UNIVERSITAS AMIKOM YOGYAKARTA

UNIVERSITAS AMIKOM PURWOKERTO

ICITISEE 2022

CERTIFICATE

OF PARTICIPATION

THIS CERTIFICATE IS AWARDED TO

Wiyli Yustanti

for the contribution as **Presenter**

In the 6th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE 2022)
"Applying Data Sciences and Artificial Intelligence Technologies for Enviromental Sustainability"

D. I. Yogyakarta (Indonesia)
December 13, 2022

ICITISEE

Prof. Dr. Kusrini, M.Kom

The General Chair of 6th ICITISEE 2022

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ICITISEE

UNIVERSITAS AMIKOM YOGYAKARTA

PROCEEDING

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"Applying Data Sciences and Artificial Intelligence Technologies for Enviromental Sustainability"

Yogyakarta, Indonesia | 13 December 2022

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PREFACE

Let us expressed our gratitude to Allah SWT because, with His permission, we can organize the 6th International Conference on Information Technology, Information Systems, and Electrical Engineering (ICITISEE-2022) 13 December 2022. This conference is an annual event jointly organized by Universitas Amikom Yogyakarta, DTETI Gadjah Mada, Universitas Amikom Purwokerto and technically co-sponsored by IEEE Indonesian Section and Amikom IEEE Student Branch.

Conference Committee would like to express our gratitude to the honorable keynote speakers for sharing their knowledge in the plenary session of this conference. We are also very grateful to all participants coming from various institutions from 17 countries. Besides from Indonesia, the paper also come from Australia, Bangladesh, China, India, Japan, Kuwait, Malaysia, Philippines, Sri Lanka, Saudi Arabia, Taiwan, Thailand, Turkey, Norway, Vietnam, and USA. High appreciation is also addressed to all committee members who have worked hard for this conference's success.

We congratulate all the presenters who have been successfully accepted into this conference after being reviewed by at least 3 reviewers using a blind review system. The acceptance rate at this conference is 45.30%.

This conference program is designed to help participants to find relevant information related to this conference, such as schedule and paper abstracts in this conference. However, should there be any confusion associated with this conference, please feel free to approach one of our committee members.

At last, we apologize for any mistakes in managing this conference, from the paper submission process until the post-conference activity.

Yogyakarta-Indonesia, December 2022

The 6th ICITISEE 2022 Committee

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Yogyakarta, December 2022
The 6th ICITISEE 2022 Committee

WELCOME SPEECH FROM THE GENERAL CHAIR OF ICITISEE 2022

It is a great pleasure and honor to invite you to **The 6th International Conference on Information Technology, Information Systems, and Electrical Engineering (ICITISEE-2022)** which will be held hybrid online and onsite in Universitas AMIKOM Yogyakarta on 13 December 2022.

Allow me to say a warm welcome to all distinguished guests, keynote speakers: 1) Dr. Madhusanka Liyanage, ME.; 2) Dr. Ahmad Nasikun, S.T., M.Sc.; 3) Dr. Theofanis G. Orphanoudaki, Head of Higher Education Service Institute: Prof. drh. Aris Junaidi, Ph.D, IEEE Indonesia representative: Dr. Wahyudi Hasbi - SPIE, leader, and member of Department of Electrical Engineering and Information Technology Universitas Gadjah Mada, Rector and all leader of Universitas AMIKOM Purwokerto, Rector and all leader of Universitas AMIKOM Yogyakarta, speakers and all of the participants from around the world are expected to actively participate in this event.

This conference is jointly organized by the Department of Electrical Engineering and Information Technology, Universitas Gadjah Mada, Universitas Amikom Yogyakarta, and Universitas AMIKOM Purwokerto, Indonesia. ICITISEE-2022 provides a unique opportunity for all of the academia, professionals, and researchers to share their research results about **Applying Data Sciences and Artificial Intelligence Technologies for Environmental Sustainability**.

I am very pleased to see so many colleagues, professors, and friends from many countries gather together in one place. There are 334 papers that have been submitted to our conference system, and after going through the review process, we have 150 papers declared as accepted and ready to be presented at today's conference. These papers were written by authors who come from 17 countries such as Australia, Bangladesh, China, India, Indonesia, Japan, Kuwait, Malaysia, Philippines, Sri Lanka, Saudi Arabia, Taiwan, Thailand, Turkey, Norway, Vietnam, and the USA. I would love to say congratulations to all of you.

The ICITISEE-2022 Committee has been working extremely hard for about a half year to get this conference well prepared for today as we all may see. As a result, 3 keynote speakers will

give their speeches and 150 presenters will present their research results in 19 room sessions. As our appreciation for the authors, we will choose the best paper for the conference which will be announced at the closing session this afternoon.

We hope this conference will enlighten us with each others and give us inspiration and motivation to give a real contribution to the community. Your strong support and active participation have made the ICITISEE-2022 a valuable and useful international conference.

We know that holding this conference may seem far from the perfectness. For that, we apologize for things that maybe not be pleasing or uncomfortable in your heart.
Thank you and enjoy the conference.

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The General Chair of 6th ICITISEE 2022

Prof. Dr. Kusrini, M.Kom.

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CONFERENCE INFORMATION

Dates	: December, 13th 2022
Organizer	: Universitas Amikom Yogyakarta
Venue	: Universitas Amikom Yogyakarta - Zoom Virtual Meeting
Official Language	: English
Secretariat	: Universitas Amikom Yogyakarta Jl. Ring Road Utara, Condong Catur, Sleman, Yogyakarta, Indonesia 55281
Phone	: (0274) 884201 – 207
Email	: icitisee@amikom.ac.id
Conference Website	: https://icitisee.org/

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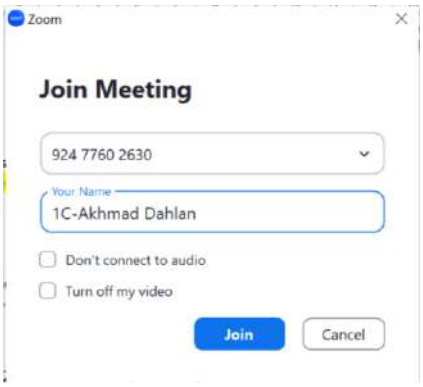
ICITISEE 2022 is held virtually using the **ZOOM** Meeting platform.
Please pay attention to 2 things below:

1. Use the latest version of Zoom: **Update version 5.11.4**. **(Required)**

2. Set the Zoom Username by following the format:
   Session Code - Your Full Name.
   Example: **1C-Akhmad Dahlan (Required)**
   Session code details, please check after this page (Program Schedule).



Universitas Amikom Yogyakarta is inviting you to scheduled Zoom meeting:

CONFERENCE DAY (Required)
Time : Tuesday, 13 December 2022 at 06:30 AM (Jakarta: GMT+7)
Topic : Conference Day (Plenary Speaker and Parallel Session for Paper Presentation)
Join Zoom Meeting
https://zoom.us/j/92477602630?pwd=aW1Ib3NKb2oyZS9CaW5razd3UHJ3UT09
Meeting ID : **924 7760 2630**
Passcode : **amikom**

Only presented papers will be submitted for publication in IEEE Xplore digital library.

