used to detect OCT images in four conditions.

Keywords: Age-Related Macular Degeneration, Diabetic Macular Edema, Optical Coherence Tomography, Convolutional Neural Network, Batch Normalization.

Mobile Based Offline Handwritten Signature Forgery Identification using Convolutional Neural Network

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Abstract - A signature is one of the official biometric identification media that has special characteristics that are difficult to distinguish just by comparing with existing signatures. This causes irresponsible people to use signatures as objects of forgery. In addition, handwritten signature identification is a challenge because it has less information when compared to digital signatures. This research proposes a new approach to identify handwritten signature forgeries using a convolutional neural network (CNN) using mobile-based. Two model architectures are compared with the same testing scenario. The first architecture is a simplification of the Siamese convolutional network namely adjusted CNN. The second architecture is a standard CNN with 6 convolution layers which in this study is called general CNN. CNN is used for both feature extraction and classification processes. The dataset is built with a limited number of individuals consisting of genuine and forged signatures. Based on the experiments, the accuracy of each network reached 88.89% for adjusted CNN and 84.45% for general CNN. Adjusted CNN then embedded in a mobile-based application to identify the signature directly. The application that is built makes the process of identifying signatures more ease.

Keywords: Signature Forgery, Mobile Based, Convolution Neural Network, Augmentation Data.

Monitoring Violations of Social Distancing COVID-19 On Standing Queues With Euclidean Distance Method

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Abstract - This paper presents about a solution for social distancing using computer vision technology, especially in a queue scenario. Social distancing is a series of measures used to prevent the spread of infectious diseases by maintaining physical distance between one person and another. To overcome these problems, we need a monitoring system that is used to detect violations in line. The system will detect the distance between people in line by using image processing. If the distance is not as recommended shorter than the limit, then the system will issue a warning through the output of image processing on the monitor. With this warning system, visitors are expected to comply with existing regulations. In this experiment, we compare two object detection algorithms. That algorithms are YOLOv3 (You Only Live Once) and mobilenetSSD (Single Shot Detector). Additionally, both algorithms are also implemented in CPU (Central Processing Unit) and GPU (Graphics Processing Unit) platforms. Based on our experiments, YOLOv3 on the GPU platform offer the best performance in term of accuracy and speed.

Keywords : COVID-19, Social Distancing, Image Processing

Smart Odontogram: Dental Diagnosis of Patients Using Deep Learning

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Abstract - Odontogram is a medical record for dental patient. It records the condition of patient's tooth and helps dentist to diagnose patient's tooth and to provide further treatment. Though, many dentists do not fill odontogram completely because either they are too busy to treat other patient, or they run out of odontogram form. Therefore, this research aims to build a platform that could help dentists to create, store, and analyze dental medical record called Smart Odontogram. The platform consists of cloud computing and edge computing. The cloud computing act as a server to store and analyze medical record using big data technology and deep learning, while the edge computing diagnoses the patient's tooth using intraoral camera with the help of artificial intelligence. The AI used in this platform is using deep learning method with YOLO algorithm. The test result shows that the model accuracy for diagnosing dental disease is 85.7% and tooth classification is 99.3%. The delay result for storing medical record on the cloud has average latency 5734.2ms, retrieve patient's medical record is 91.2ms, and analytic simulation time when uploading and analyze tooth image simultaneously is 1008.8ms.

Keywords : Cloud Computing, Edge Computing, Deep Learning, Odontogram, Medical Record.

Intersection Cylindrical Feature Recognition Algorithm for Counterbore and Countersink Geometry Application

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Abstract - This paper proposed an algorithm to recognize intersection cylindrical feature, especially counterbore and countersink geometry. The proposed algorithm analyzes 3D solid drawing in term STEP format to find intersection cylindrical feature based on a specific properties of counterbore and countersink geometry. The proposed algorithms was verified experimentally by implementing to holes inspector (HECTOR) software. A 3D product model with five different hole was designed to validate the proposed algorithm. according to the experiment result, counterbore and countersink on the 3D specimen product is properly recognized by the proposed algorithm.

Keywords : CAIP, OMM, Feature recognition, intersection cylidrical feature

Recognition of Food Material and Measurement of Quality using YOLO and WLD-SVM

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Abstract - This paper presents the development of a system for recognizing types of food materials and measuring their quality visually using a camera. The food material can be in the form of meat, vegetables, fruits and other processed food materials such as tempeh and tofu. We build a food material recognition system using YOLOv3-tiny, and measure the quality of food ingredients using the Weber Local Descriptor (WLD) feature which is then classified using the Support Vector Machine (SVM). Based on the results of experiments that have been carried out, the results of the recognition of food materials using YOLOv3-tiny reached 82.02% and the performance of food quality measurement results using WLD-SVM reached 83.33%.

