ITIS 2022

ABSTRACT BOOK

IEEE 8th itis 2022

Information Technology International Seminar

IEEE Indonesia CSS/RAS Joint Chapter

Table of Content

PREFACE

This seminar showcase the research works of contributors to the IEEE 8th Information Technology International Seminar (ITIS 2022). The conference is technically sponsored by IEEE Indonesia CSS/RAS Joint Chapter and hosted by the Computer Science Faculty of the University of Pembangunan Nasional (UPN) "Veteran" Jawa Timur, Indonesia. Dr. Agussalim and colleagues from UPN "Veteran" Jawa Timur serve in the conference's Organizing Committee, supported by an International Program Committee consisting of members from countries all around the world.

In its eighth year, ITIS remains a quality avenue for international researchers to share ideas and socialize to build networks. To adapt to the requirements during the COVID-19 pandemic, the committee decided to hold the conference as a hybrid event. During the three days of the conference, participants can attend not only paper presentation sessions but also a workshop on academic-industry matching.

We wish to thanks reviewers, keynote speakers, and session moderators for their cooperation and valuable suggestions. We would like to extend our appreciation to members of organizing committees of all events during this seminar.

Surabaya, Indonesia, October, 19th, 2022
EDITORIAL BOARD

ITIS 2022

Welcome Message from the General Chair of IEEE 8th ITIS 2022

Greetings from Surabaya, Indonesia!

On behalf of the Organizing committee, we would like to extend our warmest welcome to all keynote speakers, presenters, and participants at the IEEE 8th Information Technology International Seminar (IEEE IT IS 2022). ITIS conference was initiated on April 14, 2009, by the department Informatics Engineering Faculty of Industrial Engineering UPN "Veteran" Jawa Timur and included in International Conference on Science and Technology (IJCST) from 2016 until 2019. Since 2020, the ITIS conference has been organized under the technical support IEEE Indonesia CSS/RAS Joint Chapter. That means all papers accepted by the conference since 2020 are available at the IEEE Xplore Digital Library worldwide.

The conference aims to keep abreast of the latest development and innovation in the advanced research area of Information Systems, Information Technology, and Electrical Engineering. We proudly host this international forum to encourage students, university lecturers, and practitioners to share knowledge, thoughts, expertise, the latest information, and developments on related issues.

The ITIS has attracted more than 132 authors from 8 countries. They include South Korea, Iraq, Pakistan, Vietnam, Thailand, India, Malaysia, and Indonesia. The number of papers accepted is 77 out of 132 papers submitted, with a 58.3% acceptance rate.

We would like to express our sincere appreciation and gratitude to IEEE Indonesia CSS/RAS Joint Chapter, IEEE Indonesia section, and IEEE headquarters in the USA as the main support partners for this conference. We are also grateful for the support of the publication services. All Accepted & presented papers will be submitted for inclusion into IEEE Xplore subject to meeting IEEE Xplore's scope and quality requirements.

Lastly, please accept my deepest thanks to the conference participants for the contributions which are the foundation of this conference and all of the committee members who have worked on putting this successful conference together.

We hope that you will find this conference both valuable and enjoyable.

Thank You

Dr. Eng. Agussalim
Chair of Organizing Committee IEEE 8th IT IS 2022

SEMINAR SCHEDULE
INFORMATION TECHNOLOGY INTERNATIONAL SEMINAR (ITIS) 2022
Surabaya, 19-21 October 2022

Wednesday, October 19, 2022

Time and Date	Agenda	Venue
08.00–14.00	Online Registration and Conference Information	Via Online-Form: Go to: fasilkom.link/itis22 Then, choose **Registration Form** on Day 1 – October 19, 2022

Thursday, October 20, 2021

Venue: Mercure Grand Mirama Hotel, Surabaya

Time and Date	Agenda	Venue
07.00-08.00	Registration	Main Room ITIS 2022 & Zoom Pleno (ID: 590 900 9000 Pass: belanegara)
08.00-09.00	Opening & Coffee Break	
	Singing Indonesian Anthem “Indonesia Raya”	
	Singing “Belanegara” (State-defence) Song	
	Opening Remarks: Head of Committee Dr. Eng, Agussalim, M.T IEEE Indonesia Control System Society (CSS) and Robotics & Automation Society (RAS) Joint Chapter Chair	

	Arjon Turnip, Ph.D IEEE Indonesia Chapter Coordinator Endra Joelianto, Ph.D, SMIEEE Rector of UPN Veteran Jawa Timur Prof. Dr. Ir. Akhmad Fauzi, M.MT, IPU	
	Prayer	
	Virtual Photo Session	
09.00-09.45 09.45-10.30 10.30-11.15	**PLENARY SESSION** Keynote Speaker 1: Assoc. Prof. Dr. Dechrit Maneetham Title: "Mechatronics Engineering Research" Keynote Speaker 2: Professor Masato Tsuru Title: "The Fun of Routing and Scheduling Problems for Fast Delivery/Collection of Distributed Information" Keynote Speaker 3: Assoc. Prof. Dr. Diana Purwitasari Title: "Social Computing for Information Technology Transformation" Moderator: Mohamad Irwan Afandi, S.T., M.Sc	
11.15-12.00	Parallel Questions and Answers Session	
12.00-13.00	Lunch Break	
13.00-16.00	Paralel Session	
	Paralel Track: Information System A (Offline) Moderator: Rizka Hadiwiyanti, S.Kom.,M.Kom	Ballroom – Chamber 1
	Paralel Track: Information System	

	B(Online) Moderator: Eristya Maya Safitri, S.Kom, M.Kom	Zoom Room - ITIS 1
	Paralel Track: Information Technology A (Offline) Moderator: Dr. Rr. Ani Dijah Rahajoe, ST., M.Cs	Ballroom – Chamber 2
	Paralel Track: Information Technology B (Offline) Moderator: Pratama Wirya Atmaja, S.Kom., M.Kom	Singapore Room
	Paralel Track: Information Technology C (Online) Moderator: Wahyu Kyestiati Sumarmo, S.Pd., M. Ed., M. Pd	Zoom Room - ITIS 2
	Paralel Track: Information Technology D (Online) Moderator: Dr. Eng. Ir. Anggraini Puspita Sari, ST., MT	Zoom Room - ITIS 3
	Paralel Track: Electrical Engineering A (Online) Moderator: Dr. Eng Ir. Dwi Arman Prasetya, S.T., M.T., IPU., Asean Eng.	Zoom Room - ITIS 4
16.00 - 16.30	Coffee Break	Main Room ITIS 2022

Friday, October 21, 2021

Time and Date	Agenda	Venue
08.00-08.10	Opening	Zoom Pleno
08.10-10.00	Paralel Session 2 (Online) Moderator: Eka Prakarsa Mandyartha, S.T., M.Kom	
10.00-10.20	Best Paper &Presenter	
10.20-10.30	Program Evaluation	
10.30-10.40	ITIS 2023 General Chair Speech	
10.40-11.00	Closing	

ABSTRACTS LIST

INFORMATION SYSTEM

No	Title	Author(s)
1	Selection Modification of Model in Profile Matching Algorithm for Admission and Placement of Assistant Members	Irawan Dwi Wahyono (Universitas Negeri Malang, Indonesia)
2	Perception and E-Learning Readiness Mulawarman University	Fahrul Agus (Univesitas Mulawarman, Indonesia); Sudarman Sudarman (Mulawarman University, Indonesia); Okta Ihza Gifari (Amikom Yogyakarta University, Indonesia)
3	Understanding the Acceptance of Smartwatch Application on Football Players as a Performance Monitoring Tools	Tri Lathif Mardi Suryanto (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia); Nur Cahyo Wibowo (University of Pembangunan Nasional Veteran JawaTimur Surabaya, Indonesia); Achmad Afandi (IKIP Budi Utomo Malang, Indonesia); Wahyu Dwi Lestari and Muhammad Rafi Pratama (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia)
4	Fostering Student Engagement in E-Learning Using Mobile Technology	Fatima Vapiwala (Symbiosis Institute of Business Management, Pune & Symbiosis

No	Title	Author(s)
		International(Deemed University), Pune, India); Deepika Pandita (Symbiosis Institute of Business Management Pune, Symbiosis International (Deemed) University, Pune, India)
5	Measurement Model User Experience and Technology Acceptance for Implementation Virtual Booth in Marketplace	Henry Widjaja and Meyliana Meyliana (Bina Nusantara University, Indonesia); Erick Fernando (KALBIS Institute, Indonesia); Surjandy Surjandy and A. Raharto Condrobimo (Bina Nusantara University, Indonesia)
6	Antecedents of the E-Learning Adoption in Adamson University During Pandemic COVID 19: The Higher Education Students' Perspectives	Lianna Wijaya (Binus University, Indonesia); Lourdes Lasian and Noe Enriquez (Adamson University, Philippines)
7	Borneo Smart Forest Information System for Management of Dipterocarp Plants in Kalimantan Rainforest	Masna Wati, Novianti Puspitasari, Ummul Hairah, Joan Angelina Widians, Anindita Septiarini and Ade Fiqri Tjikoa (Universitas Mulawarman, Indonesia)
8	Rice Commodity Crisis Prediction for Food Resilience in Indonesia	Trisita Novianti (Universitas Trunojoyo Madura, Indonesia); Issa Dyah Utami (University of Trunojoyo Madura & Faculty of

No	Title	Author(s)
		Engineering, Indonesia); Heri Awalul Ilhamsah (Universitas Trunojoyo Madura, Indonesia)
9	Implementation of Gamification Learning to Increase Student Motivation and Engagement in Flipped Learning	Raden Budiarto Hadiprakoso and Farras Ahmad Naufal (Poltek Siber dan Sandi Negara, Indonesia)
10	Mapping of Salt Field Using Drone for Geographic Information System (GIS)	Muhammad Yusuf (University of Trunojoyo, Madura, Indonesia); Arif Muntasa (Trunojoyo University & Informatics Department Trunojoyo University, Indonesia); Mochammad Kautsar Sophan (University of Trunojoyo Madura, Indonesia); Kazeem Oluwakemi Oseni (University of Dundee, United Kingdom (Great Britain)); Makhfud Efendy (Universitas Trunojoyo Madura, Indonesia); Yeni Kustiyahningsih (University of Trunojoyo, Indonesia); Budi Dwi Satoto (University of Trunojoyo Madura, Indonesia & Trunojoyo University of Madura, Indonesia)

No	Title	Author(s)
11	Analysis of Factors Affecting Subscription Interest on Netflix Using UTAUT2	Arista Pratama and Clariza Risanti (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Tri Lathif Mardi Suryanto and Rizky Parlika (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia); Asif Faroqi (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
12	Customer Segmentation Based on Recency Frequency Monetary (RFM) and User Event Tracking (UET) Using K-Means Algorithm	Achmad Solichin and Gunadi Wibowo (Universitas Budi Luhur, Indonesia)
13	Alignment of Business Goals with IT Goals by Measuring the Level of Capability Using Cobit 5	Siti Mukaromah (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Arrandi Muhamad Action (Riesta, Indonesia); Carena Learns Prasetyo, Prisa Kusuma, Agung Brastama Putra, Eristya Maya Safitri, Anita Wulansari and Asif Faroqi (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
14	Implementation of Weighted Product Method as Multi-Criteria	Abdul Rezha Efrat Najaf, Anindo Saka Fitri, Seftin Fitri

No	Title	Author(s)
	Decision Making (MCDM) in Vendor Selection	Ana Wati and Anita Wulansari (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Dhian Satria Yudha Kartika (Universitas Pembangunan Nasional (UPN) Veteran Jawa Timur, Indonesia); Eristya Maya Safitri (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
15	Evaluation of Campus Event Management Information System Using System Usability Scale Method	Rizka Hadiwiyanti (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Tri Lathif Mardi Suryanto (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia); Eristya Maya Safitri (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)

INFORMATION TECHNOLOGY

No	Title	Author(s)
1	Indonesia's Open Unemployment Rate Prediction System Using Deep Learning	Basuki Rahmat (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Ni Ketut Sari, MT (Raya Rungkut Madya & Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Budi Nugroho (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Helmy Widyantara (Institut Teknologi Telkom Surabaya, Indonesia)
2	Integrated Deep Learning System for Car Damage Detection and Classification Using Deep Transfer Learning	Daniel Widjojo (Institut Sains dan Teknologi Terpadu Surabaya, Indonesia); Endang Setyati (Sekolah Tinggi Teknik Surabaya & Institut Teknologi Sepuluh Nopember, Indonesia); Yosi Kristian (Institut Sains dan Teknologi Terpadu Surabaya, Indonesia)
3	Comparison of Three Crawling Libraries for Providing Herbal Information Resources	Vincentius Riandaru Prasetyo and Oeke Yunita (University of Surabaya, Indonesia)
4	DNA Cryptography Based on NTRU Cryptosystem to Improve Security	Dwiko Satriyo. U. Y. S (Universitas Sebelas Maret, Indonesia); Harjito Bambang (Sebelas Maret University, Indonesia); Faisal Rahutomo

No	Title	Author(s)
		and Heri Prasetyo (Universitas Sebelas Maret, Indonesia)
5	Analysis of Consumer Satisfaction Levels with GoRide Services Using the Support Vector Machine (SVM) Classification Method	Virginia Ursula Lalian, Rokhana Dwi Bekti, Noviana Pratiwi, Edhy Sutanta and I Wayan Julianta Pradnyana (Institut Sains & Teknologi AKPRIND Yogyakarta, Indonesia)
6	Classification of Teenager Aggressiveness Using K-Nearest Neighbor Method	Heliza Rahmania Hatta and Nurhanisah Nurhanisah (Mulawarman University, Indonesia); Anindita Septiarini (Universitas Mulawarman, Indonesia); Masna Wati (Mulawarman University, Indonesia); Novianti Puspitasari (Universitas Mulawarman, Indonesia); Fetty Tri Anggraeny (Universitas Pembangunan Nasional (UPN) Veteran Jawa Timur, Indonesia)
7	Outdoor Social Distancing Violation Detection System Using Faster R-Cnn Algorithm	Casi Setianingsih (Telkom University, Indonesia)
8	Wind Speed Time Series Modeling Under Least Square Error and Genetic Algorithm	Mohammad Abu Jamiin, Mardi Santosa, Ii Munadhif, Ryan Yudha Adhitya and Zindhu Maulana Ahmad (Politeknik Perkapalan Negeri Surabaya, Indonesia);