PROGRAM SCHEDULE

Start	End	Duration	Agenda	Papers	PIC	Room
6:45	7:00	0:15	Join Zoom Meeting		Rifda + Ria Andriani	
7:00	**9:00**	**2:00**	Parallel Session 1A	8	Session Chair: Dr. Tonny Hidayat	Virtual Room A
			Parallel Session 1B	8	Session Chair: Mr. Yoga Pristyanto	Virtual Room B
			Parallel Session 1C	8	Session Chair: Dr. Alva Hendi Muhammad	Virtual Room C
			Parallel Session 1D	8	Session Chair: Mrs. Gardyas Bidari Adninda	Virtual Room D
			Parallel Session 1E	8	Session Chair: Mr. Aditya Maulana Hasymi	Virtual Room E
			Parallel Session 1F	8	Session Chair: Mr. Anggit Ferdita	Virtual Room F
			Parallel Session 1G	8	Session Chair: Mrs. Rhisa Aidila Suprapto	Virtual Room G
			Parallel Session 1H	8	Session Chair: Mr. I Made Artha Agastya	Virtual Room H
9:00	11:05	2:05	Opening Ceremony		MC: Ms. Dhea Laudya	Zoom Main Room
9:00	9:02	0:02	Greeting from MC		MC: Ms. Dhea Laudya	
9:02	9:05	0:03	Indonesia National Anthem		MC: Ms. Dhea Laudya	
9:05	9:15	0:10	**Opening Speech : General Chair of 6th ICITISEE 2022**		**Prof. Dr. Kusrini, M.Kom.**	
9:15	9:30	0:15	**Opening Speech : Vice Rector IV of Universitas Amikom Yogyakarta**		**Dr. Arief Setyanto, S.Si., MT.**	
9:30	**9:45**	**0:15**	**Opening Speech : Head of LLDIKTI Region V Yogyakarta**		**Prof. drh. Aris Junaidi, Ph.D.**	
9:45	**10:00**	**0:15**	**Opening Speech : Chair IEEE Indonesia Section**		**Dr.-Ing. Wahyudi Hasbi, S.Si, M.Kom.**	
10:00	10:05	0:05	introduce moderators to plenary sessions		MC: Ms. Dhea Laudya	
10:05	**10:10**	**0:05**	**Open for Plenary Session**		**Moderator: Dr. Arief Setyanto, S.Si., MT.**	
10:10	**10:45**	**0:35**	**Speaker 1: Dr. Ahmad Nasikun, S.T., M.Sc.**			
10:45	11:00	**0:15**	**Q n A**		**Moderator: Dr. Arief Setyanto, S.Si., MT.**	
11:00	11:05	0:05	Closing & Photo		**MC: Ms. Dhea Laudya**	
11:05	12:30	1:25	Break			
12:30	**14:30**	**2:00**	Parallel Session 2A	7	Session Chair: Dr. Tonny Hidayat	Virtual Room A
			Parallel Session 2B	7	Session Chair: Mr. Yoga Pristyanto	Virtual Room B
			Parallel Session 2C	8	Session Chair: Dr. Alva Hendi Muhammad	Virtual Room C
			Parallel Session 2D	8	Session Chair: Mrs. Gardyas Bidari Adninda	Virtual Room D
			Parallel Session 2E	8	Session Chair: Mr. Aditya Maulana Hasymi	Virtual Room E
			Parallel Session 2F	8	Session Chair: Mr. Anggit Ferdita	Virtual Room F
			Parallel Session 2G	8	Session Chair: Mrs. Rhisa Aidila Suprapto	Virtual Room G
			Parallel Session 2H	8	Session Chair: Mr. I Made Artha Agastya	Virtual Room H
			Parallel Session 2I	8	Session Chair: Mr. Kumara Ari Yuana	Virtual Room I
			Parallel Session 2J	8	Session Chair: Mrs. Bety Wulan Sari	Virtual Room J
			Parallel Session 2K	8	Session Chair: Dr. Dhani Ariatmanto	Virtual Room K
14:30	15:00	0:30	Break			Main Room
15:00	15:30	0:30	Speaker 2: Dr. Theofanis G. Orphanoudakis		Moderator: Dr. Arief Setyanto, S.Si., MT.	**Citra 1 Room, Universitas Amikom Yogyakarta**
15:30	**16:00**	**0:30**	**Speaker 3: Dr. Madhusanka Liyanage, ME.**			
16:00	**16:15**	**0:15**	**Q n A**		**Moderator: Dr. Arief Setyanto, S.Si., MT.**	
16:15	**16:30**	**0:15**	**Closing, Awarding, Announcement & Photo**		**MC: Ms. Dhea Laudya**	
16:30	16:40	0:10	Leave Zoom Meeting		All Committee	
				150	**Papers**	

Note:

The time shown refers to the Jakarta Indonesia time zone **(GMT+7)**

Two (2) characters in bold is the session code **(1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K)** that should be used for the zoom presenter's username.

PROFILE PLENARY SPEAKER

Dr. Madhusanka Liyanage, ME.
University College Dublin, Ireland
(Email: madhusanka@ucd.ie)

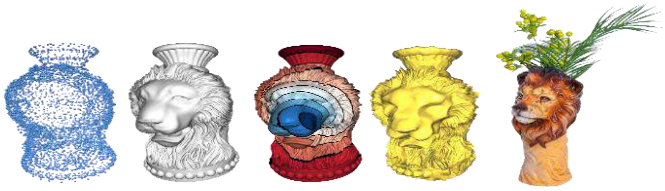
6G Security: The Vision Towards Reality

Although the fifth-generation wireless networks are yet to be thoroughly investigated, the visionaries of the 6th generation (6G) ecosystem have already come into the discussion. Therefore to consolidate and solidify the security in 6G networks, this talk will present how security may impact the envisioned 6G wireless systems with the possible challenges and the potential solutions. I will also present our vision on 6G security with the tentative threat landscape based on the foreseen 6G network architecture. The security challenges that may encounter with the available 6G requirements and potential 6G use cases will also be discussed. In particular, the security considerations associated with 6G enabling technologies such as distributed ledger technology (DLT), physical layer security, distributed AI/ML, visible light communication (VLC), THz, and quantum communication are also needed to be considered. The talk will also provide some insights into the standardization efforts and research-level projects relevant to 6G security.

PROFILE PLENARY SPEAKER

Dr. Ahmad Nasikun, S.T., M.Sc.
Universitas Gadjah Mada, Indonesia
(Email: ahmad.nasikun@ugm.ac.id)

Spectral Geometry Processing: Methods and Applications



Research in geometry processing aims to design algorithms and mathematical models to analyze and manipulate geometric data. While being a relatively new field, the application of geometry processing spans a wide spectrum of research areas: from aneurysm detection in medical study, fracture analysis in civil engineering, surface modeling in automotive design, character animation in movies, to collision detection in games, to name a few. In this talk, we will briefly take a look at some applications of geometry processing in several research areas. A set of methods that are highly important in geometry processing is spectral methods. They are proven to successfully a variety of problems in geometry processing. We will discuss the overview of spectral methods and their applications. Some state-of-the-art results in this area will also be presented. We will begin with the notion of eigenfunctions of Laplace operator as basis function in geometry processing, extending the notion of sine and cosine function from signal processing. I'll mention how an approximate method can significantly improve the efficiency and memory requirement, with a small trade-off in terms of accuracy. The aprproximate results can also be used as initial values in multigrid scheme, producing a powerful hierarchical eigensolver.