Index Terms : food material, recognize, quality, YOLO, WLD

Multi-Class Image Classification Based on MobileNetV2 for Detecting the Proper Use of Face Mask

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Abstract - Wearing face mask in public has become a health protocol standard during this pandemic to prevent further spread of COVID-19. Even though the detection of inappropriate use of face mask is important considering that people sometimes ignore the health protocols by lowering their face mask so it does not cover their nose, studies regarding automatic detection of proper use of face mask are still few. Therefore, in this research we propose a multi-class image classification for detecting the proper use of face mask based on MobileNetV2 architecture as the base model. We also propose a trainable head model for the network, consisting of a depthwise convolution layer and two fully-connected layers, that gives high classification performance. The experimental results show that the proposed system gives a high multi-class classification performance with an accuracy of 97%, precision of 97%, recall of 97%, and F1-score of 97%. The running time of the proposed method is 265.94 seconds which is considered efficient compared with other models. Because of its light-weight network architecture, the proposed method is suitable for further implementation towards a real-time application of surveillance systems. Therefore, in this research we present the results of an initial experiment of the proposed model on a real-time detection system by using a web camera.

Keywords : face mask detection, MobileNetV2, multi-class image classification, real-time surveillance system, depthwise convolution

Design and Implementation of Real-time Pothole Detection using Convolutional Neural Network for IoT Smart Environment

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Abstract - Road is a transportation infrastructure that has a very important role in supporting the economic, social and culture as well as various other aspects of community life. Various community activities are affected by road conditions. Roads that are in good condition will provide comfort and facilitate economic activity in an area. However, in reality there are still many roads that are not in good condition, such as potholes. Various attempts have been made to detect potholes automatically, especially with the two-dimensional imaging method. In this paper, we propose real-time potholes detection using the Convolutional Neural Network (CNN) method based on the Edge Tensor Processing Unit (TPU) with the MobileNet SSD v2. Our system was implemented on Jetson Nano with several additional sensors such as a camera and GPS. The accuracy of the system is verified through experiments using the testbed.

Keywords : Pothole, CNN, Mobile Net SSD, Camera

07. [IES-KCIC]
Applied-Computing Sciences

Improving the accuracy of predicting disease risk scores using SOM clustering based on noisy feature

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Abstract - In providing health services, health workers need information about the patient's disease risk to ensure that the services offered are by their needs. Meanwhile, the classification algorithm will train the system to predict disease risk information. This study will prove that using clustering Neural Network Self Organizing Maps (SOM) can increase the accuracy of predicting disease risk scores due to noisy features in the dataset. Clustering carried out at the preprocessing stage resulted in grouping disease features from 841 categories to 247 categories. The design of SOM clustering consists of a matrix of 15 x 20 neurons, 100 epochs, root means square performance, resulting in an accuracy rate of 93.7% in 47 seconds. In the training phase, 38,659 public data from Kaggle were applied, divided into seven age groups. In each age group, the system classifies disease risk scores into 11 risk score classes. The results of SOM clustering are used as predictors in the prediction system through experiments using five classification algorithms. Based on the results obtained, the Fine Tree Algorithm has the highest increase in accuracy for the entire dataset, from 99.1% to 99.8%.

Index Terms : accuracy, disease risk score, noisy feature, prediction, and SOM clustering

Identifying Precautionary Measures for High-Risk Disease from Doctor's Answer Text Using LDA

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Abstract - The Online Health Consultation (OHC), which contains a Q&A collection of various diseases since 2014, has received an increasing number of visits due to the COVID-19. Based on the benefits and increasing health information need for people who seek information in OHC, health information related to precautionary measures to avoid diseases, especially high-risk diseases, become critical because not all seeker and readers of health information are diagnosed with certain diseases. However, It has currently unidentified whether the text of the doctor's answer corpus, especially in high-risk diseases, contains words that imply precautionary. This study aims to find the pattern of doctor's answer for high-risk diseases through the corpus of doctor's answer text on OHC by identifying whether the doctor's answer text contains words that imply precautionary against disease. Thus, it can help health information seekers and readers take precautionary against disease early on. This paper's contribution was to identify precautionary measures from doctor's answer text for high-risk disease in 2014-2021 using the best model of the two models, namely Single LDA (only LDA Method) and Hybrid LDA (a combination of LDA and Collapsed Gibbs Sampling). The results showed that the best model was Hybrid LDA, and medical experts identified groups of words with this model into four domains, namely symptoms/diagnosis, treatments, precautionary measurements, and general text. The pattern that emerges from the identification of precautionary measures shows (1) which precautionary measures are divided based on what disease, (2) Some words that mean precautionary measures also mean treatment or symptom/diagnosis.

Keywords : Topic Modeling, LDA Model, Collapsed Gibbs Sampling, Doctor’s Answer Text, Precautionary Measures

Development of Sandbox English Conversation Training Applications with Atomic Design

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Abstract - This paper presents the development of a sandbox with atomic design to overcome the difficulty of developing features and harmonizes the design of an English conversation practice application. Our idea to implement a sandbox with atomic design in an English conversation practice application is how the sandbox can be used to maintain and continue the development of an English conversation practice application in a more organized manner and with the same principles as the application development rules. We implement sandbox development with an atomic design architectural model. The initial application system breakdown process begins to evaluate component consistency, then to determine the token value or design variable. After the breakdown process, we redesigned the UI using token variables, then compile it with an atomic design approach to create a complex interface composed of simple parts or vice versa. After the design process, we implement the application UI using atomic design UI design into components, then projected in the sandbox. Inside the sandbox, we isolate components for testing, documentation, and validation. The result of the component after going through the sandbox, we launch it as an application component. We created the system that we propose with the aim of providing a process flow so that managers have the same perception in application development as well as space for managers to be able to strengthen the system or feature before it is launched so that development problems are resolved properly. In a performance test, atomic design was able to accelerate page generation production by 49.9% and reduce interaction costs by 72.7%.