No	Title	Author(s)
		Mohammad Adiatmoko (Institut Teknologi Sepuluh Nopember (ITS), Indonesia)
9	Diagnosis System of Cattle Diseases Using Case-Based Reasoning and Nearest Neighbor Similarity Methods	Devie Rosa Anamisa (Universitas of Trunojoyo Madura, Indonesia); Achmad Jauhari and Fifin Ayu Mufarroha (University of Trunojoyo Madura, Indonesia); Yeni Kustiyahningsih (University of Trunojoyo, Indonesia); Sigit Putro (co Author, Indonesia)
10	Identification of Semi-Solid Liquids Using Photodiode and RGB Sensor with S-NN Method	Noor Suryaningsih (University of Pancasila, Indonesia); Ane Prasetyowati (Universitas Pancasila, Indonesia); Duta Widya (University of Pancasila, Indonesia); Busalim F. (Universitas Pancasila, Indonesia)
11	Grouping Madura Tourism Objects with Comparison of Clustering Methods	Achmad Jauhari (University of Trunojoyo Madura, Indonesia); Devie Rosa Anamisa (Universitas of Trunojoyo Madura, Indonesia); Fifin Ayu Mufarroha and Ika Oktavia Suzanti (University of Trunojoyo Madura, Indonesia)

No	Title	Author(s)
12	Soceng Warriors: Game-Based Learning to Increase Security Awareness Against Social Engineering Attacks	Raden Budiarto Hadiprakoso (Poltek Siber dan Sandi Negara, Indonesia); Giri Noto (Politeknik Siber dan Sandi Negara, Indonesia); Nurul Qomariasih (Poltek Siber Dan Sandi Negara, Indonesia)
13	Word Ambiguity Identification Using POS Tagging in Automatic Essay Scoring	Husni Husni, Fika Rachman and Ika Oktavia Suzanti (University of Trunojoyo Madura, Indonesia)
14	Comparison of LSTM and GRU in Predicting the Number of Diabetic Patients	Eka Mala Sari Rochman (University of Trunojoyo Madura, Indonesia); Miswanto Miswanto and Herry Suprajitno (University of Airlangga, Indonesia); Aeri Rachmad, AR. (University of Trunojoyo Madura & Informatics, Indonesia); Ratih Nindyasari (Universitas Muria Kudus, Indonesia); Fika Hastarita Rachman (University of Trunojoyo Madura, Indonesia)
15	Realtime Simulation Platform for Rocket Using Visual Programming	Fikana Mahardika Cantri and Muhammad Hasannudin Bisri (National Research and Innovation Agency, Indonesia); Herma Yudhi Irwanto (National Research

No	Title	Author(s)
		and Innovation Agency of Indonesia, Indonesia & Research Organization for Aeronautics and Space, Indonesia)
16	Face Recognition to Determine Visitor Attraction Using Residual Deep Neural Network	Budi Dwi Satoto (University of Trunojoyo Madura, Indonesia & Trunojoyo University of Madura, Indonesia); Rima Tri Wahyuningrum (University of Trunojoyo Madura, Indonesia); Bain Khusnul Khotimah (Trunojoyo of University, Indonesia); Muhammad Yusuf (University of Trunojoyo, Madura, Indonesia); Mohammad Syarief and Wahyudi Setiawan (University of Trunojoyo Madura, Indonesia)
17	A Comparative Study of Cuckoo and Any.Run in Basic Dynamic Malware Analysis	Kamila Rizqina (National Cyber and Crypto Polytechnic, Indonesia); Hermawan Setiawan (Sekolah Tinggi Sandi Negara, Indonesia); Adam Waluyo (Politeknik Siber dan Sandi Negara, Indonesia); Antonius Alfari (National Cyber and Crypto Polytechnic, Indonesia)

No	Title	Author(s)
18	Automatic Text Summarization of Madura Tourism Articles Using TF-IDF and K-Medoid Clustering	Yoga Dwitya Pramudita and Ika Oktavia Suzanti (University of Trunojoyo Madura, Indonesia); Saifuddin Saifuddin (University of Trunojoyo Madura & Informatics Engineering, Indonesia); Mohammad Syarief and Firdaus Solihin (University of Trunojoyo Madura, Indonesia)
19	Analysis of Centralized Vs Decentralized of Electronic Voting	Zidna Wildan Alfain (Politeknik Siber dan Sandi Negara, Indonesia); Hermawan Setiawan (Sekolah Tinggi Sandi Negara, Indonesia); I Komang Buana (Poltek Siber dan Sandi Negara, Indonesia)
20	Development of Final Year Project System (FIPOS) Based on Website with One-Time Password	Muhammad Irfan Cahyanto (National Cyber and Crypto Polytechnic, Indonesia); Hermawan Setiawan (Sekolah Tinggi Sandi Negara, Indonesia); Raden Budiarto Hadiprakoso (Poltek Siber dan Sandi Negara, Indonesia); Nadia Paramita (Politeknik Siber dan Sandi Negara, Indonesia)

No	Title	Author(s)
21	Usability Evaluation of Academic Information System Using the WEBUSE Method: A Study on University of Trunojoyo Madura Web Portal	Fitri Agustina and Nachnul Ansori (Universitas Trunojoyo Madura, Indonesia)
22	Reinforcement Learning for Automatic Cryptocurrency Trading	Andreas Nugroho Sihananto and Anggraini Puspita Sari (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Muhammad Eko Prasetyo (UPN Veteran Jawa Timur, Indonesia); Mochammad Yanuar Fitroni and Wahyu Nugroho Gultom (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Henni Endah Wahanani (Faculty of Computer Science University of Pembangunan Nasional Veteran Jawa Timur, Indonesia)
23	Analysis of SQL Injection Attack Detection and Prevention on MySQL Database Using Input Categorization and Input Verifier	Alya Aiman Salsabila Arif (Politeknik Siber dan Sandi Negara, Indonesia); Nurul Qomariasih (Poltek Siber Dan Sandi Negara, Indonesia); Hermawan Setiawan (Sekolah Tinggi Sandi Negara, Indonesia); Rahmat Purwoko

No	Title	Author(s)
		(Politeknik Siber dan Sandi Negara, Indonesia)
24	An Algorithm for Selecting the Head and Tail of an Intact Fish in the Overlapping Multi-Fish Image for Detecting Fish Freshness	Eko Prasetyo (Universitas Bhayangkara Surabaya, Indonesia); Nanik Suciati and Chastine Fatichah (Institut Teknologi Sepuluh Nopember, Indonesia)
25	Stalk Rots Diseases of Corn Classification Using Morphology Closing and Convolutional Neural Network	Wahyudi Setiawan (University of Trunojoyo Madura, Indonesia)
26	Implementation Password Stealing Attack Against Saved Passwords on Computer Browsers Using Digispark Attiny85	Farid Akram, Setiyo Cahyono and I Made Wisnu Bakti Saputra (Politeknik Siber dan Sandi Negara, Indonesia)
27	Forecasting Model of Wind Speed and Direction by Convolutional Neural Network - Deep Convolutional Long Short Term Memory	Anggraini Puspita Sari and Dwi Arman Prasetya (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Takashi Yasuno (Tokushima University, Japan); Andreas Nugroho Sihananto (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Muhammad Muharrom Al Haromainy (UPN Veteran Jawa Timur, Indonesia); Wahyu S J Saputra (University of Pembangunan

No	Title	Author(s)
		Nasional Veteran Jawa Timur, Indonesia)
28	Real-Time Vision Image Processing Based on LabVIEW and Microcontroller Controlled Parallel Robot	Surin Subson (Rajamangala University of Technology Thanyaburi Thailand, Thailand); Dechrit Maneetham (Rajamangala University of Technology Thanyaburi & TDS Thailand Company, Thailand); Myo Min Aung (Rajamangala University of Technology Thanyaburi, Thailand)
29	Comparison of Sequential Feature Selection Performance with Various Dimensional Data to Produce Optimal Classification	Ani Dijah Rahajoe and Agussalim Agussalim (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Emy Setyaningsih (Institute of Science & Technology AKPRIND, Indonesia); Eka Prakarsa Mandyartha, Fawwaz Akbar and Faisal Muttaqin (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
30	Water Requirement Prediction System Using Multi-Factors High Order Fuzzy Time Series Method	Achmad Jauhari (University of Trunojoyo Madura, Indonesia); Devie Rosa Anamisa (Universitas of Trunojoyo Madura, Indonesia); Fifin Ayu

No	Title	Author(s)
		Mufarroha (University of Trunojoyo Madura, Indonesia)
31	K-Means and K-Medoids Clustering Methods for Customer Segmentation in Online Retail Datasets	Fifin Ayu Mufarroha and Ika Oktavia Suzanti (University of Trunojoyo Madura, Indonesia); Budi Dwi Satoto (University of Trunojoyo Madura, Indonesia & Trunojoyo University of Madura, Indonesia); Mohammad Syarief and Husni Husni (University of Trunojoyo Madura, Indonesia)
32	Implementation of Quantile Regression Neural Network Model for Forecasting Electricity Demand in East Java	Aviolla Terza Damaliana (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Sri Hidayati (Institut Teknologi Telkom Surabaya, Indonesia)
33	Flood Early Warning System Using River Water Level Prediction with Artificial Neural Network (CASE STUDY JAKARTA)	Dimas Bagus Saputro, Arliyanti Nurdin and Khodijah Amiroh (Institut Teknologi Telkom Surabaya, Indonesia)
34	Online User Reviews Investigation Towards Madura Island Tourism Using Latent Semantic Analysis	Ari Basuki and Andharini Dwi Cahyani (University of Trunojoyo Madura, Indonesia); Weny Findiastuti (Universitas Trunojoyo, Indonesia); Rizki Ashuri Pratama, Faikul Umam and Shofi Fitrotis Salimah

No	Title	Author(s)
		(University of Trunojoyo Madura, Indonesia)
35	Toward Multiple Smart Home Scenario with Fog Computing Enabled	Agussalim Agussalim, Ani Dijah Rahajoe and Eristya Maya Safitri (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Dhian Satria Yudha Kartika (Universitas Pembangunan Nasional (UPN) Veteran Jawa Timur, Indonesia); Nur Cahyo Wibowo and Prisa Kusuma (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
36	Development of Extraction-Based Text Summarization Application to Improve Children's Literacy in Storybook Reading	Tresna Maulana Fahrudin, Angela Lisanthoni, Edina Alana Nabila, Divanda Shaffa Ameera, Andry Syva Maldini and Fairuz Mumtaz Izdihar Farraz (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
37	Classification of Javanese Script Using Convolutional Neural Network with Data Augmentation	Muhammad Muharrom Al Haromainy (UPN Veteran Jawa Timur, Indonesia); Andreas Nugroho Sihananto (Universitas Pembangunan Nasional Veteran Jawa Timur,

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		Indonesia); Muhammad Alfyando (UPN Veteran Jawa Timur, Indonesia); Anggraini Puspita Sari and Dwi Arman Prasetya (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Ryan Purnomo (Universitas Nahdlatul Ulama Sidoarjo, Indonesia)
38	Optimization of Single Exponential Smoothing Using Particle Swarm Optimization and Modified Particle Swarm Optmization in Sales Forecast	Made Hanindia Prami Swari (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); I Putu Susila Handika and I Kadek Susila Satwika (Institut Bisnis Dan Teknologi Indonesia, Indonesia); Henni Endah Wahanani (Faculty of Computer Science University of Pembangunan Nasional Veteran Jawa Timur, Indonesia)
39	Forecasting the Inflation Rate in Indonesia Using Backpropagation Artificial Neural Network	Agung Mustika Rizki, Afina Lina Nurlaili and Firza Prima Aditiawan (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Gusti Eka Yuliastuti (Institut Teknologi Adhi Tama Surabaya, Indonesia)

No	Title	Author(s)
40	Using Genetic Algorithm for Wide Yet Even Scattering of Game Objects: Applications on Irregular Levels and Involving Multiple Objects	Pratama Wirya Atmaja (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia); Sugiarto Sugiarto (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)
41	Single Channel EEG Based Biometric System	Muhammad Afif Hendrawan and Ulla Delfana Rosiani (Politeknik Negeri Malang, Indonesia); Arwin Datumaya Wahyudi Sumari (State Polytechnic of Malang & Indonesian Air Force, Indonesia)
42	Graphical User Interface for RYU Software Defined Network Controller	Nguyen Viet Ha (University of Science, VNU-HCM, Vietnam); Du Dong Quan (HCMUS, Vietnam); Tran Thi Thao Nguyen (University of Science, VNU-HCM, Vietnam)
43	Risk Management Capability Level of Mail Information System in the Government of Surabaya	Anita Wulansari, Carena Learns Prasetyo, Siti Mukaromah, Asif Faroqi, Eristya Maya Safitri and Abdul Rezha Efrat Najaf (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)

No	Title	Author(s)
44	Political Campaign Strategy on Social Media Using Finite State Machine	Aryo Nugroho (Universitas Narotama, Indonesia); Awalludiyah Ambarwati (Fakultas Ilmu Komputer Universitas Narotama, Indonesia); Moh Noor Al-Azam (Universitas Narotama, Indonesia); Arsi Raniah Faza (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Adri Gabriel Sooai (Universitas Katolik Widya Mandira, Indonesia & University Centre of Excellence on Artificial Intelligence for Tourism and Agriculture, Indonesia); Sherly Febriani (LSP TIK Indonesia, Indonesia)
45	Car Classification Based on Image Using Transfer Learning Convolutional Neural Network	Wahyu S J Saputra (University of Pembangunan Nasional Veteran Jawa Timur, Indonesia); E Y Puspaningrum, Anggraini Puspita Sari, Wahyu Firman Syahputra, Yisti Vita Via and Mohammad Idhom (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)

No	Title	Author(s)
46	Attendance System Using Two Factor Authentication Based on Secure App with Flutter	Donny Irwansyah (Politeknik Siber dan Sandi Negara, Indonesia); I Komang Buana (Poltek Siber dan Sandi Negara, Indonesia); Hermawan Setiawan (Sekolah Tinggi Sandi Negara, Indonesia)
47	Performance of Root-Mean-Square Propagation and Adaptive Gradient Optimization Algorithms on Covid-19 Pneumonia Classification	Budi Nugroho (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Anny Yuniarti (Institut Teknologi Sepuluh Nopember, Indonesia)
48	Stacking Ensemble Methods to Predict Obesity Level in Adults	I Gede Susrama Mas Diyasa and Mohammad Idhom (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia); Akhmad Fauzi (Universitas Pembangunan Nasional Veteran JawaTimur, Indonesia); Aviolla Terza Damaliana (Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia)