PROFILE PLENARY SPEAKER

Dr. Theofanis G. Orphanoudaki.
The Hellenic Open University, Greece
(Email: theofanis.orphanoudakis@netcompany-intrasoft.com)

Data Aggregation Platforms: European Use Cases, Architectural Requirements and Solutions Towards Traversing the Edge-To-Cloud Continuum and Growing Knowledge Out of Data

With the advent of 5G, the ever-increasing processing power of computing systems and their reduction in size, which can embed intelligence in even miniaturized devices, we are witnessing an increase of scientific interest to exploit the capabilities of distributed processing platforms. The focus turns on how to efficiently design systems that can support data aggregation, storage and processing towards developing added-value services and generate knowledge out of data processing and fusion of data from multiple data flows. Such services require traversing the so-called edge-cloud continuum so as to bring the data from the place where they are generated to the place that is most appropriate for processing and storing them. Several intermediate layers appear in this path that raise the requirements for integrated design and interoperability. As a first layer we can identify the extreme edge, which comprises the so-called Internet of Things (IoT) and sensing devices statically deployed or mounted on manned or autonomous vehicles. Through appropriate bridging devices data from these devices can be funneled through intermediate processing platforms that form an Edge Cloud (EC). The originally generated data appropriately filtered and/or annotated together with intermediate information generated by processing functions are forwarded to core cloud platforms where big data analytics and flexible storage layers can me deployed. In this talk we will provide a brief overview of the requirements of each intermediate layer from the extreme edge to the cloud network and the involved devices, the storage and the processing elements. The presentation of these requirements will be accompanied by indicative use-cases in relevant selected sectors and the architectural solutions that have been developed in the context of latest large-scale research and development projects funded in the framework of the Horizon 2020 and Horizon Europe Programmes of the European Union. Specifically, the use-cases, solutions and lessons learnt from the DataBio, AFarCloud, SILVANUS and MobiSpaces projects will be discussed presenting data aggregation platforms deployed in the context of smart-farming, smart-mobility and forest management.

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Ariel Christian C Viodor; Chris Jordan G Aliac; Larmie Feliscuzo

Mangrove Species Identification Using Deep Neural Network

Mangroves play an essential component in the coastal ecosystem and the community. Identifying mangrove plant species is critical for biodiversity assessment, restoration, or conservation programs apart from ecosystem protection from anthropogenic activities. Identifying mangrove species by traditional keys is complicated, time-consuming, and frustrating due to technical terminology for non-experts. Recent advances in deep learning algorithms have resulted in studies demonstrating excellent performance identification tasks for plant species. This paper examines existing deep neural network-based machine learning applications for identifying plants designed for handheld device usage. Driven by low-cost computation, size, and time requirements, we propose the use of MobileNet architecture and transfer learning for leaf-based plant recognition. We provide a dataset of images comprising five (5) several types of mangrove species. Then, we perform experimental validation on the proposed state-of-the-art architecture and transfer learning. Our results show that accuracy up to 97% was achieved using MobileNetV3 and transfer learning for mangrove species identification proving the viability of its use in mobile applications. The saved model has a low-cost computation that runs within a smartphone application.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Mohamad Almas Prakasa; Imam Robandi

Tuning Improvement of Power System Stabilizer using Hybrid Harris Hawk Optimization-Equilibrium Optimizer Algorithm

A Harris Hawk Optimization (HHO) become popular in recent works to resolve various power system cases, including tuning Power System Stabilizer (PSS). However, HHO has several challenges, such as premature convergence can occur due to less diversity in solutions with an unbalanced exploration and exploitation process. Therefore, this paper proposed The Hybrid Harris Hawk Optimization-Equilibrium Optimizer Algorithm (HHHO-EOA) to enhance HHO performance and acquire better PSS tuning. The EOA is a well-balanced exploration and exploitation algorithm. A Linearized Heffron-Phillips model for Single-Machine Infinite Bus (SMIB) is modeled to evaluate the proposed algorithm in tuning PSS. Various performance indices are used as the objective functions. The HHHO-EOA has a better enhancement in the convergence curve with consistent results. The minimum objective function achieved by the proposed algorithm is 78.3% and 60% lower than EOA and HHO. Moreover, the PSS based on the proposed algorithm is 10.24% and 19.69% better in damping the overshoot than conventional EOA and HHO in both frequency and power angle deviation responses.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Shaogang Hu; Tianchen Li; Yue Zuo; Pujun Zhou; Ruichen Ma; Guanchao Qiao

A Binarized Systolic Array-Based Neuromorphic Architecture with High Efficiency

Neuromorphic chips can run biologically inspired neural networks to process spatiotemporal information with greatly low power, but there is still room for improvement in terms of energy efficiency (i.e., computing power/power consumption). In this work, we are inspired by the Google TPU and propose a systolic array-based neuromorphic architecture to accelerate spiking neural networks with high efficiency. The inputs/weights are binarized and each core of the architecture can realize 4K integrate-and-fire (IF) neurons for parallel computing. Through RTL-level simulation, synthesis, and FPGA implementation, the proposed architecture achieves 98.67% accuracy on the N-MNIST dataset, 0.4 TSOPS computing power, scaled power consumption of 60.96 mW, and scaled energy efficiency of 6.72 TSOPS/W. This work provides a proof of concept for the future development of efficient systolic array-based neuromorphic chips.

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Hartatik Hartatik

Context-Aware Recommendation System Survey: Recommendation When Adding Contextual Information

The recommendation system (RecSys) helps users provide a referral by filtering information based on the relationship between interests and needs. Several methods and approaches in the SR domain, such as CBF, CF, and hybrid, continue to be developed in looking for recommendations relevant to user interests. Recent research suggests that adding contextual information can significantly increase the accuracy of RecSys. However, adding contextual information to RecSys also raises new problems, such as increasingly sparse data. The context-aware recommender system (CARS) is a solution to overcome the problem of changing user preferences by entering contextual information into the recommendation method. In this survey paper, we try to define and classify the types of contextual information. Our definition and classification of contextual information can help capture contextual attributes suitable for the domain under consideration. In addition, we also describe and summarize the modifications made by researchers to the model. We also describe the evaluation method and dataset that can be used in the domain of CARS. Finally, we present future research in three schemes at the end of this survey paper

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: AN Afandi; Irham Fadlika; A. Apripriharta; Sunaryono Sunaryono; Hartoyo

Hartoyo; Iwan Kustiawan; Faridah Hanim Binti Mohd Noh; Hajime Miyauchi

Microgrid Power Optimization Using Thunderstorm Algorithm Considering Hydrogen Storage Plant