Keywords : atomic design, sandbox, user interface, maintain, English.

Public Perception of COVID-19 Vaccine by Tweet Sentiment Analysis

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Abstract - The COVID-19 pandemic has given a tremendous impact on the economy, changed the way of living of the whole world. Many lives are lost, the labor markets are affected and the people lifestyle are changed in order to limit the impact of COVID-19 pandemic. As of now, it seems that the COVID vaccine is the only solution for the world to be safe again. In the United Kingdom and the United States, many studies have been conducted on the sentiment analysis where the emotions of participants before vaccination and after vaccination are observed. The first batch of vaccines has been launched at the end of 2020 while some developed countries started early vaccination campaigns, and others are still in the process of ordering vaccines and remained unvaccinated until early 2021. The vaccinations are prioritized on the high-risk groups, such as medical workers and the elderly population. Vaccination for people under age 18 are still not available in the initial stage. Despite the executions of vaccinations, there are various opinions on whether the COVID-19 vaccine is safe, and a number of the population remain skeptical of taking the vaccine. In this research, we analyze tweets to understand public perception on the COVID-19 vaccine by classifying the sentiments and attitudes towards the vaccination and the available types of vaccine. [1] Social media is an appropriate source of research to analyze public attitudes towards COVID-19 vaccine and what they feel about the various brands of the vaccine in the market. For this research, tweets written in two languages, English and Japanese, have been collected. In Japan, some related surveys on public willingness for vaccination and the sentiment analysis are already conducted. This study randomly surveys on the users' tweets about COVID-19 vaccination and their emotions expressed in their tweets. Due to the certain vaccination accidents, people in various countries become more concerned about the side effects and safety of the vaccine due to local deaths of various circumstances and unknown causes. In an attempt to help assess and understand public sentiment towards the initial stage of the vaccination campaign, sentiment analysis tools are utilized. It can discover that there are different sentiment patterns observed in different regions and time points as well as in different vaccine brands. It is expected that the text categorization process will be conducted using NLTK's dedicated Twitter corpus. In social media data, users enter multiple punctuation marks, acronyms and emoticons to express their emotions.

TextBlob tool will be used for analysis, which computationally identifies and classifies text into three emotions: positive, negative or neutral. TextBlob is used because it processes data by including various letters, symbols, etc. in its dictionary. In this method, each word in the dictionary is based on whether it is positive or negative, while adding an emotional analysis of commonly used expressions. In this way, people's attitudes towards vaccines in the UK, the US and Japan can be analyzed. The accuracy of the method is 73.3% in English and 71.9% in Japanese. The results show that the British and Americans are more neutral and positive about vaccines, while the Japanese are more pessimistic about vaccines.[2]

Keywords : social media, sentiment analysis, text mining, COVID-19, vaccine, tweet

A Heterogeneous Hybrid Cloud Storage Service Using Storage Gateway with Transfer Acceleration

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Abstract—The global data footprint doubles every few years. Organizations struggle to gain meaningful insights from the rapidly growing volumes of data to use this ever-increasing data. Organizations need to manage capacity placement and data governance requirements with speed and flexibility, and minimal costs to reduce capital expenditure. One of the limitations is that traditional storage still has a customer's need to spend on capital expenditure. The customer needs to pay more every year for maintenance. Many companies consider moving internal data out of their data centers or migrating their data into the cloud. And also, this cloud technology can make the customer no need to worry about the scalability of their resource. Furthermore, the customer only needs to pay for what the customer use on the cloud. Unfortunately, until now, a user does not have many options to deploy object storage solutions across on-premise data centers and the cloud with high–performance capabilities. Storage Gateway is a hybrid cloud storage service that can give users access from their on-premises to virtually cloud storage with unlimited scalability. This Storage Gateway can connect between cloud storage and on-premises site seamlessly. This gateway system can interact with cloud storage services more simply while boosting performance and reducing cost. This paper aims to study the influence of the implementation and optimization of Storage Gateway as a heterogeneous integrator between premise and cloud storage. Also, the Network factor is using optimized by CDN Enabled to reduce upload latency between on-premise to Bucket. Tests are carried out using direct measurement methods to measures Throughput, Latency, and cost-efficiency.

Keywords : Hybrid Storage, Storage Gateway, Transfer Acceleration, Intelligent Tiering, KMS.