ELECTRICAL ENGINEERING

No	Title	Author(s)
1	Path Planning and Smoothing in Maze Exploration Using Virtual Mobile Robot-Based Modified PRM	Muhammad Fuad (University of Trunojoyo Madura, Indonesia); Sri Wahyuni (Universitas Trunojoyo Madura, Indonesia)
2	Kalman and Butterworth Filter Comparison for GPS and Magnetometer Sensors	Tanya Porang (Rajamangala University of Technology Thanyaburi, Thailand); Dechrit Maneetham (Rajamangala University of Technology Thanyaburi & TDS Thailand Company, Thailand); Myo Min Aung (Rajamangala University of Technology Thanyaburi, Thailand)
3	Eleven Degree of Freedom Humanoid Upper Body Robot SIBO	Padma Nyoman Crisnapati (Rajamangala University of Technology Thanyaburi, Thailand); Evi Triandini (Institut Teknologi dan Bisnis STIKOM Bali, Indonesia); Dechrit Maneetham (Rajamangala University of Technology Thanyaburi & TDS Thailand Company, Thailand)
4	Camera Calibration Algorithm for Industrial Robot	Louie Villaverde (Rajamangala University of Technology Thanyaburi & Batangas State University, Thailand); Dechrit Maneetham (Rajamangala

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5	Experimental Four-Wheel Tractor by GPS Tracking System	Phummarin Thavitchasri (Rajamangala University of Technology Thanyaburi, Thailand); Dechrit Maneetham (Rajamangala University of Technology Thanyaburi & TDS Thailand Company, Thailand); Tenzin Rabgyal (Asian Institute of Technology, Thailand)
6	Representation of Soccer Robotics in the Fastest Trajectory Tracking	Achmad Ubaidillah (Trunojoyo Madura University, Indonesia); Achmad Fiqhi Ibadillah (University of Trunojoyo Madura, Indonesia); Aeri Rachmad, AR. (University of Trunojoyo Madura & Informatics, Indonesia)
7	Technical, Economical, Environmental Feasibility of Solar PV System for Sustainable Shrimp Aquaculture: A Case Study of a Circular Shrimp Pond in Indonesia	Nizar Amir (University of Trunojoyo Madura, Indonesia); Abdelhak Errami (L Université Mohammed V de Rabat, Morocco); Lee Seung-woo (Incheon National University, Korea (South))

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8	Application of Sensors in Arduino as a Control in Smart Home Systems	A S Romadhon and V T Widyaningrum (University of Trunojoyo Madura, Indonesia)
9	Sentiment Analysis of Government Policy Management on the Handling of Covid-19 Using Naive Bayes with Feature Selection	Aeri Rachmad, AR. (University of Trunojoyo Madura & Informatics, Indonesia); Yeni Kustiyahningsih (University of Trunojoyo, Indonesia); Muhammad Ali Syakur (Syakur, Indonesia); Eka Mala Sari Rochman (University of Trunojoyo Madura, Indonesia); Dian Puspita Hapsari (Institut Teknologi Adhi Tama Surabaya, Indonesia)
10	Design of Garbage Collection Robots in Tourism Area (Beach) with Artificial Neural Network Method	Hanifudin Sukri, Ach Dafid and Ari Basuki (University of Trunojoyo Madura, Indonesia)
11	Autonomous Museum Tour Guide Robot with Object Detection Using Tensorflow Learning Machine	Faikul Umam and Ach Dafid (University of Trunojoyo Madura, Indonesia); Firmansyah Adiputra (Department of Informatics Engineering, Indonesia); Sri Wahyuni (Universitas Trunojoyo Madura, Indonesia)

KEYNOTE SPEAKER

The Fun of Routing and Scheduling Problems for Fast Delivery/Collection of Distributed Information

Professor Masato Tsuru
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ABSTRACT

As the data explosion continues in diverse areas, the information networking resources become more scarce and should be shared more efficiently. That requires us to return the old fashioned fully-managed optimization approaches but with the latest advanced technologies. In this talk, we revisit the design problems in routing and scheduling to deliver and/or collect information over distributed locations as fast as possible. Two different technical domains are considered.

One is a per-flow routing and scheduling problem to deliver large files among distributed datacenters to minimize the delay in receiving a file by leveraging the multipath-multicast transfer with data coding at the sender in the Software Defined Networking (SDN) framework. The other is a vehicle routing problem to monitor the information along streets and bring it to a headquarters by patrolling vehicles, e.g., in a disaster region, to minimize the average delay in incrementally collecting the whole information by leveraging the Store-Carry-Forward (SCF) networking.

While only somewhat simple and ideal examples are shown, the fundamental results suggest the usefulness and the power of optimization approaches applicable to real-world problems.

Mechatronics Engineering Research

Assoc. Prof. Dr. Dechrit Maneetham
Associate Professor at Rajamangala University of Technology Thanyaburi in the Mechatronics Engineering Department

Presentation Outline

- Industrial Robotics
- Agricultural Robotics
- Bio-Medical Robotics

Social Computing for Information Technology Transformation

Diana Purwitasari
Associate Professor at Sepuluh Nopember Institute of Technology in the Informatics Department

ABSTRACT

Information technologies like deep learning, blockchain, and the rise of "as-a-service" computing, especially the Work-From-Home revolution during the COVID-19 pandemic, have become samples of digital disruption that transforms society's behaviors. Because of those cultural changes, social computing as an intersection branch of computer science observes the dissemination of information distributed across social communities like content sharing on Twitter, Facebook, Flickr, or even online health consultation and Spotify.

INFORMATION SYSTEM

Selection Modification of Model in Profile Matching Algorithm for Admission and Placement of Assistant Members

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Abstract

Practicum assistants assist practicum supervisors in practicum activities in the subjects being taught. A practicum assistant must have the skills and criteria needed to carry out a practicum assistant's duties so that students can participate appropriately in practicum activities. This study aims to select and place students to become electrical machine practicum assistants. The problem of selection is many rules with the complexity of student data. This study uses Profile Matching, which uses model development to improve accuracy in determining student placement as an electric machine practicum system. The tests in this study tested

the accuracy in selecting students as assistants and tested the placement accuracy. This test obtained assistant selection accuracy of 86.6% and placement accuracy according to the Division of 83.3% using three models. Meanwhile, at the division placement stage, the accuracy rate obtained is 83.3%, with a weighting percentage of each Core Factor and Secondary Factor of 70% and 30%.

Keywords: *selection; profile; matching*

Perception and E-Learning Readiness Mulawarman University

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Abstract

Mulawarman University is the largest college in East Kalimantan Province, accredited A by the National Accreditation Institute, and currently has students numbering not less than 33 thousand, with 1000 educators and approximately 2000 education personnel. Due to the Corona Virus Disease (Covid-19) pandemic, learning and teaching activities on campus are diverted to online learning. However, there are still many lecturers and students who feel they are not ready for the transition to online learning. This study agreed to measure the level of readiness of Mulawarman University for online learning in the odd semester of 2020. This research collects new data that has not been done by previous researchers. The survey was conducted electronically for 4 weeks and has nettled over 1231 respondents, consisting of lecturers and students. On the basis of the data gathered, descriptive statistical analysis and ELR measurement are conducted to see the tendency of readiness in the online learning application. ELR measurement results with the Aydin Tasci method of 3,179. This implies that respondents' data from this research stated that they were not ready for online learning. Mulawarman University needs preparation for many aspects that can improve the readiness of lecturers and students in online learning.

Keywords: *Online Learning; Readiness Level; Mulawarman University*

Understanding the Acceptance of Smartwatch Application on Football Players as a Performance Monitoring Tools

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Abstract

Football is a favorite sport in Indonesia. According to to a survey institute in Indonesia, almost 50% of the Indonesian population chooses football as the most popular sport. Unfortunately, achievements in national football have not been maximized. Indonesia football is ranked 155th in the FIFA World version in 2022. Various technologies are sought to help optimize the conditions of Indonesian football, one of which is implementing smartwatches to monitor players' physical performance during training sessions. However, not all football players are willing to use a smartwatch, one of which is because it interferes with movement during practice. So, this study aims to explore thze acceptance of football players in using smartwatches when practicing, and this study proposes a UTAUT measurement model that was developed. Then 128 football players were involved in filling out questionnaires, and then data processing was carried out using Smart-PLS with the SEM-PLS. This study found that the behavior of football players in accepting the use of smartwatches while practicing was influenced by three factors, namely Ease of use, enjoyment, and social influence.

Keywords: *FORZA; Smartwatch; Football; SEM; UTAUT*

Fostering Student Engagement in E-Learning Using Mobile Technology

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Abstract

The pandemic has induced significant changes in the higher education sector with the shift to e-learning. The range of e-learning possibilities in higher education has increased due to mobile learning. The present study attempts to understand the role of mobile technology in the higher education sector in India. Using a qualitative exploratory approach, the authors obtained the responses of 100 educators by conducting semi-structured interviews. Various advantages associated with the application of mobile technology in e-learning in higher education that can boost student engagement and participation have been identified. The authors also propose a 4 E Process that educators can adopt to augment student engagement when using mobile learning technology in the e-learning process.

Keywords: *e-learning; mobile; technology; higher*

The Measurement Model User Experience and Technology Acceptance for Implementation Virtual Booth in Marketplace

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Abstract

This research aims to create a measurement model for integrating the virtual booth in the marketplace. A virtual booth is a virtual stand for a store in a marketplace. The use of this virtual booth breaks the boredom of the current marketplace form because it looks too monotonous with its current appearance. So, with the emergence of the application of a virtual booth, it can provide a new look for application visitors. At this time, nothing is found specifically to discuss how a feature is measured once the user uses it. This study develops a measurement model based on TAM theory and User Experience. Furthermore, this study builds a model using the literature survey method, which involves searching for related articles. The results of this study, a conceptual model built from two main variables (perceived usefulness and ease of use) and supported by supporting variables: Functionality, Affective quality, aesthetics, usability,

behavioral intention, and use. This model is hoped to be used as a reference for measuring the implementation of the virtual booth in the marketplace.

Keywords: *User Experience; Conceptual Model; TAM model; Virtual Booth; Marketplace*

Antecedents of the E-Learning Adoption in Adamson University during Pandemic COVID 19: The Higher Education Students' Perspectives

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Abstract

This study aims to analyze the antecedents of e- learning adoption during the pandemic at Adamson University. This is quantitative research and uses Structural Equation Modeling Partial Least Square (SEM-PLS) to analyze the data obtained. The data was collected from the Adamson University's higher education students with an online questionnaire survey distributed from May until July 2022. In total, there are 207 respondents collected and valid to do measurement and further analysis. The study comprehensively demonstrates consistent results with the previous research. The results show all hypotheses are accepted and supported by previous research. System Quality and Prior e-learning experience have positive and significant direct effect to Perceived Usefulness and Perceived Ease of Use. Then. Perceived Usefulness and Perceived Ease of Use both have positive and significantly effect to Attitude towards e-learning. Attitude towards e-learning has a positive direct effect to behavioral intention to use e-learning. Implication, limitation, and further research suggestion are well discussed.

Keywords: *e-learning; pandemic; system quality; perceived ease of use; perceived usefulness; technology acceptance model*

Borneo Smart Forest Information System for Management of Dipterocarp Plants in Kalimantan Rainforest

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Abstract

Kalimantan's tropical rainforest is home to indigenous plants of the Dipterocarpaceae family (tribe), which is renowned for having the most endemic species. Dipterocarp is a family of pantropical plants, many of which are used in the wood industry. The average height of this tribe is 70 to 85 meters. This kind of tree can be found in abundance in Kalimantan's forests. This study aims to provide information on the potential of Dipterocarp in Kalimantan forests. Education and conservation efforts for Dipterocarp trees, a prominent component of the forest ecosystem, are crucial in light of the significant harm done to Kalimantan's rainforests. The authors develop the Borneo Smart Forest information system. This system digitally organizes data on the diversity of Dipterocarp in the Kalimantan rainforest based on Web and QR-Code

technology. Borneo Smart Forest (BSF) system for monitoring plant inventory and plant markers can be read by smartphones using QR codes. It gives visitors a comprehensive overview of the plants. A QR code is a printed, two-dimensional barcode with limited space for data storage. This technology allows the plant to show earlier administrator-made additions to the inventory information system. Using this tool, administrators may easily manage all plant data. Most individuals have smartphones with cameras for QR code scanning. The QR code will direct the user to the BSF website, which has data about the plants. The development of this system is one of the efforts to support the achievement of Dipterocarp conservation.

Keywords: *Information System; QR Code; Dipterocarp; Endemic plants; Borneo*

Rice Commodity Crisis Prediction for Food Resilience in Indonesia

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Abstract

The country's population is increasing every year, leading to an increase in rice consumption. The existing rice production is considered insufficient, so rice imports are one of the efforts to maintain the stability of rice prices so that they remain affordable for all parties. However, continuous implications can affect the Indonesian economy because the increase in imports has pushed down foreign exchange reserves. The development of a commodity crisis prediction system in Indonesia was conducted by analogy with the currency crisis prediction system to make a strategy to prevent the commodity crisis in Indonesia; thus, the backpropagation neural networks method was used to predict the problem. A critical stage was to determine the crisis variables and indicators of the occurrence of the commodity crisis. The crisis indicators were rice production, rice consumption, rice prices, land area, and population. The calculated data in this study was from January 2010 to December 2020. The best network architecture resulted in an MSE of 0.209192, an average accuracy of 51.77%, and an average precision of 35.38%. The result showed that the indicators strongly correlated to the rice commodity crisis are rice consumption, land area, and total population.

Keywords: *commodity crisis, food resilience, prediction, backpropagation, neural network*

Implementation of Gamification Learning to Increase Student Motivation and Engagement in Flipped Learning

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Abstract

The availability of information and communication technologies has made flipped learning a prevalent learning style. There are various advantages to flipped learning, such as allowing students to learn at their own pace, encouraging students to be more engaged in class discussions, and reducing difficulty by introducing some knowledge to be learned prior to class. Students are less engaged in the learning process outside of the classroom, and social media and video games present a significant distraction. This project developed an application that incorporates gamification features into learning media to stimulate student participation in flipped learning. The application is designed for first-year computer science students. A total of 31 respondents were sampled using a random snowball technique. The test consisted of pre-test and post-test questions designed to assess student outcomes utilizing the gamification learning application. In addition, when employing the learner gamification program, we used a questionnaire to assess student motivation and engagement. The findings indicate that the built application can improve knowledge of the offered learning content. This finding is consistent with increased student motivation and engagement in gamification learning apps.