Recently, a microgrid system is more popular than the previous network for electrical connection based on a renewable energy penetration into the power grid where the system has shifted to remote an isolated load that is not supplied by the energy provider. The microgrid is structured in a small-scale network that can meet locally and close to energy users. Photovoltaic and fuel cell systems have major opportunities in the microgrid for reducing reliance on fossil fuels. However, a suitable combination is very important to include all power plants on the microgrid. These works present an optimal integration of the power production for the microgrid based on the fossil and non-fossil base units optimized using the Thunderstorm Algorithm associated with an operating cost. The IEEE-30 bus system was chosen as a model for locating solar and fuel cell devices for 24-hour operation. Furthermore, for 24 hours, the executions have been proven in diverse performances based on load demand changes. Non-fossil-based power plants can lower daily and peak-load power generation. These methods have also been dynamically demonstrated in various balanced consumptions between fuel and emission costs, as well as power loss, throughout the full operation.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: AN Afandi; Langlang Gumilar; Mohamad Rodhi Faiz; Andy Pramono; Lilik Anifah;

Goro Fujita

Wind Shear Penetration to Turbulence Phenomenon on Energy Capture Optimized Using Artificial Salmon Tracking Algorithm

Due to the hunt for new sources of energy, such as wind power, where already-developed technological advancements are used to gather natural energy sources, alternative energy has recently grown in popularity. One of the most frequently researched crops is the wind farm, and also downstream evaluates the impact of speed and turbulence on the 24/7 operation. This work is focused on wind shear penetration while turbulences have a role in energy capture. The effectiveness of the wind farm has been tested using computations to show how models, speed reduction, and big space affect performance associated with Artificial Salmon Tracking Algorithm. In terms of energy collection and reawakening the wind farm's power, it also has an impact on energy output as important as wind shear penetration. On the performance side, understanding the wake's impact on the turbulence effects is crucial. It can be subjected to a variety of conditions during operation for 24 hours due to the wind's turbulence, which places different loads on the blades comparable to the further energy captured following the wind flow.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Ade Indriawan; Nur Aini Rakhmawati

Characteristics of Blockchain-based Digital Asset Datasets: A Systematic Review

The widespread use of two types of digital assets derived from blockchain technology, namely cryptocurrencies and NFTs, is inextricably linked to the technology's high level of popularity. The transparency of the blockchain allows for quick access to a wealth of data. This work generates an in-depth review of online datasets for both sorts of digital assets. This study provides a thorough analysis of the platforms employed and the characteristics of the datasets. A meticulous analysis of 45 datasets and the 88 papers that used them reveals the use of more than seven different types of platforms and three different types of data characteristics across all datasets. Datasets with graph-based data type generally have low sparsity, while ordered data type can have various resolutions. Datasets with unstructured data type have specific properties to meet particular needs and can have high dimensionality.

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Sammani Fernando

Image processing-based solution to repel crop-damaging wild animals

Two-thirds of Sri Lanka's population is directly dependent on agriculture, which generates one-third of the nation's GDP. Crop efficiency in Sri Lanka has declined recently due to several issues including sub-farm maintenance, wildlife damage, and unethical farming practices. Among them, the most responsible for agricultural economic damage is the destruction of wildlife. Farmers use different methods to prevent crop damage. Because of this both humans and animals suffer. As a result, the death rate of people and animals as well as the rate of injury is increasing day by day. Therefore, a crop-repellent system that addresses the above-mentioned problems without following a time-consuming and tedious manual process, and without human intervention is introduced as the primary security of the developed solution. Apart from these facts, the research also points out the precautions that farmers should take while attacking crops. The main objective of the research is to create a system by which the farmer can protect his farm animals from harm. This method uses a deep learning algorithm to identify colors and coat marks during the day and the body shapes of animals at night by processing images, as well as barking sounds. Likewise, after studying the postures and behavior patterns of the identified animals, the system emits ultrasonic frequencies and sounds according to the distance between the crop boundary and the animal, thus eliminating the chances of crop destruction.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Afif Dimas Harfi; Muhammad Ridho Rosa; Muhammad Zakiyullah Romdlony;

Sudarmono Sasmono

Automated Kite Detecting Drone Using YOLOv4

Kites stuck in the electricity network often cause blackouts, especially in West Kalimantan. There were 426 power outages triggered by kite wires in 2018, 219 cases in 2019 and 297 cases in 2020. The method to find the location of kites stuck in the electricity network is still not efficient enough and takes a long time. This happens due to manual observation by deploying some officers to do surveillance along the electric grid. Knowing the position of the stuck kite quickly and precisely using a drone will speed up the maintenance time. The images captured by the camera will be processed using the YOLO object detection method to detect kites. When a kite is detected, the system will directly store the drone's position (latitude and longitude) and altitude in the database. In this research, we have designed a drone that can detect kites at a distance of 10 to 12 meters at speeds of 1.5 m/s, 3.5 m/s and 5 m/s. The best kite detection accuracy is 88.33% when the drone flies at a speed of 1.5 m/s with a distance of 10 meters

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Kumara Ari Yuana; Kusrini Kusrini; Arief Setyanto; Arif Dwi Laksito; Zauvik Rizaldi Maruf; Muhammad Zuhdi Fikri Johari; Gardyas Adninda; Renindya Azizza Kartikakirana; Rhisa Aidilla; Prasetyo Mimboro; Wiwi Widayani

Monte Carlo method for map area calculation in wildland fire map management

Fire spreading or fire propagation is the transfer of heat from the fire to the fuel bed, and heating it to its ignition point. Wildland fire management needs information about the characteristics and areas on the map. The map is always available in complicated geometry and difficult to calculate the area. The Monte Carlo technique gives an easy but powerful and accurate method to handle that problem. This study prepares the methodology for complicated area calculation with a large area range ratio. Hypothetic map areas with different shapes and sizes ensure the applicability of the real map. For validation purposes, the hypothetic map is also ready for theoretical calculation due to its border involving ideal geometry. The results show that the Monte Carlo technique give 1% error for small size area (1% of total area), 0.2% - 0.05% error for mid-size area (20% - 30% of total area), and 0.025% error for big-size area (50% of the total area).

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Kittikhun Sirinaksomboon; Phatham Loahavilai; Toshiaki Kondo

Calibration-Free Monocular Distance Estimation Performance Assessment Under Influences of Environmental Conditions

Camera distance measurement can provide a low-cost and setup-free experience. From several techniques to estimate the distance of the object of interest from a single image, many of them require a calibration for specific parameters and a training for a model when machine learning approaches are implemented. This study introduce the use of a single calibration-free image, to generate the model and evaluate a model with a tilted oriented object. To simplify the model, the ArUco pattern is introduced since it can be detected easily using its pre-occurring detector. The perimeter, the area, and the sum of diagonal lengths of the pattern corners are the parameters to determine the distance. Measurements using a single training image are assessed, which is considered well-balanced between complexity and accuracy in some applications.