Development of Vulnerable Web Application Based on OWASP API Security Risks

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Abstract—APIs are critical for digital transformation as well as the establishment and development of new business models. They are the foundation of application economics which allows for quicker, better, and less expensive development. In security perspective, OWASP released its first API security report in 2019 which finally differentiate the security risk categories between API and web application. In recent years, there have been many incidents of cyber attacks related to API, while the implementation of the API itself is growing in popularity among organizations. Therefore, the need to understand APIs from a security perspective should be taken seriously and considered as an integral part of the software development life cycle. In this research, we proposed an API security learning environment called Vulnerable Academic Information System (VAIS) based on the OWASP API Security Risks with containerization deployment plan and gamification technique to provide a fun yet challenging environment for people in understanding the API security in a legal environment.

Index Terms : API, API security, Vulnerable Web Applications, Vulnerability Assesment, Penetration Testing, Gamification

Development of Text Classification Based on Difficulty Level in Adaptive Learning System using Convolutional Neural Network

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Abstract - Text classification is advantageous and necessary in a variety of fields. The adaptive learning system is one of the sectors that requires text classification. Adaptive learning is a type of online learning that makes learning recommendations based on the needs of the students. The learning module and the testing module are the two aspects of adaptive learning. The purpose of the learning module is to give recommendations of learning materials. The testing module, on the other hand, is used to assess and test the student's progress. The Learning Module requires text classification based on difficulty level to ensure that students have access to learning resources that are appropriate for their ability level. The dataset used in this study is the ebook of Science for junior high school, and we also crawling from RuangGuru (one of the E-learning platforms in Indonesia). The method that used in this study is CNN that combines with word embedding techniques. The dimension of Glove and Word2Vec are 100 dimensions. CNN-Word2Vec performs better than CNN-Glove with 96% accuracy and 61.20 seconds of computing time. Based on this, CNN-Word2Vec is appropriately applied to Adaptive learning that requires accuracy and fast computing time.

Keywords : adaptive learning, Text Classification, CNN, Glove, Word2Vec.

Classification of Colon Polyp on Endoscopic Image Using Support Vector Machine

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Abstract - Colon polyps are abnormal tissues belonging to tumors that grow on the walls of the human colon. Colon polyps can be visualized using the technology that is endoscopy. However, the results of endoscopy image examination often differ depending on the accuracy and experience of the doctor. To overcome these problems, a system was built by implementing digital image processing that can detect types of colon polyps based on endoscopy images. There are several stages of the process in this system. The first process is preprocessing using scaling, and bilateral filtering which is used to improve endoscopic image quality. Then, the the second process is segmentation to separate the area of polyp from other object using watershed, thresholding, and cropping. The third process is extraction used to get the area, length, width, and texture of the polyp. The last process is classifying colon polyps based on their type is a hyperplastic, adenoma, and sessile using the SVM (Support Vector Machine) method. The system in this study was tested on 20 endoscopic images, and this system has a high level of accuracy, sensitivity, precision, and specificity in classifying colon polyps. is 93.54%, 94.73%, 85.71%, and 93.02% respectively.

Keywords : colon polyp, endoscopy, segmentation, image processing

Classification of Brain Tumor on Magnetic Resonance Imaging Using Support Vector Machine

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Abstract—Early diagnosis of brain tumors is a crucial process for detecting human brain tumors. Various ways are conducted for the early detection of brain tumors, one with the anatomy of a digital image. A digital image through magnetic resonance imaging (MRI) is one of the methods that help doctors both analyze and classify the type of brain tumor. However, tumor detection on MRI images is usually done through manual by the doctors. In this study, a Computer-Aided System (CAD) was created that could assist doctors in detecting brain tumors based on MR images. If a tumor is identified appropriately at an early stage, the chances of survival can be improved. The methodology consists of the following steps: pre-processing by using median filters, skull stripping to removes non-cerebral tissues, segmentation of the image is performed by thresholding, the feature extraction from the detected tumor is realized by using statistical features which is first order features are extracted from the histogram of the image and the Gray Level Co-occurrence Matrix (GLCM) is used to extract second order features, classification techniques based on Support Vector Machines (SVM) are proposed and applied to brain image classification. From the result of the tests conducted on 48 data, the system achieved a total accuracy, precision, sensitivity, and specificity is 95,83%, 94,08%, 93,33%, and 96,87% for classification of meningioma, glioma, and pituitary tumors respectively. This system was tested on T1-weighted CE-MRI.

Keywords : MR Images, Brain Tumor, Detection System, Segmentation, Classification.

Data Analytics for Medical Record Data of Covid19 Patient with Descriptive & Predictive Mining

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Abstract - Currently, the number of COVID-19 patients in Indonesia has not shown a significant decline. One of the reasons is the difficulty of analyzing medical record data of COVID-19 patients. The analysis becomes difficult because of the large volume of data and the heterogeneous characteristics of the content. This is what makes medical personnel take a long time in the process of analyzing data on COVID-19 patients, and causes the slow handling of cases in Indonesia. Therefore, this study proposes a new approach to analyze and classify medical record data of COVID-19 patients using a data analytics approach with descriptive and predictive mining methods. Where descriptive method is used to grouping patient's disease risk categorization and predictive method is used to classify positive/negative patients. The input data used for the analysis process was sourced from the results of the RT-PCR test of COVID-19 patients. Before being analyzed, the data is normalized first, and the features are extracted. Next, the descriptive mining process was carried out using the Hierarchical Clustering Complete Linkage method and predictive mining using the Decision Tree and K-Nearest Neighbor (KNN) methods. If so, then the results of the process are tested using the confusion matrix and error ratio methods. From the whole process, it can be concluded that the error ratio of this approach is 8% for predictive mining and 21% for descriptive mining. And the features found at the end of the process were 19 features, including Leukocytes, Eosinophils, Red blood cells, Patient age quantile, etc.