Keywords: *gamification learning; flipped learning; student motivation; student engagement*

Mapping of Salt field using Drone for Geographic Information System

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Abstract

Madura Island is well known as a salt island. There is a lot of salt field there. The latest salt field map was taken in 2012 from the Marine and fisheries ministry. Updating the image of the salt field is essential to get updated information about the real condition there. Therefore, it is necessary to capture the updated condition by mapping the salt field from the air using a Drone. This paper aims to develop a method and a framework for mapping salt fields using a Drone for Geographic Information System (GIS) application. Therefore, the

salt field was mapped from the air. We experimented in the salt field of Polagan village Sampang, Polagan village Pamekasan, and Talango Sumenep. This research contributes by providing a novel method of mapping salt fields using Drone. The novelty of this research is the method is developed based on the case study on Madura island, well known as the salt island.

Keywords: *Mapping; Salt field; Drone; Geographic Information System (GIS)*

Analysis of Factors Affecting Subscription Interest on Netflix Using UTAUT2

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Abstract

Development of the internet has had a major impact on people's lives. One of the entertainment services using the internet is Subscription Video-on-Demand (SVoD). SVoD is a service that provides unlimited access to information media to subscribed users. SVoD service in Indonesia that has experienced a high increase in subscription users is Netflix. With the increase in the number of users and the emergence of other SVoD service providers, Netflix needs a business strategy in facing business competition to attract the attention of new consumers and retain existing customers. This study aims to analyze the formation factors of interest in subscribing to Netflix using the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) method. The research data was collected by distributing online questionnaires and obtained 400 respondents. Analysis of research hypotheses using Structural Equation Modeling (SEM) with SmartPLS

software. Results showed that behavioral intention, content availability, facilitating conditions, habit, performance expectancy, price value, and social influence variables had a significant impact on SVoD subscription intentions on Netflix.

Keywords: *SVoD; Netflix; UTAUT2; SEM; SmartPLS*

Customer Segmentation Based on Recency Frequency Monetary (RFM) and User Event Tracking (UET) Using K-Means Algorithm

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Abstract

Business competition in e-commerce today is very tight, so every company is competing to increase sales. One of them is by providing the best service for its customers, so customer loyalty is formed to continue transacting again. Therefore, companies are required to be able to recognize and establish closeness with their customers. Customer segmentation is an effort to group customers based on customer characteristics and behavior in conducting transactions. With customer segmentation, companies can provide more targeted treatment and services. However, producing the proper customer segmentation requires a complicated data analysis process. In this study, customer segmentation was carried out using the K-Means clustering method based on the Recency, Frequency, and monetary (RFM) model combined with the User Event Tracking (UET) parameter. Based on the results of tests that have been carried out on 1,447,984 transaction data and 932,021 user tracking data, the resulting customer segmentation is divided into 3 (three) groups, namely Platinum (43.9%), Gold (9.5%), and Silver (46.6%). Companies can run different marketing strategies for each of these customer groups.

Keywords: *customer segmentation; k-means clustering; RFM; user event tracking*

Alignment of Business Goals With IT Goals By Measuring The Level of Capability Using Cobit 5

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Abstract

The application of IT to help implement business processes in the company should always be organized and managed. because the majority of IT implementation is carried out without supervision, so that there is often a misalignment between business goals and IT goals. For this reason, it is necessary to assess whether the IT implemented is in line with business objectives, whether using the measurement of IT maturity level using Cobit 4.1 or measuring the level of capability using Cobit 5. In this study, measuring the level of capability in two government offices engaged in communication, namely cities and provinces. The results of this study are both at level 1 with the "Largely Achived" category. Thus, it can be concluded that the level of readiness of information security management for provincial and municipal offices is still at the implementation stage.

Keywords: *cobit, maturity; capability; it goal; business goal*

Implementation of Weighted Product Method as Multi-Criteria Decision Analysis (MADM) in Vendor Selection

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Abstract

A company's procurement activities are very important because it supports the supply chain process, which allows the company to compete, and because the procurement process will involve many interests from various parties. One of the processes used by companies to procure goods and services is the selection of shipping service vendors. The research objective is to facilitate decision-making on issues related to vendor selection decision-making. Because many parties are decision-makers with different preferences, selecting an expedition service vendor will be challenging. In this study, data processing uses the Weighted Product method with the concept of multiplication to connect the attribute ratings that must be raised first with the relevant weights to determine which courier service vendor provider offers the best. The criteria used in the research on the selection of expedition service vendors are generally considered, namely

the price of service quality, document legality, delivery time, and response time. Based on the weight of each attribute, the most significant value will be selected as the best alternative. The results showed that Alternative 3 (Si Cepat) had the highest score (0.3252), ranked first, and made it the best choice.

Keywords: *vendor selection; weighted product method; procurement activities*

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Abstract

Within a year, universities as educational institutions can organize tens or hundreds of activities or events, such as seminars, workshops, exhibitions, cultural festivals, arts and sports and others. Good management is very necessary in the implementation of an activity. A web-based Campus Event Management Information System that is used to manage all events on campus was developed and implemented. The system is used to manage all events on campus, including promoting activities for both internal and external campuses. This research is a continuation of previous research and focus on the evaluation of usability system to confirm whether users could approve Campus Event Management Information System using System Usability Scale (SUS). The average value of SUS is 80.91, indicating that the system can be accepted by users.

Keywords: *event management, evaluation, information systems, system usability scale*

INFORMATION TECHNOLOGY

Integrated Deep Learning System for Car Damage Detection and Classification Using Deep Transfer Learning

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Abstract

The process for claiming car insurance in Indonesia often takes a long time. Therefore this research aims to speed up the process of car insurance claims by making an integrated deep learning system. There are 3 main tasks that are able to segmenting car damage, detecting damaged parts, and classifying the severity of car damage. The dataset consists of 3 parts that are damage segmentation dataset, car parts segmentation dataset, and car damage classification dataset. The models that are used in this paper are trained using deep transfer learning methods to save up time and resources. Model for the segmentation task is Mask R-CNN while for the classification task we compare EfficientNet and MobileNetV2. In this paper we try to increase the F1 score by adding a concatenate simple CNN and using the output from damage segmentation as an additional input for the classification model. Experiments show that Mask R-CNN is capable of detecting damaged car parts. Concatenate simple CNN modification on classification model is able to boost the model up to 9% average differences on the F1 score. The best classification model is MobileNetV2 with F1 score up to 91%.

Keywords: *Car Damage Detection; Car Damage Classification; Mask R-CNN; EfficientNet; MobileNetV2*

Comparison of Three Crawling Libraries for Providing Herbal Information Resources

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Abstract

Abstract—The growth of the herbal market and its potential worldwide is closely related to the need for information about herbal plants. Various companies use this information to develop herbal products, one of which is PT Saka Farma Laboratories (Kalbe Consumer Health). This information is obtained through public websites such as knapsackfamily.com, phytochem.nal.usda.gov, and ntbg.org. However, gathering this information takes a long time. One way that can be used in order to obtain information quickly is to use a crawling technique. Some of the crawling libraries often used are beautiful soup, selenium, and simple HTML dom. This study aimed to evaluate the crawling results of the beautiful soup, selenium, and simple HTML dom libraries. The websites used as crawl targets are knapsackfamily.com, phytochem.nal.usda.gov, and ntbg.org. Evaluation is done by comparing the crawling results of the libraries used. Based on the results of the tests, the Beautiful Soup library is ideal for crawling the three targeted herbal information websites. However, the selenium library and simple HTML dom can get all the information from the website phytochem.nal.usda.gov, while beautiful soup only gets some information.

Keywords: *herbal information; crawling; beautiful soup; selenium, simple_html_dom*

DNA Cryptography Based on NTRU Cryptosystem to Improve Security

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Abstract

Information exchange occurs all the time in today's internet era. Some of the data are public and some are private. Certain methods are used for secure private data transfer. However, technological advances have caused private data at risk because of the presence of quantum computers. Therefore, we need a new method for securing private data. In this paper, a combination of DNA cryptography methods based on the NTRU cryptosystem is proposed to improve the confidentiality of security data. This method is compared with conventional public key cryptography methods. The result of this comparison is that the proposed method has a long encryption and decryption time compared to other methods except for RSA. However, the key generation time of the proposed method is much faster than other methods tested except for ECC.

Keywords: *DNA cryptography; NTRU; confidentiality.*

Analysis of Consumer Satisfaction Levels with GoRide Services Using the Support Vector Machine (SVM) Classification Method

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Abstract

The online transportation service that is popular and often used by the public is Gojek. To Every customer has different feedback on Gojek's services. The level of customer satisfaction can be influenced by the quality of services provided. Therefore, it is necessary to analyze the prediction of the level of satisfaction of GoRide. This study uses the Support Vector Machine (SVM) method to predict it. The object was the students of IST AKPRIND Yogyakarta. The results of the classification of the level of consumer satisfaction on GoRide use the SVM method, which uses a linear kernel function with Cost = 0.1 and testing data of 25%, producing an accuracy rate of 100%. SVM with RBF kernel function, with a value of Cost = 100 and gamma = 0.00026, produces an accuracy rate of 88.46%. The results of the classification are that 76.69% of respondents stated that they were satisfied and very satisfied with the GoRide service. Meanwhile, a total of 23.30% of respondents stated that they were dissatisfied and very dissatisfied with GoRide's services. This proves that the SVM method is able to predict the classification of the level of consumer satisfaction with GoRide services very well.

Keywords: *Level of Satisfaction; GoRide; Support Vector Machine, classification.*

Classification of Teenager Aggressiveness Using K- Nearest Neighbor Method

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Abstract

Teenage is a period of transition from childhood to adulthood. During this time, teenagers will experience the process of finding self-identity and begin to recognize how and what they are like. This process of searching for self-identity is carried out by teenagers in various ways, although in a way that is at risk that it can cause problems in teenagers and impact their environment. Therefore, research is needed to classify teenager aggressiveness to know early who needs to be dealt with intensively by parents or the expert. This classification of teenager aggressiveness will use the K-Nearest Neighbor method, with the data used being teenager data from SMPN 11 Samarinda, as many as 101 teenagers, 70 data training, and 31 data testing with 29 symptoms. The study results obtained an accuracy value is 58.06%. It is hoped that with this classification of teenagers' aggressiveness, parents, teachers, or schools can pay attention to early treatment for students in need.

Keywords: *classification; aggressiveness; teenager; K-Nearest Neighbor*

Outdoor Social Distancing Violation Detection System using Faster R-CNN Algorithm

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Abstract

The implementation of social distancing at this time is very necessary because of the increasingly widespread cases of Covid-19. One of the easy and effective ways to break the chain of Covid-19 spread is by implementing social distancing. This final task will discuss the design and implementation of social distancing detection. This detection will take a picture of the person caught on camera then analysed whether they are doing social distancing or not. Detection of social distancing can be done in real-time. The Faster Region based Convolutional Neural Network (Faster R-CNN) method is used for the detection of human objects and the Euclidean Distance method is used to calculate human distance. The result of this final project is that the system will detect humans caught on camera using models with 80% for train : 20% test data partitions, epoch 7000, learning rate 0.0004, and num steps 21000. Accuracy obtained by using the Faster Region based Convolutional Neural Network (Faster R-CNN) method reached 96.90%, precision value of 97.81%, and recall value of 98.67% obtained from confusion matrix calculations performed on datasets. The accuracy of social distancing tests obtained in CCTV scenarios was 82.35% and parallel scenarios were 86.66%.

Keywords: *Accuracy; Covid-19; Deep Learning; Euclidean Distance; Faster Region based Convolutional Neural Network; Social Distancing.*

Wind Speed Time Series Modeling under Least Square Error and Genetic Algorithm

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Abstract

This paper presents a mathematical model for the representation of wind speed modeling. This model consists of two parts, namely the deterministic part which is the autoregressive sub-section and the stochastic model part which is the moving average sub-section with the time series autoregressive moving average (ARMA) model structure. The problem of the ARMA model structure that will be solved is to find the model parameters and generate the NID signal that gives the best model accuracy. The method used to find the optimal model parameters is the search for optimal solutions using genetic algorithm techniques. The fitness function used is a residual error which can be expressed by the mean square error. Simulation is done with 5000 cycles or training. The parameters obtained were tested with training data which give an MSE value of 0.1868, while the one tested using data outside of training give an MSE value of 0.1970. Therefore, this model is quite feasible to predict wind speed with a MSE difference of about 5.4%.

Keywords: *wind speed modeling; time series; ARMA; genetic algorithm; least square error*

Diagnosis System of Cattle Diseases Using Case-Based Reasoning and Nearest Neighbor Similarity Methods

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Abstract

Madura cattle is a type of dairy cattle, beef producing cattle, and working cows that should receive special attention from the Government to increase the cattle population. However, in recent years, the Government has often from foreign imports to meet the needs of the community. This resulted also in some areas in Madura Madura cattle population has decreased. This resulted in many cows from being attacked by disease outbreaks so that they could not produce quality milk and meat. Therefore, in this study we designed an early disease diagnosis system in Madura cattle to make it easier for farmers to know what diseases attack their livestock. This study's contribution is to diagnose systems using Case-Based Reasoning (CBR) and Nearest Neighbor Similarity (NNS) methods to assist cattle farmers in identifying cattle diseases that attack them quickly. The NNS method is used to find similarity values in disease classification, while CBR functions as a reasoning technique between symptoms to get an accurate diagnosis. From the tests that have been carried out using 240 cases with 160 as training data and 80 as test data, the resulting accuracy is 85.83%. This proves that the NNS method with CBR can diagnose cattle disease accurately.