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Bramantiyo Eko Putro; Mochamad Rama Ramdany; Fajar Ahmad Faisal;

Mohamad Kany Legiawan; Iman Nurjaman

Rice Factory Warehouse Layout Design with A Combination of Association Rule and Dedicated Storage Methods

PB. Jembar Ati is a production and service company for rice milling and processing of by-products. PB. Jembar Ati has a rice storage warehouse of 105 m2. However, the layout is irregular and always changing. The purpose of this study was to minimize working time based on the redesign of the PB Jembar Ati warehouse facility layout. The data used in this study are one-year sales data in 2020, layout data for current conditions, layout area data, and pallet area used. The method used to improve the current warehouse layout is dedicated storage and the association rule mining method to find correlations between product categories that are often transported together. The data processing used AutoCAD, SketchUp, and RapidMiner software. The results obtained from the proposed layout design are the displacement distance in the initial conditions is 59.75 m while the proposed layout is 75.6 m. At the moment of displacement, the initial condition is 600759 m/year, while in the proposed layout the moment is 174714 m/year. While the utilization can be seen in the proposed layout, which is lower than the current condition, namely the initial condition of 50%, while in the proposed layout it is 49.7%.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Jumrianto Jumrianto, Jr; Abdul Syakur; Wahyudi Wahyudi; Betantya Nugroho;

Royan Royan; Rizal Ichsan Syahputra

Sensitivity Analysis of Current and Voltage Sensor on Electrical Tracking Test Using Linear Regression Approaches

Sensor sensitivity is necessary for the accuracy of a measurement. If the sensitivity of the sensor cannot reach the quantity to be tested, then all measurement results will be wrong and distorted. In measuring electrical tracking and leakage current on electrical insulating materials, a voltage sensor and a current sensor are used which need to be tested for sensitivity, in order to get good accuracy and precision in the measurement, it is necessary to analyze the sensitivity of the sensor. The voltage sensor is installed in parallel to the test voltage source. The current sensor ZMCT103C is installed in series before the test material. The sensitivity of the voltage sensor is 18.1 mV/V and a linear regression formula to determine the value of the voltage on the input side x=(y+0.1957)/0.0005. The sensitivity of the current sensor is 0.452 mV/mA and the linear regression formula is used to determine the current value on the input side x=(y-0.0006)/0.0005.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Alfian Idris; Dimas Anton Asfani; I Made Yulistya Negara; Yoga Uta Nugraha

Torque Analysis of V-type Interior PMSM for Electric Vehicle Based on FEA Simulation

Automotive technology, especially electric vehicles (EV), in the industrial era 4.0 is developing very quickly. Researchers continue to strive to improve performance on every component of electric vehicles including electric motors, batteries, and controllers. Permanent Magnet Synchronous Motor (PMSM) is a type of electric motor that is currently a concern because the rotor uses permanent magnets, and has a high power density. In this paper, the design and simulation of V-type Interior Permanent Magnet Synchronous Motor (IPMSM) is carried out, which is widely implemented in electric vehicles because it has a simple design and large power density value. In designing the motor, the V-angle shape of the magnet is arranged in such a way that it can produce optimal torque performance. Design modeling and performance simulation of IPMSM using finite element analysis (FEA) based software. IPMSM has 12 slots and 8 poles. FEA simulation results show that the optimal torque is at a V-angle of 95 mechanical degrees, which is 8.48 Nm. This motor can be a good consideration to be implemented, especially on electric vehicle.

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Muhammad Ilham Alhari; Asti Amalia Nur Fajrillah; Muharman Lubis

Business Value Assessment and IT Roadmap to Achieve e-Government Dimension of Smart Village using TOGAF ADM: A Case Study of Regency in Indonesia

An architectural business process in a company certainly needs an estimate related to assessing the owned business. Because by doing this assessment, of course, you can find out how good or how complex a project can be done or handled by an agency organization. Another thing that needs to be considered is how a regulation runs and can follow the development of the latest technology. Of course, in conducting this evaluation, it is hoped that it can provide pressure or reduction in terms of operational costs and increase investment so that the process or value presented will be proportional and even increase and have good quality. This study will present a result of the assessment with the value of the business value assessment (BVA) of the information technology project based on a case study of the development of the smart village concept in the e-government domain. The method used is expected to provide an output design in business architecture enterprise artefacts, data, applications, and technology architecture

Session Title: Parallel Session 1-A

Chair: Dr. Tonny Hidayat

Authors: Muhammad Rizky Pribadi; Eka Puji Widiyanto; Dedy Hermanto; Desy Iba Ricoida;

Desi Pibriana; Rusbandi Hudoyo

Analysis of Marketplace Social Media User Engagement by Topic

Social media is currently a place for every virtual user used to share information; social media users themselves are not limited to individual users. The research was conducted on social media user engagement based on the topics discussed. The data collection process is carried out by collecting Instagram data. Data collection is distinguished based on the issues discussed. The topics chosen in this study were obtained using the Latent Dirichlet Algorithm (LDA); after the process, the subjects were giveaways, Games, Promotions, Advertisements, and Tips. In the testing phase, data get from a post made by shoope from 1 June 2022 until 30 June 2022 by dividing the data by 80% of the training data and 20% of the test data; the results obtained from the LDA are topics 1 and 3 related to promotions, games, and tips. Decision Tree and Random Forest have more minor errors with MAE 5804 and 5656.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Luthfia Saskia; Indriana Hidayah; Sri Suning Kusumawardani

Improvement of GAN-LCS Performance with Synonym Recognition

Automated Essay Scoring (AES) is an automated scoring system that compares answer keys with answers given by students and calculates the similarity of answers using intelligent system algorithms. The advantage of automated essay scoring is that a computerized scoring system can provide faster assessments than manual scoring. This study will use the GAN-LCS (Geometric Average Normalized-Longest Common Subsequence) and MMR (Maximum Marginal Relevance) combined with Synonym Recognition in the text pre-processing section to improve the system performance. Synonym Recognition will be processed after the stemming part. Our proposed methods resulted in an accuracy of 86.77%, a correlation of 0.891, RMSE of 1.434, and MAPE of 13.23%. In terms of accuracy, our proposed method has improved from the original GAN-LCS results. However, there was a sharp increase in time performance resulting in 87.26 seconds of time execution. This is due to the large number of words scanned and converted to the main word form. There is also the ambiguity of words after changing the word in the answer sentence to the main word based on the Thesaurus Dictionary.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Ice Krisnahati; Nanik Suciati; Shintami Chusnul Hidayati

Face Expression Recognition with Local Ternary Pattern Images using Convolutional Neural Network and Extreme Learning Machine

Facial Expression Recognition (FER) performed computationally is an exciting task to explore in computer vision. Some methods have been proposed to handle variants of illumination in FER. Based on the state of the art, Local Ternary Pattern (LTP) as a feature extractor can handle invariance illumination. However, LTP is a traditional feature extractor that needs to be processed manually. Unlike LTP, Convolution Neural Network (CNN) architecture has an automatic feature extractor. This study proposes LTP images as input into CNN architecture to handle illumination and keep the feature extraction automatically. Afterward, in the classification layer, Extreme Learning Machine (ELM) is employed as a classifier to improve the training speed of the original CNN classifier. The proposed model performance for the KDEF dataset with 10fold cross-validation yields an accuracy of 85.51%.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Qing-yuan Luo; Weitang Liu; Boran Wang