Keywords : Data Analytics for COVID-19, Analysis of COVID-19 Medical Record Data, Descriptive & Predictive Mining COVID-19.

Source-Oriented POV Visualization for Multidimensional Analysis of International Conflicts and Terrorist Incidents with 5D World Map System

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Abstract- In this study, we develop an implementation method of a multidimensional analysis system to visualize the dynamism of international conflicts and terrorist incidents, which are becoming increasingly complex due to the intertwining interests of multiple actors/players/stakeholders in the global world. This study aims to support people to understand the differences in perceptions or "point-of-view (POV)" among the related countries and actor groups by analyzing multiple media data sources, such as international news articles on international conflicts and terrorist incidents. The system calculates and extracts the "Source-oriented POV" and visualizes the difference of POV on the time-series global maps. By using the search and visualization functions of the system, a user is able to understand the differences in POV among the countries and actor groups and re-enact the time series dynamics of international conflicts and terrorist incidents in a multidimensional way. In our method, we define "Source oriented POV" as a combination of a name of country/region
based information sources and a "contention" = a set of document metadata (frequently appearing words and spatiotemporal information) from the sources. In this paper, we present cases for applying our method for the international news articles of CNN and Sputnik to analyze the Syrian Civil War.
Keywords: *international affairs, international relations, conflict, terrorism, map, text processing, text mining, spatiotemporal data, media, visualization, visual data mining*

Implementation of Liquid Animation Techniques for Developing Renewable Energy Motion Graphics

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Abstract **-** Renewable Energy is environmentally friendly and does not have a negative impact on climate and global warming. It continues to be developed as an alternative energy in everyday life because Non-renewable energy derived from fossil fuels have negative impacts on the environment. Referring to National Energy General Plan, Indonesia has targets of implementing renewable energy in the national energy unit by 23% in 2025 and 31% in 2050. To support the program, socialization must be carried out to the public, especially young generation so that they will be more aware about the importance of renewable energy. The socialization is done by using motion graphics as a media of learning using liquid animation techniques on the motion graphics. Through this motion graphics, it is hoped that students will be able to understand the role and types of renewable energy that are used as alternative energy in daily life. Liquid animation, which is also called liquid motion, is a technique that uses continuous motion, often with elements that look like water. It is hoped that this motion graphics can produce object movements and smooth transitions so that they can make this learning media more interesting. Based on the results of the questionnaire used for the testing process, it can be concluded that after watching the motion graphics, the percentage of correct answers is good. It shows that this renewable energy motion graphics video has educated users about the definition of renewable energy, the effect of fossil fuel energy, various sources of renewable energy, and Indonesia's plan to apply renewable energy evenly.
Keywords : *Liquid animation, Motion Graphics, Renewable Energy*

Animated Video Using Duik Bassel Rigging Toolset on Tuberculosis Education

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Abstract- TB is an infectious and deadly disease that attacks the lungs and is caused by Mycobacterium tuberculosis. Indonesia occupies the third position as a country with the highest number of TB patients in the world according to the World Health Organization (WHO). In addition to the high number of TB patients, there are still many TB patients who do not complete their treatment. Patients who do not complete their treatment can harm others and themselves. As long as a patient has not been declared cured, there is still the potential to be a source of transmission for others. In addition, patients who do not complete their treatment can potentially become MDR - TB (Multi Drug Resistant TB) because the TB bacteria mutate so that they are resistant to drugs given by doctors. Tuberculosis is still a stigma in society, causing some patients to tend to close themselves off and be reluctant to have their health checked. These problems raise new problems in increasing the transmission of TB. It is known that this problem occurs because of the low knowledge and awareness of the community regarding TB. Therefore, an animated explainer video was made that aims to educate the public about TB and how to treat it. This video will be created using Duik Bassel, a plugin that helps in the character rigging process. Rigging is the process of giving a character structure so that it can be moved in the animation process. The use of Duik Bassel can make the animation process easier, and character movements can be more dynamic.