Keywords: *Diagnosis; Cattle Diseases; Methods; Nearest Neighbor Similarity; Case-Based Reasoning.*

Identification of Semi-Solid Liquids Using Photodiode and RGB Sensor with Spektrofotometri Neural Network (S-NN) Method

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Abstract

Droplet or human saliva is a type of semi-solid liquid that can be caught by Covid-19 on its patch media. Human saliva is also one of the causes of the fastest spread of Covid-19, resulting in a pandemic nowadays. No research has been conducted in the form of a tool used to identify semi-solid liquids in mobile media. So in this preliminary study, we created a tool that uses spectrophotometry to identify semisolid liquids, including saliva, yogurt, and yeast water. In general, spectrophotometers using spectrophotometry are used as wavelength absorption analyzers to pass liquid samples in the form of semi-solid liquids. The non-monochromatic spectrophotometric output will be classified using the neural network (NN) method. NN identifies the type of liquid by calculating the weight of each wavelength of absorption of each semi-solid liquid sample from a non-monochromatic spectrophotometer. From this initial research, we can find out several types of wavelength spectrum that can be recognized by Photodiode and RGB sensors through non-monochrome spectrophotometric methods. From the test results, saliva samples on glass media have a very high error rate of 99.9098% this is due to the ability of the RGB sensor to capture reflections during the identification process of saliva which has a very small level of turbidity (clear) on glass media. For the overall average of saliva samples in all media, the accuracy is 89.1036% and the error is 10.8964%. For the overall average of the yogurt sample, the accuracy is

99.3075% and the error is 0.6925%. For the overall average of the yogurt sample, the accuracy is 99.3075% and the error is 0.6925%. For the overall average on the media without liquid, the accuracy is 78.8809% and the error is 21.1191%. Based on the results of the analysis carried out in this study, it can be concluded that the device can work properly as it aims.

Keywords: *Semi-solid liquid; Photodiode; RGB; Spectrophotometry; Neural Network*

Grouping Madura Tourism Objects with Comparison of Clustering Methods

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Abstract

Madura has tourist attractions spread over four regencies, one of which is Bangkalan. Bangkalan has the most tourist attractions compared to other districts in Madura. There are twenty-one attractions in Bangkalan from three categories, including religion, nature and culture. And, there are several indicators that influence visitor needs in determining tourist attractions, including Name of Tourism, Type of Tourism, Region, Gender, Age, Occupation, Education and Marital Status, as well as three groups of high, medium and low. Clustering is a data mining process that can be applied in various fields. The method used in this study is K-Means and Density-Based Spatial Clustering Algorithm with Noise (DBSCAN) methods. The K-Means method is a data mining method by grouping non-hierarchical data. While the DBSCAN method is a grouping method based on data density. This study aims to compare between the two methods to produce optimal solutions in classifying tourist objects. From several trials that have been carried out by comparing the two methods, the resulting accuracy value using a dataset of 21 attractions with 10 criteria and shows the accuracy value obtained by K-Means is superior to DBSCAN. The K-Means method has a higher Silhouette Index (SI) value of 0.6902 and k= 8.

Keywords: *Clustering; Attractions; Comparison Methods; K- Means; DBSCAN.*

Soceng Warriors: Game-Based Learning to Increase Security Awareness Against Social Engineering Attacks

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Abstract

The majority of businesses rely on technology such as the internet and smartphones. A significant amount of money is spent on security tools, software, and hardware, but a naive employer can provide an attacker with all the information without accessing the system. Social engineering is about utilizing the weakest aspect of any institution or organization: the human element. Humans are more accessible to compromise than computer systems and networks. Most people are raised to be polite and helpful, causing them to trust others by nature. Improving cybersecurity technologies and infrastructure alone will not suffice to combat social engineering attack. An education approach is one strategy. This paper suggests 'Soceng Warriors, an educational game designed to raise security awareness of social engineering attack. This game was tested by 30 responders ranging in age from 14 to 25 years. The pre-test and post-test questionnaires were completed by each responder. The test is used to determine the extent to which people are aware of social engineering attacks. According to the results of the paired T-test, Soceng Warriors can raise security awareness against social engineering assaults.

Keywords: *game-based learning; social engineering; security awareness; android game*

Word Ambiguity Identification using POS Tagging in Automatic Essay Scoring

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Abstract

Exam is one of the evaluations carried out by teachers to their students. Until now, research developments for Automatic Essay Scoring (AES) are still being carried out to produce better accuracy. In AES, the test documents are student's answers and the groundtruth are teacher's answers. Essay answers from students can consist of one or more sentences. The formation of words in a sentence can affect the meaning of the sentence. In Indonesian sentences there are words that can have more than one meaning (polysemy). This can lead to ambiguity of meaning. The examples of words with ambigous meaning are 'bisa', which in the Indonesian KBBI has 3 meanings (capable, toxic substance, and greeting shaman in the tradisional 'pingitan' ceremony). In this study, the addition of POS Tagging in the document preprocessing process is used to overcome document ambiguity and the application of the Cosine Similarity Method for AES can produce an accuracy value of 79%.

Keywords: *Automated Essay Scoring; POS Tagging; ambiguity document; Cosine Similarity*

Comparison of LSTM and GRU in Predicting the Number of Diabetic Patients

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Abstract

Diabetes is one of the chronic diseases that many people have. This diabetes disease even experienced a large increase during the pandemic, which could cause a higher percentage of people who were infected with Covid-19 and could cause many deaths. One way to help hospitals prevent too many diabetic patients is to predict the number of diabetic arrivals. To find out the predictions of diabetic patients who will check-in in the future, a prediction process is carried out using the LSTM (Long Short Term Memory) method for diabetic patients. The study was conducted using patient data from the Modopuro Health Center, Mojokerto Regency. The prediction process is carried out by manually calculating the data, then looking for the correlation of the data according to the LSTM method, namely identifying the autocorrelation coefficients at two to three different time lags. The data observed is daily data from January 2, 2021, to April 20, 2022, with as many as 345 data. From the calculation results, the RMSE value is 3.184 while the GRU produces an RMSE of 1.727. so it can be concluded that the GRU can better predict the number of visits of diabetic patients in internal medicine polyclinics

Keywords: *Diabetes; prediction; LSTM; GRU*

Realtime Simulation Platform for Rocket using Visual Programming

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Abstract

Rocket technology is included in high technology with a massive and complex system and has a high risk of danger. So, it needs to carry out a correct and thorough test before a flight test is carried out. One of them is by performing a software simulation in the early stages of rocket control development. This work introduces tools for rocket control algorithm simulation and rocket visualization, using LabVIEW and the flight simulator X-Plane. The communication used is UDP communication. All code is designed using block diagrams to facilitate development. The platform consists of virtual rocket launch data with real-time locations and weather. The thrust value generated in this experiment has a maximum point of 16000 Kgf according to the graph of the static test results. The results of this program will be developed into a ground control system and hardware testing.

Keywords: *SILS; Rocket; X-Plane; LabVIEW*

Face Recognition to Determine Visitor Attraction Using Residual Deep Neural Network

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Abstract

The development of social media in the form of websites and android applications should be appreciated. The background of this research is the stage to develop the software needed to know the age range. The objective thing to observe is through the visitor's face on the web or application. The purpose is to avoid false information and get the right process flow. The Technology used is deep learning for facial image recognition. The methods use Convolutional Neural Network with residuals, because the advantage is using multi-branch layers but having a stable training process. The use of augmentation is needed to increase the variety of facial recognition image positions and to overcome unbalanced classes. The dataset used consists of seven categories, namely Children, Youth, Early Workers, Middle Ages, Pre-Retirement, Retirement, and Old People, which Bappenas regulate. Each folder contains about 1157 images with a total data of 8,105 images. The training process results can obtain a model with an average accuracy of 99.08% and a computational training time of about

three hundred minutes. The model's accuracy is 99.08%, with MSE 0.0037, RMSE 0.0610, and MAE 0.0037. Testing time is about 2 seconds.

Keywords: *Face recognition; Visitor attraction; deep learning; residual network; data augmentation.*

A Comparative Study of Cuckoo and Any.Run in Basic Dynamic Malware Analysis

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Abstract

Malware is malicious software that is installed on a computer system without the user knowing. There are several classifications of malware. This classification is based on the characteristics of the malware at run time. In addition, it can also be seen from the payload contained in it and how it is distributed. Each malware has a unique way of infecting its target. Because malware continues to develop, it is necessary to detect and analyze malware files. This study intends to analyze the comparison of the two most popular tools for malware analysis, namely Cuckoo and Any.Run. Each tool will run the same sample. After the dynamic analysis is complete, a comparison table is presented to determine which tools are good at detecting malware files, providing detailed sample information, changes to system files, registry changes, change processes, etc. The result is that each tool has its own advantages in certain functionality. There are significant differences in the results of hook register detection, evasive behavior, file deletion, port details and DNS Query. Any.Run's accuracy in detecting malware is 73.3% while Cuckoo's is 40%. Any.Run has a higher TPR value than Cuckoo. Cuckoo's FNR value is higher than Any.Run.

Keywords: *Cyber Security; Malware Dynamic Analysis; Accuracy value*

Automatic Text Summarization of Madura Tourism Articles Using TF-IDF and K-Medoid Clustering

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Abstract

Tourism is one of the most popular article topics. Reading articles takes a lot of time, especially if you read a lot of article documents. An automatic text summarization system is needed to shorten the time in reading articles. Text summaries are composed of important sentences from documents that are less or more than half in length. This study proposes the implementation of TF-IDF and K-Medoid in the Extractive method of automatic text summarization of Indonesian documents, which are expected to provide good speed and accuracy in automatic text summarization. The TF-IDF algorithm is known to be able to generate text summaries based on the weights obtained for each sentence in the text. The K- Medoid method is a clustering method that functions to group sentences considered by the system to have the same meaning. This study uses data totaling 33 document texts taken from different web sources on the internet. To test the study's summary results, expert respondents will manually correct the summary results from the system. From the results of the tests that have been carried out, the accuracy value is 65.40%.

Keywords: *Tourism article; Automated Text Summarization; Extractive Methods; TF-IDF; K-Medoid Clustering.*

Analysis of Centralized vs Decentralized Electronic Voting

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Abstract

Some developed countries such as America, Switzerland, and Norway have not implemented an e-voting system. However, there are several countries that have implemented an e-voting system, one of which is Estonia by implementing a centralized e-voting application. Now, the e- voting system can be implemented in a decentralized manner by utilizing blockchain and smart contract. This paper presents a comparative study of centralized and decentralized e-voting applications. This study gives an overview of features offered by each application and analyzes performance, security, usability, and user experience of each application. The analysis was obtained from simulations and questionnaires for each application carried out by two groups of respondents. The questionnaires were distributed using a simple randomization technique and then analyzed using tools provided by SUS. The results obtained from security testing show that voting data in decentralized e-voting application cannot be modified while centralized one can. Therefore, a decentralized e-voting application indicates the existence of a guarantee of the integrity of the stored data. However, there are still performance issues are likely to be fixed in a near future.

Keywords: *e-voting; blockchain; Ethereum; smart contract*

Indonesia's Open Unemployment Rate Prediction System Using Deep Learning

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Abstract

The Open Unemployment Rate indicates the percentage of the labor force that is included in unemployment. The interpretation of a high Open Unemployment Rate indicates that there is a large number of workers who are not absorbed in the labor market. Thus, a prediction system for the Open Unemployment Rate in Indonesia is needed, to find out how much of the labor force is not absorbed in the labor market. So that the government in this case the Ministry of Manpower can anticipate by increasing job opportunities and employment opportunities for a productive workforce. In this study, a Deep Learning method is proposed to predict the Open Un-employment Rate in Indonesia. From the training stage, the success percentage is 97.93%, and the testing stage is 92.10%.

Keywords: *Open; Unemployment; Rate; Prediction; Deep Learning*

Stacking Ensemble Methods to Predict Obesity Levels in Adults

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Abstract

One of the causes of chronic disease is obesity, where obesity is a condition of someone who is overweight. The beyond-weight problems simplest befell in high-earnings nations; however, weight problems are growing dramatically in low- and middle-earnings countries. Based on this, obesity needs further investigation to suppress the increasing number of obese people. To predict obesity levels, we use a machine learning approach in this study. The dataset is a dataset on obesity levels in adults, so the method used is a classification method including Random Forest, Gradient Boosting, KNN, SVM, and Stacking Ensemble. This study uses Cross Validation (CV) to reduce the possibility of bias in the accuracy of results. The Cross Validation used is k = 10, 20, and 30. The classification method is evaluated using Performance measures, including accuracy, precision, and recalls, to get the best method. This research includes data exploration, pre-processing data, seeking accuracy and comparing each method, namely Random Forest, Gradient Boosting, KNN, and SVM with CV k=10,20, and 30, and

looking for accuracy and comparing the results of the stacking ensemble method with its meta-models. The highest accuracy is the accuracy value of the ensemble stacking method with the Gradient Boosting meta-model. The accuracy value obtained is 97.87%.

Keywords: *Cross Validation; Machine Learning; Obesity; Performance Measure; Stacking Ensemble.*

Car Classification Based on Image Using Transfer Learning Convolutional Neural Network

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Abstract

Classification of vehicle types is an important process in the development of intelligent transportation and intelligent traffic systems. Based on the ability to develop artificial intelligence, this paper proposes an artificial intelligence model to classify vehicles based on images. The test data used in this paper are CIFAR-10 data and CIFAR-100 data. Cifar-10 data has 60,000 image data divided into 10 classes, consisting of 50,000 images as training data and 10,000 images as testing data. There are two classes that can relate to the means of transportation, namely the automobile class and the truck class. The Cifar-100 data consists of 19 super classes, two of which are vehicles-1 and vehicles-2 classes. The images used in this paper consist of 3 classes, namely the bus class which consists of 600 images, the car class consisting of 6,000 data, and the truck class consisting of 6,000 data. Each class is taken 16.66% for testing data, and the rest is used as training data. Preprocessing is done by resizing and rescaling, which is followed by an augmentation process. the process is continued with transfer learning using the densenet model. From the test results, the average value of accuracy is 92% and the average value of precision is 87%.

Keywords: *Convolutional Neural Network, DenseNet, Transfer Learning, Image Processing.*

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Attendance System Using Two Factor Authentication Based on Secure App with Flutter

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Abstract

Every Indonesian community is required to implement health protocols in their daily activities. Therefore, used technology is needed to avoid the spread of the virus and become a solution to face the new normal era. One of the uses of technology is to track attendance using a mobile platform. This method poses several problems in its implementation, such as poor authentication, abuse by other users, and the difficulties of monitoring by teaching staff. Based on this, this research will build an application that aims to overcome this problem by utilizing the Face Recognition, Disable Multi-Device, and Present Validation features. This application was developed on the Android platform using the Flutter framework. This application is built by integrating two features: authentication and time for attendance validation. Measuring the accuracy of the face recognition algorithm as a factor of authentication that shows the characteristics, scenario testing occurs with five aspects such; camera quality, distance, light intensity, facial expressions, and image-taking position. The sample taken was 40 respondents. A face recognition system is designed and implemented using the Flutter framework on the Android platform. By comparing the experimental results of testing scenarios to verify face recognition, measuring the feasibility of this scheme.