Dual-Robotic-Manipulator Collaborative System Based on Depth Image

Collaboration between robots, especially for multiple robotic manipulators, has been widely implemented in industrial applications attributed to its high efficiency and robustness working in harsh environments. However, successful applications of multiple agents in real-life laboratory applications are still quite limited to fulfilling the requirements of high precision and good adaptability when dealing with complex processes. This paper proposes a visual servo-controlled dual-arm robotic system handling routine experiments, such as gripping and placing tubes, screwing or unscrewing caps, shaking tubes, and pipetting. Based on the depth and RGB image feedback, the independently controlled UR3 robotic arms corporate efficiently and demonstrate the excellent potential to replace labor in human-defined specific tasks partially. We developed a program to detect the target and generate corresponding actions. As one of the typical applications, the laboratory-oriented configuration presented in this paper could adapt to other scenarios with minimal effort by customizing the end-effector according to different operation targets. Such a robotic-based scheme increases working efficiency and output value and demonstrates the capability of liberating the labor force from repetitive multi-process tasks. Systematic testing results have revealed that the success rate for tube grasp can reach 82.9%, and the success rate for a sequence of seven continuous movements is around 73.7%.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Syafrial Fachri Pane; Jenly Ramdan; Aji Gautama Putrada; Mohamad Nurkamal Fauzan; Rolly Maulana Awangga; Nur Alamsyah

A Hybrid CNN-LSTM Model With Word-Emoji Embedding For Improving The Twitter Sentiment Analysis on Indonesia's PPKM Policy

The policy of limiting community mobilization is implemented to reduce the daily rate of COVID-19. However, a high-accuracy sentiment analysis model can determine public sentiment toward such policies. Our research aims to improve the accuracy of the LSTM model on sentiment analysis of the Jakarta community towards PPKM using Indonesian language Tweets with emoji embedding. The first stage is modeling using the hybrid CNN-LSTM model. It is a combination between CNN and LSTM. The CNN model cites word embedding and emoji embedding features that reflect the dependence on temporary shortterm sentiment. At the same time, LSTM is used to build long-term sentiment relationships between words and emojis. Next, the model evaluation uses Accuracy, Loss, the receiver operating curve (ROC), the precision and recall curve, and the area under curve (AUC) value to see the performance of the designed model. Based on the results of the tests, we conclude that the CNN-LSTM Hybrid Model performs better with the words+emoji dataset. The ROC AUC is 0:966, while the precision-recall curve AUC is 0:957.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Isra Andika Bakhri; Ema Utami; Anggit Dwi Hartanto

The Influnce stemmer truncating and statistical in mapping students research trends with latent dirichlet allocation (LDA)

The application of the LDA model in finding trends in student research topics needs to be done by testing the effectiveness of the application of stemmer truncating and statistics by looking at the coherence score. In this research stemmer truncating uses literal algorithm while stemmer statistic uses N-grams. There are 4 scenarios that will be carried out in this study, namely the first model with the application of stemmer truncating and statistics, the second model with the application of stemmer truncating but without the application of stemmer statistics, the third model without the application of stemmer truncating but applying stemmer statistics and the fourth model without applying stemmer truncating and statistics. From the results of the study, the first model that applied stemmer truncating and statistics had the largest total and average coherence score compared to other models and it was found that in the first model and the selection of the best number of topics was number 12. So this proves that the application of stemmer truncating and statistics has a big influence on the LDA model with case studies looking for trends in student research topics.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Thacha Lawanna; Jittima Wonwuttiwat; Rujira Ounchaoen

Selection&Deletion Model under Discovering Vavid&Invalid Test Case

Gathering the accurate test cases of any adopted program and eliminating unrelated ones follow the notion of retaining software to build a typical of a test suite by concerning with the judgment of test case formation, fixing bugs and methods of selection, deletion or minimization, while the lowest size and the ability of solving faults have been required for this work. Therefore, several test case methods have been proposed to response the matters of keeping good cases or removing the bad groups that may drop the entire performance of a software. The proposed model comprises four main algorithms, which are clarifying, selecting, deleting, and collecting test cases. It gives lower percentage of size reduction than the regression test selection by 2%-4% while proportion of solving fault is higher than random and regression approaches about 20%-70% and 0%-25% respectively.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Lilik Anifah; Haryanto Haryanto

Smart Integrated Patient Monitoring System Based Internet of Things

Some diseases today have a rapid and dangerous rate of transmission. This causes doctors or medical personnel have a high risk of transmission. It caused the need for a system that can monitor the patient's condition in order to minimize the risk of contacting medical personnel. The research aims to design and build an integrated IoT-based patient monitoring system that provided information about the patient's temperature, infusion fluid level, and heart rate. This system is equipped with a database of patient conditions and can be accessed by web-based users. This system is integrated between hardware, software, and IoT system, which allows users to access data (based on their respective roles) from various places, because they can access it via the internet. The research stages are hardware and software design, design implementation, software embedded system development, IoT design, system integration, and web development that is integrated with IoT. The system has been running well and patient's information can be accessed by the user. This system is also equipped with indicators of normal and abnormal conditions, so that medical personnel can anticipate early if there are conditions that are dangerous for patients.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Rudy Tri Saputra; Suharjito Suharjito

Building Machine Learning Operations Platform Using Microsoft Azure Cloud Computing Services

Nowadays, the development of Machine Learning is increasing. Therefore the implementation is still inefficient, and there is still human interference during its implementation, so the infrastructure is needed to support the operation of Machine Learning. Machine Learning Operations (MLOps) can solve current problems. MLOps covers many aspects, including operationalization, job roles, deployment, versioning, and DevOps. In this paper, a solution will be made to implement MLOps with the commercial cloud platform. MLOps will connect Machine Learning Applications workflow CI/CD. In this study, Microsoft Azure Cloud Services will be used as an architecture for implementing and deployment for MLOps, and a dataset from House Pricing was used. The dataset has 1460 rows of data. The linear regression method will be used for Machine Learning Model to predict the house price in the future using the evaluation methods MAE (Mean Absolute Error), and MAPE (Mean Absolute Percentage Error), to find out the better error. The result of this research got a result on each training, for MAE 24462.67, 25134.06, 24083.58, and 21538.13, MAPE 15.18%, 14.97%, 15.57%, and 12.98%, and also from this research MLOps can be done by using Microsoft Azure as a cloud platform and deploying the endpoint result that can be accessed.