Keywords: *Animated Explainer Video, Duik Bassel, Rigging, TBC*

Formalin Fish Detection System Based on Digital Image Processing

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Abstract- Fish is an Indonesian marine commodity that is mostly consumed by humans and exported. Relative the price is cheap and high nutritional content, but fish are easily damaged, especially in tropical conditions. Fish quality declines very quickly, so they are easy to spoil. They prevent spoilage is preservation. Therefore, preservation is often ignored by irresponsible people by preserving with dangerous chemicals that are still happening today. The circulation of the issue of formalin raises anxiety for the public as consumers. They choose fish based on their judgments and standards, consumers tend focus on the eyes and gills of fish, so the solution a mobile system application based on digital image processing with deep learning implementation uses the Convolutional Neural Network (CNN) algorithm, Mobilenet as the network architecture model. Based on the eye dataset, training accuracy have arrived at 100% and validation100%. The gill's dataset training accuracy have arrived at 98% and validation 80%. Testing of the MobileNet architecture on the mobile application, eye's dataset accuracy 100% and gill's dataset accuracy 95%.
***Keywords*:** Identification, Formalin, Fish, Digital image processing, Deep learning, MobileNet, Mobile applications.

Glaucoma Detection Based on Cup-to-Disc Ratio in Retinal Fundus Image Using Support Vector Machine

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Abstract- Glaucoma is damage to the optic nerve due to increased pressure on the eyeball which can damage the optic nerve. Efforts that can be made to prevent glaucoma are early detection through retinal screening. To evaluate glaucoma, the most widely used indicator is the cup-to-disc ratio. Currently, cup-to-disc ratio evaluation is performed manually by a trained ophthalmologist or with expensive equipment such as Heidelberg Retinal Tomography (HRT) and Optical Coherence Tomography (OCT). This study aims to develop a system that can assist ophthalmologists in conducting analysis based on the value of the cup-to-disc ratio to determine the severity of glaucoma by using image processing. This system has 4 main stages, namely fundus image preprocessing to improve image quality, segmentation to detect and separate optical discs and optical cups from the background, feature extraction based on cup-to-disc ratio, area, perimeter, and circularity values. Classification based on the severity of glaucoma into early, moderate, and advanced glaucoma. From the system test which was carried out on 40 data, the accuracy level was 95%, precision was 93.91%, the recall was 91.37% and specificity was 95.86%.

Keywords— *Glaucoma, cup-to-disc ratio, retinal fundus image, image processing, retinal screening.*

Animated Company Profile Video Using Puppet Pin Rigging for Character Movement

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Abstract- Company profile is an important part for business entities. In order to convey the important messages to the public, visual forms are added to increase comfort for the audience. Two dimensional (2D) animation video can be one of the presentation options. Sometimes, animation designed in Adobe After Effects has limitations in moving characters. In fact, figures that move more smoothly can provide an element of interest in them. Puppet pin rigging techniques is a technique to move characters or objects in a video company profile to provide a dynamic visualization that look professional. The performance metrics of the animated video are measured based on attractive visual, degree of interest and story-line flow. The results show that animated video characterized is very good performance in all metrics.

Keywords: animation, characters, company profile video, puppet pin rigging

Portable Device-Based Medical Service System for DICOM To PNG Conversion

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Abstract- Obtaining medical images require high speed and mobility in receiving and analyzing patient medical information, a portable device is the solution. However, the medical image format that is commonly used is an image with the DICOM format that cannot be accessed directly by portable devices because of the limitations of portable devices to access DICOM images and the size of the DICOM image format which will eat up the memory of portable devices so a system is needed to help solve this issue. In this case study is a system capable of performing the conversion and an application that can access the results. This system works by processing medical data in the form of DICOM image files with the denoising method to reduce noise in medical images on a local computer so that the converted images have better quality, then convert the files into PNG file format. The result of those stage are PNG and CSV which will be uploaded into database and with PHP server side programming, then from the conversion image and patient data can be obtained and accessed through an application on a portable device.
Keywords*: conversion, dicom, png, medical service system, portable device*

Action Recognition with Spatiotemporal Analysis and Support Vector Machine for Elderly Monitoring System

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***Abstract*—** Nowadays, action recognition is widely used in various aspects of life, one of which is for monitoring purposes. One of the challenges in this problem is the process of detecting and recognizing the actions of the elderly. In this research, an integrated system is proposed to detect and monitor the actions of the elderly based on Computer Vision. This system using joint skeleton coordinate data as a system input. The system can detect actions taken by the elderly based on the dataset we created. There are seven actions: standing, sitting, walking, falling, drinking, sleeping, and eating. This system uses the OpenPose library to detect skeletons from the elderly. Then for feature extraction using spatiotemporal to extract the joint position data of the elderly every 15 frames. For classification using the Support Vector Machine in this system. Then, the recognized action data will be sent by the system to the backend of the platform. The test shows that the system can detect seven actions of the elderly with an accuracy value of 87.81% on the training model used.

Keywords: Action Recognition, Computer Vision, Openpose, Spatiotemporal, Support Vector Machine

Media Information of Generalized Anxiety Disorder in Adolescent Through Animation Explainer

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Abstract **-**Teenage are the stages of human transition towards adulthood with various forms of change in various aspects such as physical, emotional, and cognitive aspects of adolescence. According to data on the Indonesian basic health investigation in 2018, 9.8% of the number of Indonesian or about 14 million at the age of 15 have mental and emotional health problems, one of which is marked with symptoms of anxiety. The impact of such anxiety disorder can be marked by inability to adapt. One kind of anxiety disorder is generalized anxiety disorder. To reduce the risk of generalized anxiety disorder, people around need to know what symptoms are and how to handle them. Therefore, an informative and interesting media was created to raise adolescent awareness to care more about the mental health of those around him who are registered suffer from a common anxiety disorder. From these videos it was proven that video explainer are an effective media to give teenagers the highest understanding about generalized anxiety disorder up to 78%, and an interesting explainer video aspects with an index value of 96%.