Keywords: *Online Attendance Application, Face Recognition, Flutter*

Political Campaign Strategy on Social Media Using Finite State Machine

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Abstract

Political campaigns are routine activities leading up to the General Election. Each election will be preceded by a campaign period to attract the sympathy of potential voters. Conventional political campaigns have developed into modern campaigns. Modern campaigns take advantage of technological advances that allow campaign activities through social media. The target of this campaign will be to reach a wider range of potential voters. Campaigns using social media have different challenges compared to conventional patterns. How to get social media users interested in joining campaign groups and actively interacting is a challenge for the candidates. This study was conducted based on data observations and experiences as a campaign team. This study proposes a simple way to build working guidelines for the campaign team. This guide was created using the Finite State Machine (FSM). Finite State Machine (FSM) is a model building method that can be used to describe sequential logical sequences and is widely used in games for artificial intelligence. This study uses FSM in the form of designing a simple game scenario. There are three scenarios developed, one main process and two sub-processes. These scenarios are the main activities in

managing campaign groups on social media. The results of this study resulted in FSM which is part of a serious

Keywords: *finite state machine, political campaign, social media*

Performance of Root-Mean-Square Propagation and Adaptive Gradient Optimization Algorithms on Covid-19 Pneumonia Classification

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Abstract

The SARS-CoV-2 coronavirus causes inflammation of the lungs, known as Covid-19 Pneumonia. Doctors or radiologists usually use lung images from X-rays to detect the condition of a person's lungs has Covid-19 Pneumonia or not. In its development, we can use software that utilizes a machine learning approach to analyze the image automatically. The classification process was carried out on these lung images using a machine learning approach in this research. The classification process uses three categories, namely Covid-19 Pneumonia, Ordinary Pneumonia (non-Covid-19 Pneumonia), and Normal (healthy or non-inflamed lungs). The machine learning method for classification in this research uses the Convolutional Neural Network (CNN), which applies 22 layers containing 5 Convolutional Layers with dimension values 16, 32, 64, 128, and 256. The optimization process is used in model compilation to produce better classification performance. This research tested the Root-Mean-Square Propagation and Adaptive Gradient optimization algorithms used to optimize the performance of the CNN model for the classification of Covid- 19 Pneumonia. The experiment involved 3.900 lung images for the training process, 450 lung images for validation, and 225 lung images for testing. Based on the investigation, the implementation of the Root-Mean-Square Propagation optimization algorithm produces an accuracy of 87.99%, a precision of 0.88, a recall of 0.86, and an f1 score of 0.87. Meanwhile, the implementation of the Adaptive Gradient optimization algorithm produces an accuracy of 75.99%, a precision of 0.79, a recall of 0.72, and an f1 score of 0.75. These results provide essential information that the optimization algorithm of the Root-Mean-Square

Propagation produces better performance than the Adaptive Gradient in classifying Covid -19 Pneumonia.

Keywords: *Covid-19 Pneumonia, Optimization, Root-Mean- Square Propagation, Adaptive Gradient, Convolutional Neural Network and Classification Performance.*

Risk Management Capability Level of Mail Information System in Surabaya Government

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Abstract

Abstract—ICT (Information and Communication Technology) plays strategic role in government institutions. The existence of ICT is considered capable of promoting the realization of good governance. Dinas Komunikasi dan Informatika of Surabaya (Dinkominfo Surabaya) was also aware of this. Therefore, Dinkominfo Surabaya implemented a mail management information system called e-Surat. Dinkomifo Surabaya has established standard operating procedure (SOP) for e-Surat. However, some problems still occurred such as data loss and mail disposition errors. Since SOPs were not enough to minimize the occurrence of information security risks, Dinkominfo Surabaya had need of knowing its capability level of information security risk to then identify the extent of information security risk management that has been carried out and corrective

action that needs to be taken. This study aimed to help Dinkominfo Surabaya assess the extent to which risk optimization management in e-Surat using COBIT 5 and focusing on the APO12 domain. The results showed that the capability level of the risk management process on the APO12 domain was at level 1 (performed), two levels below the expected level, indicating that the risk management process has been done well although it has not met the criteria of the practice itself. Recommendations given to improve risk management-related process to achieve the expected level 3 (established) include determining the objectives and limits of the risk management process carried out as well as providing work products for institution leaders so that the handling of problems related to risk management can involve policymakers.

Keywords: *e-government, risk management, capability level, APO*

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Graphical User Interface for RYU Software Defined Network Controller

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Abstract

Abstract—Software-Defined Networking (SDN) is a new networking technology that is dynamic, easy to manage, cost-effective, adaptable, and well-suited to today's growing network needs. Ryu Controller is SDN's open source controller which NTT developed. Ryu Controller has rich functions and Applica- tion Programming Interfaces (APIs) to support very much the network engineer. However, it works with a command interface, so it is difficult for network managers who do not always master programming. To overcome that problem, we need to develop a web-based user interface system to help users to be more convenient in using the Ryu controller. The paper uses the Mininet emulator to create the SDN network environment and JavaScript, CSS, and HTML to process the derived APIs into the management page. The results achieved to create an interface that helps users easily observe the network's protocol, the traffic of packets, the status of switches, and flow tables. It also helps network engineers and managers recognize that the transmission lines are failing (e.g., network congestion) or running out of bandwidth to promptly fix those transmissions in the fastest and most effective way.

Keywords: *SDN, Ryu Controller, GUI, Mininet*

Single Channel Electroencephalogram (EEG) Based Biometric System

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Abstract

The biometric system is one of the great options for replacing the passworded system. Several biometric modalities, including fingerprints, face, palm prints, and voice, have been described as performing effectively. Unfortunately, the existing biometric system still faces challenges, such as the tolerance for fabricated data. The electroencephalogram (EEG) signal is a possible resolution modality. Numerous investigations have determined that the EEG biometric system can attain high levels of accuracy. However, EEG-based biometric systems also have some issues, especially in practical implementation. Most proposed EEG-based biometric systems require multi-channel sensor configuration that gives rise the complexity in data collection and computation. In this study, the optimum channel for biometric systems was investigated. It was found that by utilizing EEG data that comes from a single channel sensor, the system was able to achieve 80% accuracy. To achieve that accuracy, the EEG signal was segmented into five second lengths of segments, then Power Spectral Density (PSD) feature was extracted from delta (0.5-4Hz), theta (4-8Hz), alpha (8-14Hz), beta (14-30Hz) and gamma (30-50Hz) bands. The classification approach by using K Nearest Neighbours (KNN) and Support Vector Machine (SVM) algorithms were employed to evaluate the system.

Keywords: *biometric, channel selection, classification, EEG, KNN*

Using Genetic Algorithm for Wide yet Even Scattering of Game Objects: Applications on Irregular Levels and Involving Multiple Objects

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Abstract

The rising costs of game development necessitate algorithmic and automatic methods for creating game content, also known as procedural content generation or PCG. Among many types of content, game levels are increasingly generated with PCG. The literature has recorded various level generation methods for specific games or contexts, yet no general-purpose one. We have previously addressed this gap by proposing a genetic algorithm-based method that scatters objects widely yet evenly on a level, which satisfies the player's needs for exploration. Our previous work acquired good results when applying the method on a simple and rectangular level. This paper presents two follow-up case studies that reflect real games: one with irregular levels and another with multiple object types. Our results show that our method fits the first case study, although the irregular level's layout may yield unexpected results such as the tendency of objects to appear along its edge. Meanwhile, we also find that objects of different types are best scattered separately, each under a specific parameter, to optimize their wide yet even distributions. We then discuss our results' implications for PCG research and how to generalize our method to generate other types of game content.

Keywords: *procedural content generation, game levels, object scattering, genetic algorithm, wide yet even distribution.*

Forecasting the Inflation Rate in Indonesia Using Backpropagation Artificial Neural Network

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Abstract

Economic growth is an important indicator in measuring the country's economic development. In this case, the stability of the rupiah exchange rate against the prices of goods and services is included in inflation. To achieve low and stable inflation, this inflation can be caused by two things, namely domestic pressure and external pressure. Pressure experienced from within the country is a change in market prices. Meanwhile, the pressure experienced from abroad is inflation in other countries, because this can lead to an increase in import prices and affect the balance of payments between countries. Another problem that will occur as a result of an unstable inflation rate is an increase in the poverty rate. Therefore, it is necessary to forecast the inflation rate in Indonesia by applying an Artificial Neural Network. The RMSE value generated in predicting the inflation rate using Artificial Neural Network is 0,41273932.

Keywords: *Artificial Neural Network, Backpropagation Algorithm, Forecasting, Indonesia, Inflation Rate*

Optimization of Single Exponential Smoothing using Particle Swarm Optimization and Modified Particle Swarm Optmization in Sales Forecast

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Abstract

The selection of a smoothing constant in the Single Exponential Smoothing (SES) algorithm is a crucial path in increasing the accuracy of the results of a forecasting system, where in the SES method, the value of the smoothing constant is chosen randomly. Optimization algorithms can be used to determine the best smoothing constant value, such as the use of the Particle Swarm Optimization (PSO) algorithm which is proven to be an algorithm that is able to solve optimization problems well. However, in its development, there is a Modified Particle Swarm Optimization (MPSO) Method which is claimed to have better performance, even being able to produce 99% reduction in mean square error over the conventional PSO technique in the case of electrocardiogram (ECG) Signals. This study aims to compare the performance of the PSO and MPSO algorithms to produce the best smoothing constant value in the case of sales forecasting. Based on the tests carried out, it can be concluded that the MPSO algorithm produces a better MAPE of 17.95, compared to the PSO algorithm which produces a MAPE value of 19,515 in the built forecasting system.

Keywords: *Particle Swarm Optimization, Modified Particle Swarm Optimization, Single Exponential Smoothing, Sales Forecasting*

Classification of Javanese script Using Convolutional Neural Network With Data Augmentation

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Abstract

Javanese is a language that is widely used by people living on the island of Java. The Javanese language was originally compiled using the Javanese script, not Latin. Many historical objects use Javanese script, but along with the low level of recognition of Javanese script, people are not familiar with even Javanese script. Therefore we need a method of recognizing Javanese characters. One method of pattern recognition that can be applied to Javanese script classification is using the Convolutional Neural Network (CNN). For its implementation, there are several challenges such as the many variations of Javanese script forms, the selection of the right architecture, and a lot of training data needed so that the system can predict accurately. Convolutional Neural Network (CNN) is an effective deep learning in image processing. The CNN model was trained using a Javanese script dataset. The dataset consists of 10220 data with 20 classes, namely the HA TO NGA script, with 8160 used as training, 2040 as validation and 20 predictions. In this research, optimization is carried out in the form of data augmentation which is useful for adding variations to the training data. The test results managed to get 98% accuracy on training data, 92% data validation and can classify predictions with accurate results.

Keywords: *CNN, Augmentation, Javanese script*

Development of Extraction-based Text Summarization Application to Improve Children's Literacy in Storybook Reading

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Abstract

The literacy level in Indonesia is relatively low, this is evidenced by the reading literacy ranking at 72 out of 77. Even though reading literacy is very important for the future of the country and children. Improving literacy can be started by adopting the habit of reading from an early age or once as a child. One way to increase children's interest in reading is through short stories. However, children's reading literacy with an understanding of the summary or essence of this short story needs to be analyzed further. This requires an application that can summarize the short story automatically to get a representative short story subject. Therefore, the research proposed extraction-based text summarization to summarize children's stories using the TF-IDF (Term Frequency-Inverse Document Frequency) algorithm. The application has been tested on 5 children's stories, compare it to another text summarization application and gets a similarity of summary reach 80%. The experiment result reported that the

summarization has a good structured story line, the meaning of the story that is still conveyed, and efficient in time. By summarizing children's stories, a story looks shorter and increase children's interest in reading which leads to adopting reading habits.

Keywords: *Extraction-based Text Summarization, Children, Literacy, Storybook Reading, TF-IDF*

Toward Multiple Smart Home Scenario with Fog Computing Enabled

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Abstract

The cloud server is responsible for collecting and processing data sent from each sensor device, then executing and sending back visually processed information. The problem arises when the location of the cloud server is far from the IoT data source, so multi-hop communication is required from the IoT data source to the Cloud Server. Fog Computing helps cloud computing process and store data so that data read from IoT devices does not need to be sent directly to cloud computing. This study proposed a multiple smart-home scenario with fog computing-enabled. Each smart- home unit consists of one camera and three sensors. Two sensors measure temperature and humidity, the other measures light intensity, and the camera for security is integrated with face and object detection. The evaluation was done by comparing the scenario's efficiency with and without fog computing in terms of network usage and Latency. The network usage of the scenario with fog computing is still lower than the scenario without fogcomputing, although the number of smart-home units has increased. On the other hand, the Latency of the scenario without fog computing is lower than with

fog computing when the number of smart-home no more than 12 units. However, the scenario with fog computing could maintain the Latency, although the number of smart-home units increased.

Keywords: *fog, cloud, computing, smarthome, iFogSim*

Online User Reviews Investigation Towards Madura Island Tourism using Latent Semantic Analysis

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Abstract

Modern tourism relies on customer experience feedback that is often shared via social media in the format of images, videos or texts. The massive growth of user-generated content, especially text, opens the opportunity for research in this area to help us analyse and extract the information from the documents. Natural Language Processing methods enable us to extract data from users' opinions in unstructured text, which is helpful for business strategy making. In this study, we summarize the terms often discussed in the Google Maps review regarding Madura Island using the topic modelling technique. One well-known topic modelling method is Latent Semantic Analysis, which is an unsupervised learning method that extracts the documents based on the appearance frequency of words. This method then calculates the distance between words and clusters of similar terms. By extracting 11240 reviews from Google Maps, we obtain ten words representing the themes that often emerge in user reviews. The emerging themes then are beneficial for further analysis to decide

Keywords: *Text Mining, Topic Modeling, Latent Semantic Analysis, Madura Tourism*

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Flood Early Warning System Using River Water Level Prediction with Artificial Neural Network (Case Study: Jakarta City)

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Abstract

The problem of flooding is still an important topic to be solved in Indonesia because many flood events still occur in most areas in Indonesia. In 2021, floods were the most common disaster. Of the 1891 disasters, 788 of them were floods. So, this research proposes one way to deal with flood disasters: by predicting the arrival of the flood by predicting the river's water level to know the alert status in each river so that residents can anticipate the arrival of floods. The prediction of river water height in this study is going to use one of the machine learning algorithms, Artificial Neural Network (ANN). The machine learning model that has been created will be presented using a web application system so that it can be used. In the process of making a machine learning model using 1096 historical data on river water level and weather, we carried out several experiments on the model to change the number of ANN algorithm nodes. In the experiments carried out, we also carried out comparisons using data that has been carried out by the Synthetic Minority Over-Sampling Technique with Gaussian Noise (SMOGN) process and data that has not been processed by SMOGN. The results obtained show that the use of 125 nodes can produce a smaller prediction error value than using nodes of 25, 15, 30, and 50. Experiments using SMOGN, For experiments using SMOGN, the results of the experiment are still inconsistent, some observation points produce smaller MAE values and some observation points produce larger MAE values.