Session Title: Parallel Session 2-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Shiddiqi Shiddiqi; Muhammad Rivai; Rudy Dikairono; Djoko Purwanto; Sheva Aulia

Electric Wheelchair with Avoiding Obstacle Feature using LiDAR and CNN Method

Wheelchairs are one of the important medical instruments for the mobility of patients with disabilities to carry out several activities. Besides that, wheelchair has been significantly developed from the structures to features for user's easy mobility such as adding electric motors, controller, and driver, as well as location detection system to improve the quality of safety and comfort. However, aspects of the smart obstacle avoider are currently being developed. In this study, an Advanced Driver-Assistance System (ADAS) has been developed using 2D LiDAR as an area mapping sensor, and Convolution Neural Network (CNN) to control a wheelchair embedded in a Raspberry Pi single board computer. The experimental results show that the success rate in avoiding obstacles automatically is between 76.57% - 100%.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Suryadi Suryadi; Norshamsuri Ali

Polarization state characteristics of weak-coherent photon pulse in MEMS optical switch

We present experimental verification of the polarization state characteristics of nearly single photon pulses in micro-electro-mechanical systems (MEMS) optical switches. Four different photon polarization states (|H⟩,|V⟩,|D⟩,|A⟩) were investigated independently at three different average photon densities per pulse (μ = 0.1,0.3,0.5). The polarization state characteristics of the output-port photons were estimated by fitting the detected photon number to the sinusoidal curve model. The results show that for all polarization states, the visibility fringes of the output-port photons were greater than 92%. Interestingly, the polarization states before and after the splitting process remained conserved.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Ali M. Albishi

Sensitivity Enhancement of a Complementary Split-Ring Resonator as a Dielectric Sensor Using Nonzero-Offset Coupling

It is well-known that microstrip lines generate quasi-TEM modes that can be used to excite microwave resonators either by capacitive and or inductive coupling. This paper presents nonzero-offset coupling between a microstrip line (TL) and a complementary split-ring resonator for sensitivity enhancement as a dielectric sensor. Changing the offset between the central island of the CSRR and the TL makes the overall system extremely sensitive to changes near the sensor. The resonator can be designed by etching out a ring with a split in the ground plane of a one-port microstrip line. The resonator is then inductively excited by connecting the resonator's island and the TL using a via (copper plated via). The sensing mechanism is based on measuring the relative changes in the resonance frequency concerning a reference case. The proposed system is evaluated using a numerical simulation (HFSS) by calculating the normalized resonance frequency shift in percentage. The sensor is used to detect the presence of a dielectric slab with a thickness of 3 mm and width and length of 22.5 mm, where the relative permittivity of the slab is varied between 1 to 11 with a variation of 0.5. Since the sensor has many features such as high sensitivity, simplicity in the sensing mechanism, and low-cost fabrication using printed circuit board technology, the sensor can be attractive for sensing-system designers, making the proposed sensor an ideal candidate to be utilized for biomedical and industrial applications.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Agus Widyianto; Edwar Yazid; Midriem Mirdanies; Rizqi Ardiansyah; Rahmat Bubu; Mohamad Luthfi Ramadiansyah

Optimization of PD Controller Using ACO for the Trajectory Tracking of a Ship-Mounted Two-DoF Manipulator System

A ship-mounted two-DoF manipulator is a very important water vehicle for coastal surveillance, and its operation is highly influenced by ocean waves. This paper proposes genetic algorithm (GA) and ant colony optimization (ACO) based PD controller to compensate the ship motions by tuning the gain values. Efficacy of proposed controller is not only highlighted using simulations but also through real-time experiments either without or with ship motions. Finding results show that ACO-PDC can compensate the ship motions better than Ziegler-Nichols PDC (ZN-PDC) and GA-PDC in terms of rise time, overshoot, and steady-state error values.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Muhammad Ridwan; Kevin Gausultan Hadith Mangunkusumo; Sriyono Sriyono

Preliminary Design of Solid State Transformer Application for Power Distribution System in Indonesia

Power converters are widely used in power systems such as inverters for solar power generation or rectifiers in electric vehicle battery chargers. In addition, AC-AC converters are also used in wind power plants to stabilize the power output. Solid state transformer (SST) is a power transformer consisting of a high frequency transformer, power converter and control circuit, which is designed to provide a high level of control flexibility. In the future, this control flexibility can be developed so that SST has the ability to solve the above problems. This study project the potential application of SST for power distribution system at PT. PLN (Persero) and designed the SST topology based on the expected functions according to the available literature. The SST topology is selected based on the capability to perform the expected functions and the switching components are selected based on their commercially available ratings. Based on these considerations, a three-stage SST configuration with h-bridge module and dual active bridge was chosen using the highest voltage rating available of IGBT. The output of this study is potential application of SST at power distribution system along with its preliminary design.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Tan Ivan Tanujaya; Slamet Riyadi

The Effect of Speed on the Power Factor of a Grid-Connected Three-Phase Induction Generator

The development of electrical energy sources continues to overgrow in the development of electrical energy, along with the increasing electricity demand. One of the developed power plants uses a three-phase induction electric machine. Some research has been done on this type of electric machine because of its many advantages, such as its simple construction, easy control, low maintenance, and affordable machine price. Analysis of the three-phase induction machine has been carried out. It is necessary to research the effect of the rotational speed of the rotor on the power factor of an induction machine on a laboratory scale. The method is to operate a three-phase induction machine with a grid-connected operating mode. This research method requires an excitation current in the form of reactive power from the grid. The prime mover drives the mechanically connected induction machine by increasing the rotational speed of its rotor. This technique is used to prove changes in the power factor of a three-phase induction machine and its effect when the rotational speed is changed. The study results are used to prove the analysis of the research that has been done.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Mayang Abi Narwastu; Slamet Riyadi

Analysis of Squirrel Cage Induction Machine in Motoring and Generating Operation

Alternative energy has begun to be widely developed worldwide due to increasing energy needs. By utilizing water and wind energy to reduce the use of conventional fuels. Especially in need of electricity which is getting more and more users. Power plants based on renewable energy are being further developed in many studies. This situation makes power plants start to appear by utilizing the performance of induction machines. The squirrel cage induction machine has a simple circuit with easy maintenance. Due to its easy operation, this squirrel cage induction machine is converted into a three-phase induction generator. The induction machine operates in motoring and generating modes. This operation is distinguished from the rotational speed of the rotor. However, between the two modes, there is a transition operation. This paper will discuss these three modes.

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Andhika Wicaksono Klapoviq; Slamet Riyadi

Performance Analysis of Three-Phase Induction Machine in Generator Mode

The energy crisis currently engulfing the world is the impact of the increasing demand for energy which is not matched by sufficient resources. Many studies have been conducted to develop alternative energy, one of which is induction machines in the industry. Induction machines are widely studied because they have a small size, lower price, and easy maintenance. This paper will present a performance analysis of a three-phase induction machine in the motor and generator mode connected in parallel with the grid. Unlike previous research papers, this paper is based on simulation results with laboratory testing to support the data analysis that has been carried out. The study includes motoring, transition, and generating modes on a three-phase induction machine connected in parallel with the grid. The research will be based on the characteristic curve of the induction machine. In this study, the rotor speed of the induction machine will be increased until it exceeds the synchronous speed. The observation of the behavior of phase angle change on machine current to grid voltage is the main focus of this paper.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Yulianus Palopak; Valeria Cynthia Dewi; Sun-Jen Huang

An AHP Analysis of Correlations Among Project Performances, Agile Core Values, Principles, and Practices