Keywords: anxiety disorder, generalised anxiety disorder, teenagers, explainer video

Vulnerability Mapping of Toddler Pneumonia in East Java, Indonesia, Using the K-medoids Clustering Algorithms

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Abstract - In Indonesia, pneumonia is the second leading cause of death in toddler after diarrhea. East Java Province is one of the provinces with a high rate of toddler pneumonia. Pneumonia cases in East Java are the second highest in Indonesia and still a big health problem that must be solved. Mapping of toddler pneumonia susceptibility can provide an overview of the relationship between regions and the level of susceptibility. Spatial analysis can determine the pattern of disease distribution and possible causes to plan more effective community-based pneumonia efforts. This paper proposes a new approach to map the susceptibility level of toddler pneumonia in East Java using the K-medoids clustering algorithm. The attributes used as factors influencing vulnerability consisted of the number of children under five, the number of patients, the number of patients treated, healthy homes, sanitation, clean water sources, TUPM, weighed toddlers, malnutrition and poor nutrition. These criteria have a strong correlation with each other to determine the level of susceptibility of toddler pneumonia. The susceptibility level of toddler pneumonia is divided into low, medium and high levels. The mapping is visualized spatially-temporal from 2015-2019. The results of average silhouette of the K-medoids clustering 2015-2019 data generated are 0.33 better than K-means.

Keywords: Toddler pneumonia, vulnerability mapping, K medoids algorithm, spatial analysis.

Spatial Mapping of Tubercolusis Vulnerability in Tuban District, Indonesia, Using Hierarchical Clustering

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Abstract **-** Tuberculosis (TB) has spread over the world and continues to be a serious public health concern. The high rate of finding cases of pulmonary TB in Tuban district requires an analysis to find out what actions and policies needed to reduce the number of cases of pulmonary TB disease. spatial analysis is an instrument for identifying areas where there is a risk of disease, so it is an important instrument for managing and planning health policies. This paper proposes a new approach to assess the level of susceptibility to tuberculosis in Tuban district using hierarchical clustering. The multi-criteria for vulnerability assessment consist of population density, number of patients, total number of TB cases, CNR of all TB cases, estimates of patients found and treated, and mortality during treatment. The TB susceptibility level as a result of the clustering of 20 sub-districts was mapped spatially-temporal in 2017-2019. Based on the results of the evaluation of the variance mapping of the 2017-2019 tuberculosis vulnerability level with single linkage, the average variance value is 0.23660, smaller than the average linkage of 0.29861 and the complete linkage of 0.30332. This shows that single linkage grouping is better than average linkage and complete linkage.

Keywords: Tuberculosis, hierarchical clustering algorithm, multi-criteria, spatial mapping.

Distributed Online Computer-Based Test System for English Exam

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Abstract **-** Nowadays, computer-based tests are commonly used since a pandemic made educational institutions hold exams from home and it made computer-based tests application demand increasing time by time. This situation leads to the need for applications that can run on any device, secure from cheating and compatible with poor internet connection. Our proposed system able to improve security and deception issues in the examination. In this paper we also introduce distributed online computer-based test for English test that made our software can share questions-data to another instance securely.

Keywords: computer-based test, distributed system, hybrid encryption

08. [IES-KCIC]
Intelligent Multimedia Systems

Design And Development of Human Anatomy Learning Platform for Medical Students Based on Augmented Intelligence Technology

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Abstract **-** Augmented Intelligence technology was introduced for the task of helping improve human work in various fields, one of which is education. Several problems in the learning process, which are currently completely virtual, raise new problems, especially related to practicums which require teaching modules as guidelines for practicum implementation but still maintain the impression of interactive learning. For this reason, Augmented Reality technology is applied as a solution to build a practical human anatomy module, then called AIVE Platform embedded in smartphones to provide informative and immersive learning that can be run indoors or outdoors so that it is not limited by space and time. This platform can run on Android and iOS which is built on the AR Foundation framework to work across platforms. This module has followed the rules of the anatomical atlas that include labels on each part, there is also a login system to store student usage history, as well as the choice of learning mode. This module has been licensed to operate from a teaching doctor in anatomy to be used as a teaching module. The PIECES framework used to analyze the importance and satisfaction level of the platform gives score 4.085 out of 5 on and 4.081 out of 5 respectively.

Keywords**:** Human anatomy, medical education, mobile learning platform, augmented reality, ARFoundation, AIVE Platform.