Keywords: *Flood, Machine Learning, Artificial Neural Network, Disaster Mitigation, Web Application*

Implementation of Quantile Regression Neural Network Model for Forecasting Electricity Demand in East Java

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Abstract

Electricity is one of the energy sources essential in many activities. The company that manages electricity in Indonesia is PT. PLN Persero. This company divides electricity energy demand into six sectors: household, social, industrial, business, general, and other sectors. The household sector finds the highest electricity demand.It is because the household sector has the highest number of customers. PT. PLN Persero must know the increased electricity demand in the future to anticipate a power outage. The actual data that has the characteristics is the electricity demand of the household sector. The data used in the study is electricity demand data for January 2010 to April 2016. The Electricity data have non-homogeneous variants, so we use The Quantile Regression Neural Network to predict electricity use in East Java. We use this method because it can capture nonlinear patterns in the data. The Quantile Regression Neural Network is a hybrid statistical method. The Neural Network will compare it. The value of the model selection criteria used is the Root Mean Squared Error (RMSE). The bes way to predict electricity demand is the QRNN method with a Root Mean Squared Error (RMSE) value of 28975770.

Keywords: *Electricity Demand, Neural Network, Nonlinearity, Quantile Regression.*

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K-Means and K-Medoids Clustering Methods for Customer Segmentation in Online Retail Datasets

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Abstract

An important part of being targeted in a business that can bring so much profit to a company is customer segmentation. In principle, customer segmentation is a way to get to know the target consumer more deeply so that the business can operate at a pace that has positive prospects and generates profits. Segmentation customer has an important role for businesses because one of the benefits is that it makes it easier for companies to organize the products and services offered to suit consumer needs. That way the relationship between the company and the customer is well established which will result in customers shopping more often. The purpose of this study is to identify customer segmentation on online retail data based on Recency, Frequency, Monetary. In achieving this goal, the methods applied to perform the customer segmentation process are K-Means and K-Medoids. The result obtained is that this method is the number of appropriate K values in this case study with a value of 4 for K-Means method and a value of 6 for K-Medoids method.

Keywords: *Segmentation customer, K-Means, K-Medoids, Online Retail.*

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Water Requirement Prediction System using Multi-Factors High Order Fuzzy Time Series Method

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Abstract

Madura Island is a dry area, and lacks of water which is the main means to maintain the environment and personal hygiene. Madura Island has a very low average rainfall of 10.5 mm per year. Bangkalan is one of the areas on the island of Madura with a high population density compared to other Madura areas. Based on that, resulting in high air usage in this area. Thus, forecasting is needed that aims to predict the water requirement in Bangkalan for clean water service companies. The method used is Multi-Factors High Order Fuzzy Time Series (MFHO FTS) where this method is the Fuzzy Times Series (FTS) method which uses more than one factor that affects forecasting. This study's contribution is water requirement prediction system using MFHO FTS Method.

There are several steps carried out by the Multi-Factors High Order Fuzzy Time Series method in this study, including establishing the Universe of Discourse, determining the number of clusters, forming subintervals, forming fuzzy sets, fuzzification processes, forming Fuzzy Logic Relationships (FLR), and defuzzification processes. The measurement with the MAPE calculation obtained from this study is 0.09. The MAPE value close to zero indicates that the Multi-Factors High.

Keywords: *Forecasting, Clean Water, Service Companies, Fuzzy Times Series.*

Comparison of Sequential Feature Selection Performance with Various Dimensional Data to Produce Optimal Classification

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Abstract

Feature selection is one part of preprocessing which aims to reduce data dimensions. This study aims to produce optimal performance of the best feature selection method implemented on low- and high-dimensional data. The feature selection methods used are Sequential Forward Selection (SFwS) and Sequential Backward Selection (SBwS) algorithms. Meanwhile, to test the results of the best feature selection algorithm using the classification algorithm Logistic Regression, Linear Regression, k-Nearest Neighbor (kNN). The data set to test the performance of the feature selection algorithm uses Loan and Wine datasets to represent low dimensional data and Parkinson's disease datasets to represent high dimensional data. The low dimensional data test results show that the SFS algorithm with the kNN classifier and the Regression group has the best average score. The SFwS algorithm with Logistic Regression has the best average score in the high dimensional data set. The minimal number of feature selections resulted from the SFwS algorithm rather than the SBwF algorithm. Although it should have the same accuracy or number of selected features, in this study, the

results were different except for SFS-Linear Regression. The highest average accuracy score for low dimensional data is the Wine dataset of 0.994 (SFS-kNN), and for high dimensional data is the Parkinson's disease dataset of 1 (SFS-LGR). The least number of feature selections obtained from the SFwS-Logistic Regression algorithm is one feature with an accuracy score of 0.8083. The Sequential Backward Selection algorithm generally has alonger running time than the Sequential Forward Selection.

Keywords: *Sequential Feature Selection, forward, backward, kNN, Linear Regression, Logistic Regression.*

Real-time Vision image processing based on LabVIEW and Microcontroller controlled Parallel Robot

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Abstract

Manual inspections and executions in factory operations are not efficient with many issues regarding accuracy, precision and control. This research presents the development of camera vision to classify the different colors of the target object and works with parallel robots to pick and place objects. The efficiency of using the camera and the robot's accuracy is studied by simulating a suitable robot workspace with MATLAB Simulink. The focus is on developing a parallel robotic arm that can be used in practice using the kinematic computational. Two key components are studied: robot kinematics for motion analysis by design a prototype of parallel robot that can be controlled automatically by Arduino microcontroller, and vision analysis to check and analyze the target object's different colors by using a camera and NI vision LabVIEW. The camera vision and the robotic arm were set up together to inspect three spherical metal specimens of different colors: blue, yellow and red. The parallel robot will pick and move the workpiece to different positions in conjunction with the vision system. The experimental result is found satisfactory and can be used effectively. The accuracy of image processing detection is 100.00% and the kinematic of the robot.

Keywords: *Parallel robot, kinematic of Robotic, MATLAB Simulations, NI vision LabVIEW, Image Processing,*

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Forecasting Model of Wind Speed and Direction by Convolutional Neural Network - Deep Convolutional Long Short Term Memory

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Abstract

This paper provides a forecasting of wind speed and direction using convolutional neural network - deep convolutional long short term memory (CNN-DConvLSTM). The forecasting model merges merit between CNN and ConvLSTM to enhance forecast accuracy of wind speed and direction. The input of the forecasting model is an image data on two dimensions (2D) - coordinate which expresses the time sequential image of the wind vector. The forecasting model consists of encoding and forecasting networks which are forecast one hour later. The actual observed data taken from Automated Meteorological Data Acquisition System (AMeDAS), Japan. The forecasting model performance is evaluated using mean absolute error (MAE) between forecasted and observed data. For confirming effectiveness, the forecasting model is compared by persistent model and fully connected - long short term memory (FC-LSTM).

Keywords: *LSTM, CNN, ConvLSTM, wind power, wind forecasting*

Implementation Password Stealing Attack Against Saved Passwords on Computer Browsers Using Digispark Attiny85

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Abstract

Passwords are the most commonly used authentication method. However, there are problems with its use, the users must remember their passwords constantly. The solution to this problem is to use a password manager. Currently, there is a password manager that is integrated with the computer browser. However, because the security in the password manager does not fully protect the user's personal data, the passwords stored in the password manager will be stored in a file. It can be exploited by malicious parties to steal files stored with these passwords by carrying out password stealing attacks using malicious software (malware). Among the many types of malware, there is malware that can be run using a universal serial bus (USB) microcontroller. The USB interface is still a possible area to attack because the firmware of the USB device cannot be detected by antivirus software. Therefore in this study, the implementation of a password stealing attack will be carried out to steal files stored with passwords using a USB device microcontroller and provide knowledge regarding the impact caused by the attack. The USB microcontroller used in this study is Digispark Attiny85. The implementation phase includes function testing, programming, testing, and impact analysis. After doing and testing the password stealing attack on Digispark Attiny85, it was found that the password stealing attack can be implemented on Digispark Attiny85 with evidence of the file being stored password being stolen and all functions of the program running properly. Based on the results of the attacks obtained, this study will also present mitigation recommendations to minimize password stealing attacks using microcontrollers that occur on the user's computer, such as limiting physical access, using screen lock, and banning unauthorized devices.

Keywords: *Digispark, password, password stealing attack, malicious software.*

Stalk Rots Diseases of Corn Classification using Morphology Closing and Convolutional Neural Network

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Abstract

Corn diseases need to be a concern. The disorders can attack all parts of the corn, including leaves, stalk rots, and cob. In this article, the focus is on discussing conditions in stalk rots. Data was obtained from corn plantations in Bangkalan, Madura. The system built is an image classification of three classes (healthy, anthracnose, and gibberella). The data consists of 335 images for each class, so the total images is 1005. The system is composed of preprocessing (HSV conversion, thresholding, morphology closing, masking) and classification with Convolutional Neural Network (CNN). The CNN layer arrangement has six convolutional layers, three pooling layers, a fully connected layer, and a softmax for the classification layer. The training process is carried out using the epochs 30, batch-size 10, and learning rate 0.0001 with Stochastic Gradient Optimization (SGD). The experiment using 5-fold cross- validation and split data training vs. testing is 80%:20%. The result shows the average accuracy of 93.13%. The best model is obtained in the second fold with an accuracy of 96.51%.

Keywords: *Convolutional Neural Network, Image Classification, Morphology Closing, Stalk Rots, Corn Diseases*

Development of Final Year Project System (FIPOS) Based on Website with One-Time Password

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Abstract

Final Project or Thesis is one of the processes and requirements for graduation from college studies which in the process of making it require sufficient intensity in communication between lecturers and students. However, problems that arise during guidance are the limited communication time and the suitability of the schedule between students and lecturers so that the frequency of offline meetings is reduced or even non-existent. In addition, common problems encountered are poor project planning and management, unstructured documentation, student problems unrelated to the project, and inadequate or negligent supervision. These problems can be overcome by building a final year project system called web-based FIPOS. FIPOS was built starting from the Proposal process and Final Year Project with predetermined features. The Year End Project is one of the works that needs to be kept confidential because it involves valuable ideas. FIPOS not only maintains communication between lecturers and students but also maintains the confidentiality of the year-end guidance process. Based on OWASP 2021, SQL Injection is still in the top 10. In applications using logins, SQL Injection must be anticipated. Therefore, the development of FIPOS implements security by using a two-factor authentication scheme that utilizes email, password, and one-time passcode in the login process. And also implement secure coding to reduce the impact of SQL injection attacks. In addition, because FIPOS is an application that is often used by final year

students, its usefulness is tested with UAT at XYZ University. From the research results, FIPOS can secure the login authentication process and secure data from SQL injection attacks as well as useful applications by getting a UAT value of 97.7%, which means that FIPOS can run well and is user friendly.

Keywords: *FIPOS, Final Year Project, One-Time Password, SQL Injection*

An Algorithm for Selecting the Head and Tail of an Intact Fish in the Overlapping Multi-fish Image for Freshness Detection

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Abstract

Abstract—The fish freshness detection application assists the public in determining the freshness of fish purchased at the market. The application operates two principal tasks: detecting body parts' regions of interest (ROI) and classifying freshness. For ROI detection, the You Only Look Once (Yolo) method detects intact fish and their parts, such as heads and tails. Then, a Convolutional Neural Network classifies them for freshness. However, the input image for Yolo may contain fish with arbitrary placement resulting in overlapped and redundant detected parts. Hence, an algorithm to select the appropriate head and tail of an intact fish from the detected parts is required to correctly aggregate the freshness classes of all fish in the image. This study proposes a head and tail selection algorithm using two principal components: the head-tail distance and the intersection over the fish part. The experimental results on 20 overlapping fish images show that the algorithm selects heads and tails with an accuracy of 84.21%.

Keywords: *head and tail selection, fish freshness, intersection over fish part, intact fish, distance.*

Analysis of SQL Injection Attack Detection and Prevention on MySQL Database Using Input Categorization and Input Verifier

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Abstract

Data leakage affects confidentiality and integrity which can be detrimental to various parties. According to OWASP (Open Web Application Security Project) research, SQL injection attacks rank first in the top web application vulnerabilities. Moreover, the website is directly connected. SQL injection attacks are common on MySQL databases because they are generally more popular than other database systems. One of the efforts to detect and prevent SQL injection attacks is to use input categorization techniques and input verifiers based on input. Application development using SDLC Waterfall. The analysis is obtained from the test results using sqlmap and manually. This paper provides an overview of detection and prevention efforts with input categorization approaches and input verifiers based on the type of SQL injection attack. All applications without prevention and detection can be attacked, while applications with prevention and detection cannot be attacked. This paper designs and develops a web application with and without SQL injection attack detection and prevention using input categorization and input verifier. The results obtained, input categorization, and input verification techniques can

detect and prevent SQL injection attacks based on their type including union-based SQL injection, error-based SQL injection, and blind SQL injection. Input categorization and input verifier can be used in addition to the use of an encrypted database.

Keywords: *SQL Injection, input categorization, input verifier.*

Reinforcement Learning for Automatic Cryptocurrency Trading

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Abstract

Reinforcement learning is one of the machine learning algorithms that can make software agents and machines work automatically to determine the ideal behavior so that they can maximize the algorithm. On the other hand, in recent years cryptocurrencies are increasingly being known by many people because many people use cryptocurrencies as a medium of investment and trading. With the popularity of cryptocurrencies, many people create automated cryptocurrency trading systems to save time in trading activities. Therefore, researchers want to develop an automated trading system by implementing a reinforcement learning algorithm. This implementation uses a stable baseline and OpenAi gym with three methods of RNN such as A2C, ACER, and PPO. The result we got is A2C is best method for low volume trade like BTC/USDT while for higher volume trade in ETH/USDT, the ACER method proved itself more useful.

Keywords: *reinforcement, machine learning, cryptocurrency, algorithm.*

Usability Evaluation of Academic Information System Using the WEBUSE Method: A study on University of Trunojoyo Madura web portal

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Absract

A website is a means to convey information, one of which is academic information about higher education (SIAKAD). SIAKAD users are lecturers and students. However, users often fail to understand the function of the features or commands available in SIAKAD. Consequently, users require longer time to access information and provide feedbacks to SIAKAD. Therefore, this study was conducted to evaluate and determine the level of usability of SIAKAD and provide some recommendations for improvement. The Web Usability Evaluation Tool (WEBUSE) method will be applied in this study. Questionnaire feedback from users when using the website will reflect user satisfaction. The level of usability of the SIAKAD will be determined based on the respondents' answers. This research takes a case study on the website siakad.trunojoyo.ac.id. According to the findings of this study, ten attributes have a moderate level of usability, whereas fourteen have a good level. The highest level of usability is that the website doesn't have too many ads. In contrast, the lowest level is the attribute of an attractive website interface design. Finally, the primary issue is that SIAKAD content updates are frequently delayed. The recommendation that can be provided is to organize information at each level of the website so that it

displays a clear structure and to add updated dates to maintain the content current.

Keywords: *website, academic information system, usability, WEBUSE.*

ELECTRICAL ENGINEERING

Path Planning and Smoothing in Maze Exploration Using Virtual Mobile Robot-Based Modified Probabilistic Road Map

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Abstract

Planning an efficient and smooth path has grown into the recurring issue in supporting mobile robot navigation. In the case of maze exploration, path planning must provide the shortest and easiest path to be followed by mobile robot. This paper aims to develop path planning method connecting several target positions with smooth path. This paper proposes modified probabilistic road map with virtual mobile robot path smoothing. A new approach to produce random nodes that differ from previous version of path planning is presented here. A virtual non-holonomic mobile robot follows the sharp turn path generated by the proposed method. The trajectory left by the virtual robot results in a smooth path that connecting some desired destinations. The magnitude of the distance of the proposed path planning and smoothing was more efficient than the path of previous research with average value 18.72%. The virtual mobile robot-based modified probabilistic road map successfully improved the smoothness of the path.

Keywords: *maze exploration, path planning, probabilistic road map, path smoothing, virtual mobile robot*

Kalman and Butterworth Filter Comparison for GPS and Magnetometer Sensors

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Abstract

In this research, a comparative study of the application of two filtering techniques was conducted, namely the Kalman and Butterworth Low-Pass Filter. Both of these filtering techniques are applied to the GPS sensor readings and Magnetometer on the prototype tank. The Neo Ublox 6M GPS module and Compass HMC5883L were used in this study. Three scenarios in the form of triangular, square, and hexagon paths were used to collect data. Based on the results of data observations and the resulting longitude and latitude coordinate mapping pattern, it can be concluded that the Kalman Filter has better stability than the Butterworth Low-Pass Filter.

Keywords : *kalman, butterworth, low-pass filter, gps, magnetometer, sensors*

Eleven Degree of Freedom Humanoid Upper Body Robot SIBO

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Abstract

Rapid technological advancement is an asset that can be leveraged to preserve culture. This article carried out the assimilation of robotic technology into culture. In this study, the first design was accomplished by simulating a humanoid robot using a three-dimensional model. This study focuses on the experiment of the SIBO welcome robot, which replicates the humanoid upper body's movement with eleven degrees of freedom. This research focuses on the experiment of the SIBO welcoming robot by imitating the movement of the upper body humanoid with eleven degrees of freedom. Blender application is used to create 3D models and rigging for size simulation and estimation of robot movement. The implementation of the real robot uses low-cost materials and a second-hand motor power window car as the actuator. This robot casing uses concepts and materials with the nuances of Balinese culture, namely 'Ogoh-Ogoh'. The combination of art and technology creates the SIBO welcoming robot.

Keywords: *Keywords—eleven dof, humanoid robot, mechanical design, robotics, simulink*

Camera Calibration Algorithm for Industrial Robot

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Abstract

The purpose of this research paper is to present an algorithm for camera calibration for an industrial robot using a target pattern from a 2D image utilizing camera vision and MATLAB. The camera sensor will fetch data then send it to the computer application for image processing. Camera calibration using planar checkboard grid to get camera parameters for industrial robotics was performed. The study attempts to identify the commands to which the robot articulates its movements. Performing both tasks and integrating them into a system requires development of a control algorithm that initializes a trajectory of robot's joint angles to place the end to the target point captured in the 2D image. The method of using camera calibration was done to identify the camera intrinsic parameters. Applying the parameters to the perspective camera algorithm. Robot model is also presented converting the CAD model to controllable block diagrams. Joint space trajectory was discussed for movement simulation.

Keywords: *Industrial robotics, 3D model, Simulink, Camera Calibration, Robot Simulation*

Experimental Four-Wheel Tractor by GPS Tracking System

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Abstract

This research is a comparative study and experimental of the four-wheeled tractor. The key objective of this research focuses on the semi-automatic tractor experimentation control drive following Module Nero Ublox 6M and compass module HMC5883. The tractor system used PID control theory. The result focuses on GPS data tracking with different positions in the sample area. The result will be compared between manual tracking by people for baseline data and data recording when tractor drives with autonomous control to get the best outcome during the experiment. Therefore the best results after the trial run three times were lower than 3% error after comparing with the baseline. The development focuses on GPS data tracking with different positions in the sample area. The result will reach manual tracking by people for baseline data and data recording when tractor drives with autonomous control to get the best outcome during experimental. Therefore the best results after the trial run three times were lower than 3 percent error after comparing with the baseline. The resulting accuracy is about 93 percent improvements and parameter adjustment in PID control was improved by Kp, Ki and Kd adjustment to help result improvement. GPS data results are compared before and after fixing the vibration issue during tractor drive on the waypoint. The results were improved by about 93 percent accuracy, and the tractor drive on the waypoint and total error were reduced to 7 percent.

Keywords: *unmanned vehicle, automatic tractor, PID control*

Representation of Soccer Robotics in The Fastest Trajectory Tracking

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Abstract

Estimating the robot's movement towards the target will be more optimal if it considers the shortest path to the target, and still consider the obstacles to that target. Soccer robot games have a dynamic object movement activity, so soccer robots must always compare the difference in distance and obstructed paths. Dijkstra's algorithm which is an optimization algorithm for determining the shortest path of a track can be applied in a dynamic environment by considering the distance and weight of the track so that the robot can choose a more effective path. The application of this method to the soccer robot game is more effective than the obstacle avoidance method without regard to several environmental factors. This method can prevent the robot from being trapped in an impassable path so that the robot can optimize travel time to the target point. The test results show that the distance to the target of 0.85 m in the presence of several obstacles can be reached in the path of 0.87 m, with a speed of 0.08 m / s and within 12 s.

Keywords: *Soccer robot; Dijkstra Algorithm; a dynamic environment, trajectory tracking acceleration*

Technical, Economical, Environmental Feasibility of Solar PV System for Sustainable Shrimp Aquaculture: A Case Study of a Circular Shrimp Pond in Indonesia

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Abstract

The shrimp aquaculture industry in Indonesia has continued to expand, leading to a higher energy demand. The new circular shrimp pond technology has gained much attention; this method uses paddle wheel aeration and an air blower to satisfy the dissolved oxygen in the pond. The energy consumption by both devices is intensive and associated with greenhouse gas emissions. This study demontrates an optimal configuration for a solar PV system to satisfy the electrical requirements for circular pond technology in shrimp aquaculture. This paper presents a technical, economic, and environmental analysis for achieving a cost-effective configuration using actual data from a supply and demand perspective. The results show that integrating 28.4-kW solar PV panels, a 5.52-kW DC-AC inverter, and 114 strings of 1-kW lead-acid battery storage banks is the configuration that leads to a minimum cost of energy (COE) of 0.468 $/kWh. Such a configuration can reduce emissions by 7,349 kg of carbon dioxide, 31.9 kg of sulfur dioxide, and 15.6 kg of nitrogen oxide per year. Using a solar PV system reduces the negative environmental impact and allows sustainable shrimp aquaculture.

Keywords: *Sustainable Shrimp Aquaculture, Solar PV System, Circular Shrimp Pond, Indonesia*

Application of Sensors in Arduino as control in Smart Home

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Abstract

The application of sensors in smart homes using Arduino to control equipment such as lights, fans, alarms, and so on. Sensors used in Arduino include LDR, Ultrasonic, DHT11, and MQ2. LDR is used to automatically control railing lights, balcony lights, garden lights, and backyard lights if during the day the lights will turn off and on at night. Ultrasonic sensors are used to open the gate, the rolling door is driven by a DC motor, while the house door is driven by a servo motor. Testing on the ultrasonic sensor can open the gate and roll when the ultrasonic sensor reads objects with a distance of 5-25 cm. Testing on this sensor is done by utilizing heat from a match that is placed ± 10 cm from the sensor with a time of 5-25 seconds to turn on the fan when the temperature is above 30^0C. The MQ2 sensor is used to detect gas leaks, if a gas smell is detected it will turn on the blower. Testing on this sensor gives a good response, namely providing gas from a match that is placed ± 10 cm from the sensor with a time of 5-25 seconds.

Keywords: *Smart Home, Ultrasonic Sensor, LDR, DHT 11 dan MQ2.*

Sentiment Analysis of Government Policy Management on the handling of Covid-19 Using Naive Bayes with Feature Selection

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Abstract

The government's policy in dealing with the Covid-19 pandemic that has entered Indonesia has generated a response from the public, including Twitter social media users. Responses or comments from the community are also very religious, ranging from positive responses in the form of supporting government policies in dealing with this Covid-19 and negative responses in the form of criticism of the government which is considered to have underestimated this virus. By using sentiment analysis we can find out whether an opinion or comment that contains an opinion is positive or negative. the comments are rated by Indonesian language experts. In this study, the sentiment analysis process uses the TF-IDF method for word weighting, the information gain method for feature selection, and the Naive Bayes method for classifying public opinion. The results of this study indicate that the Naive Bayes algorithm is quite good in the text data classification model with the highest accuracy, precision, and recall levels of 87.0%, 89.0%, and 98.0%, respectively. The average levels of accuracy, precision, and recall are 86.2%, 87.6%, and 97%, respectively. This research

can provide accurate and useful information for the community regarding the response of Twitter users to the policy of handling Covid-19 in Indonesia

Keywords: *Covid-19, sentiment analysis, Twitter, Naive Bayes, TF-IDF*

Design of Garbage Collection Robots in Tourism Area (Beach) With Artificial Neural Network Method

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Abstract

The problem that is being faced by tourism managers in Madura about the form of a bad environment is problem of waste. This is caused by the behavior of tourists unaware of throwing garbage in its place. The inorganic waste dominates the waste generated from the tourism sector in the form of plastic waste; if accumulated it can reach ±6 tons/day of the total volume of ±7.6 tons/day. At the same time, the total number of officers is very few ± 44 people. This is very ineffective with such a large amount of waste and a tour operating time of 12 hours/day. Therefore, in this study, a robot can help ease the cleaning staff's work. This robot can recognize bottle trash objects and avoid obstacles in real time using a camera with an object recognition system on a bottle. In addition, there is an ultrasonic sensor to detect any obstacles in a predetermined tracking area. The object recognition system applied to this garbage collection robot uses the Artificial Neural Network method with a success rate of 93.3%, which indicates that the technique works well on the system.

Keywords: *Tourism, Garbage, Garbage Picking Robot, ANN*

Autonomous Museum Tour Guide Robot with Object Detection Using Tensorflow Learning Machine

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Abstract

This device focuses on making tools as a substitute for human resources in the field of historical tourism by making the Autonomous Museum Tour Guide Robot. This robot is made to help tourists while in the Museum to walk around in a coherent way throughout the museum area and explain comprehensive information and experiences related to the Museum and the existing collections. The implementation of the tool is controlled by deep learning Convolutional Neural Network method using the Tensor flow framework to recognize and classify the detected objects. The robot that will be created is a 3-wheeled robot which has 1 camera as a sensor to detect objects around the robot. The robot is equipped with an audio speaker to provide object detection information. The robot succeeded in detecting 6 objects at the Sumenep Palace Museum which were integrated into a robot with a 100% success percentage in the 5th epoch with the 175th iteration, the time required was 117.11 error 0.393. Weaknesses in this study are the need for control over the course of the tour guide robot so

that the robot runs more stable and the use of a camera with a higher resolution but when run on the system does not affect system performance.

Keywords: *CNN, Autonomous Robot, Omni Robot, Tour Guide Robot, Framework Tensorflow.*

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Anjik Sukmaaji	Universitas Dinamika	Indonesia
Mat Syaiin	Politeknik Perkapalan Negeri Surabaya /	Indonesia

Name	Institution	Country
	Shipbuilding Institute of Polytechnic Surabaya	
Taufik Taufik	California Polytechnic State University, San Luis Obispo	USA
Apriana Toding	Universitas Kristen Indonesia Paulus	Indonesia
Evi Triandini	Institut Teknologi dan Bisnis STIKOM Bali	Indonesia
Dedi Trisnawarman	Tarumanagara University	Indonesia
Tsuyoshi Usagawa	Kumamoto University	Japan
Nguyen Viet Ha	University of Science, VNU-HCM	Vietnam
Abdul Wahid	Universitas Negeri Makassar	Indonesia
Rima Wahyuningrum	University of Trunojoyo Madura	Indonesia
Tenia Wahyuningrum	Institut Teknologi Telkom Purwokerto	Indonesia
Budi Warsito	Information System School of Postgraduate	Indonesia

Name	Institution	Country
	Diponegoro University	
Arief Wibowo	Universitas Budi Luhur	Indonesia
Helmy Widyantara	Institut Teknologi Telkom Surabaya	Indonesia
Edi Winarko	Universitas Gadjah Mada	Indonesia
Ligang Zhang	Queensland University of Technology	Australia
Shushan Zhao	Central Connecticut State University	USA