Animation of Mathematics Learning for Vocational High School About Geometry Transformation Using Participatory Design

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Abstract **-** The result of the Programme for International Student Assessment (PISA) 2018 states that Indonesia's mathematical ability is below the average value of other countries. It is undeniable that mathematics, especially Geometry Transformation, has abstract learning objects. In the study of basic and intermediate education, it can still be difficult to learn. Especially during the Covid-19 pandemic, students needed more learning methods than just books. Departing from the problem, more media learning is needed to sustain math study in the classroom. It will be made into an interactive audio-visual animation packaged on a website. Students will be helped later to understand the substance of Geometry Transformation during this period of online study. The material is packed more conceptual so that students can understand the concept of mature Geometry Transformation, not just calculations and memorizing formulas. By using participatory design methodology, the production of the animation involves both user and stakeholder to analyze and present the input associated with the present project. With the testing index score of students of 93.91% and of teachers of 97.74%, the animation of mathematics learning produced can be said to be in line with the expectations of students and teachers. Although there are still many suggestions and input from expert reviewers, this interactive learning animation is appropriate to use to help students and teachers in the learning process of mathematics, especially during this pandemic.

Keywords: geometry transformation, animation, interactive learning media

PIECES Framework Method to Measure the Effectiveness of Obesity Explainer Animation Videos

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Abstract - Along with the times, there are changes in people's lifestyles, especially in the capital city. The people of the capital city has new habit, likes consuming more fast food and reducing physical activity. If those happens continuously, people can become obesity which can cause dangerous diseases such as stroke, diabetes, coronary heart disease, hypertension and even death. Even the effect of obesity are dangerous, public awareness of obesity is also relatively lacking, this can be seen from the obesity rate in Indonesia which continues to increase from 10.5% in 2007 to 21.8% in 2018. To increase public awareness about how to handle obesity, it is needed providing information about obesity in the form of an explainer video that contains an explanation of obesity and also its handling with an attractive appearance. Through this explainer video about obesity, it can increase public understanding about obesity as much as 42.25. Respondents' level of satisfaction with explainer videos as an educational media regarding obesity treatment is 4,61 obtained from the test results using the PIECES Framework method. The authors hopes that this explainer video can be an additional form of information about obesity.

Keywords: explainer video, obesity, capital city, PIECES Framework

A Color and Composition-based Image Retrieval System by Image-Query Drawing Method with Color-Impression Database

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Abstract - In this paper, we propose a color and composition-based image retrieval system with an image-query drawing method for color-impression database. This system retrieves image data similar to an image-query that is drawn using color combinations corresponding to an impression word expressing the overall impression of an image that a searcher imagines. The most significant feature of this system is that it sets a color-impression database storing expert knowledge of impression words and their corresponding color combinations and an image-query drawing function on the query part of the image database. Thus, the searcher uses an impression word to choose three color combinations in order to draw an image query consisting of $N \times N$ grids, which used as searcher's image query. Each image in the image database also has metadata containing keywords that describe image's contents to categorize the images. The category is used for specifying semantic space of the searched images at the search step. In this time, the "color combination image scale", which shows the relationship between psychological impressions expressed as impression words and combinations of three colors of the 130 representative colors, is stored into the color impression database. The data stored in the color-impression database can be replaced with other color-impression combinations data. So that, the searcher also uses other experts' knowledge of color impression combinations. For similar image retrieval, the image query and all image data in the image database are divided into $N \times N$ grids. This system also deals with the image composition the searcher imagined by comparing grids. The color features of the segmented grid are represented as a color histogram of 130 colors. Then, color similarity is compared with each grid between the image-query and the images in the image database. Godlove's Color Difference Formula in the HSV color space is used to calculate the color similarity. The sum of the color difference in each grid corresponds with the similarity between the image-query and the images stored into the image database. We show the details of this method and its effectiveness and feasibility in this paper.

Keywords: Selecting color combination, Color Combination Image Scale, image retrieval, Query by Drawing, Color-Impression Database

Design of Collaborative WebXR for Medical Learning Platform

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Abstract - The Corona-Virus Disease 2019 (COVID-19) pandemic has affected all levels of society and has had a disruptive effect on all aspects of life, including education. Additionally, it puts a strain on the ability of medical educationists to adapt to this unique situation. Clinical mentors and students from all health-related fields are considered potential carriers when considering hospital based education. On the other hand, the current economic crisis is reviving the need for online learning opportunities and virtual education programs. Most medical schools respond to lockdown by shifting to live online or video-based learning, which is becoming increasingly popular. In the face of a pandemic, maintaining standards in medical education, keeping clinical learning on track, and minimizing assessment disruption are all difficult tasks to accomplish. This new environment requires adaptation in order to better prepare future clinicians for their roles. In this research paper, the authors design an immersive medical learning platform to emphasizes the importance of virtual education and the potential consequences of integrating the immersive experience of extended reality (XR) into medical education for the future of clinical competency learning and assessment in the healthcare education field. This platform can run on PCVR and mobile VR devices. We have designed and developed a medical simulation scenario using the considerations of medical educators or doctors to ensure that the platform we designed can provide an immersive experience to increase the effectiveness of online teaching and learning activities.

Keywords: COVID-19, virtual education, clinical competency learning, immersive learning, extended reality.

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