Agile Software Development (ASD) has greatly influenced the community of software developers. Extreme Programming and Scrum are the two most known and widely used agile practices in handling the challenges of a software project. However, insufficient knowledge and understanding of the practices may affect the project's performance. Therefore, this study analyzes the correlation between agile values, principles, and practices to enhance project performance. We use the Analytic Hierarchy Process (AHP) to analyze the relationship between project performance, agile core value, agile principles, and agile practices. A total of 35 respondents from academics and practitioners provided judgment on the correlation priority. The result indicated the highest rank of priority associated with correlation among each variable. The final result of this study suggests which practices to adopt when the project performance needs enhancement and which moderator can affect the decision-making process

Session Title: Parallel Session 2-H

Chair: Mr. I Made Artha Agastya

Authors: Dany Eka Saputra; Joshua Christian; Calvin Calvin; Nathaniel Andrian

Experiment on the Accuracy of IoT-based Hydroponic System

IoT-based hydroponic farming is known as a precision agriculture method. The ability to fine tuning the environment and growth conditions automatically has been the main attraction of such system. This study is conducted to measure the accuracy level of a common IoT-hydroponic system via several experiment. The experiment showed that the commercially available sensor has quite good accuracy, with MAPE around 3%. The experiment also showed that the control process has a MAPE level around 3-6%. However, the experiment also showed that different sensor can interfere with each other and greatly reduce the accuracy of the sensors.

Session Title: Parallel Session 1-B

Chair: Mr. Yoga Pristyanto

Authors: Yogi Yulianto; Ema Utami; Kusnawi Kusnawi

Automatic Deployment Pipeline for Containerized Application of IoT Device

In this modern era, many companies in the technology field compete to win the hearts of customers. Because of that, companies must be adaptive to changes in their product following users' needs. Agile methodology is one of the software development methodologies that have the principle of being customer-centered. So, make agile methodology is trendy for software development management nowadays. It is not enough to choose the correct methodology. It is also necessary to adopt ways of developing and delivering products that match the speed and effectiveness of the agile methodology. Previous studies' CI/CD pipeline has been shown to increase the speed methodology effectively in the production stage of super apps such as Facebook, GitHub, Rally Soft, and Netflix. The automation process is handled by third-party software such as Jenkins, Gitlab CI, GitHub Action, and Travis CI. This study will apply a combination of Gitlab CI and Jenkins to implement Continuous Integration and Continuous Deployment (CI/CD) on 2 Software called Fishee Backend App and Fishee Frontend App with different technology and architecture. This study aims to determine the quality of the CI/CD pipeline, the time required for the CI/CD process, and also to check server performance. The result shows that the times required for CI/CD pipeline Fishee Backend App is 112,5 seconds to build the image docker and 41,2 seconds to push the image to the registry Gitlab, which requires 153,7 seconds in total. Next, Fishee Frontend App takes 174,2 seconds with detail 133,7 to build the docker image and 41,2 seconds to push to the registry Gitlab. Then, in a successful pipeline job Fishee Backend App reached 70,45%, and Fishee Frontend App reached 83,3%. Meanwhile, in terms of CPU usage, Fishee Frontend App is better than Fishee Backend App, but the story is different in terms of RAM usage. Fishee Backend App is better than Frontend App.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Rachel Dyah Wiastuti

The Role of Food Delivery Application Attributes on Customer Satisfaction and Intention to Reuse

This study aims to determine the influence of Food Delivery Application (FDA) attributes on customer satisfaction and intention to reuse. Primary data was collected on May to June 2022 through online questionnaire to 142 FDA users in Indonesia, namely GrabFood, GoFood, TravelokaEats, and ShopeeFood. Data was then analyzed with structural equation modeling with six hypotheses. Findings show that delivery experience and ease of use from previous experience rank as the most experienced attributes compare to review and food rider. For instance, respondent found FDA is easy to use, either from its interface as well as the ordering process and traces. In contrast, respondent found review from other user slightly helpful in determining the restaurant and menu option. These attributes however, all together show a significant and positive effect on customer satisfaction, in which was also positively influence the customer intention to reuse FDA, either in the near future or to order for food. From these findings, FDA should emphasize more on ease-of-use interface and customer delivery experience, such as real time order tracking, continuous delivery fee discount, advance filtering menu and enhancement of the food rider soft skill. FDA should acknowledge that once customer well perceived the attributes, will increase their satisfaction and intention to reuse.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Rajnaparamitha Kusumastuti; Ema Utami; Ainul Yaqin

Detection of Sarcasm Sentences in Indonesian Tweets using SentiStrength

Detection of sarcasm sentences in the Natural Language Processing (NLP) field has a fairly high level of difficulty because it ignores elements of facial expressions and intonation of speech style. SentiStrength works by way of unsupervised learning so it is easier to use to classify sentiments more quickly. This study uses SentiStrengthID which has been developed for Indonesian texts. SentiStrength will classify sentences into 3 classes, namely positive, negative, and neutral sentiments to detect the spread of sarcasm sentences within each sentiment group. The results of this study indicate the SentiStrength accuracy value of 54.52% in detecting sarcasm sentences in Indonesian-language tweets. SentiStrength managed to divide the detected sarcasm sentences into as many as 13 sentences on positive sentiment, 24 sentences on negative sentiment, and 70 sentences on neutral sentiment

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Robertus Dri Kurniawan; Sri Saraswati Wisjnu Wardhani; Linda Nuryanti; Faisol Ba Abdullah; Agoeng Srimoeljanto; Nimas Ayu Untariyati; Nuraisa Novia Hidayati

Designing An Ecosystem Model for E-Government Ontology Development Using Ecosystem Pie Model

The emergence of e-Government as a concept and practice has been a significant development over the last decade. Government Institutions have developed various applications providing public or inter-governmental services. These E-Government applications, some are legacy applications, were built independently using different platforms. Consequently, this heterogeneity creates problems such as lack of data integration and system interoperability. This integration/interoperability problem makes it difficult to perform semantic linking between databases to create a government knowledge base which is critical for knowledge discovery and innovation. Ontology has been regarded as a promising technology to solve this integration/interoperability problem as it provides semantic interoperability and promotes knowledge discovery and innovation. To support the development and operation of cross domain government ontology services for semantic interoperability in e-government systems, it is necessary to define an ecosystem model. The aim of research is to design an ontology development ecosystem model for Indonesian E-Government System using Ecosystem Pie Model.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Sal Sabila Wijayanti; Ainul Yaqin; Ema Utami

Comparison of Kernels on Support Vector Machine (SVM) Methods for Analysis of Cyberbullying

Nowadays social media has grown rapidly and has become a part of the daily routine. Along with the development of social media, there are various abuses and deviations from the ethics of interaction carried out by its users. One of the exist abuses social media is bullying (cyberbullying). Recently, cyberbullying has become more frequent and the incident is still difficult to detect. Therefore, researchers conducted an analysis of cyberbullying on Twitter social media using the Support Vector Machine (SVM). The data used is Twitter's crawled data. This data is included in non-linear data so it requires a kernel to carry out the text mining process. However, to date there has been no specific research on what kernels are good to use in cyberbullying cases. Therefore, researchers conducted experiments to find the best kernel among the four kernels, namely Polynomial, Radial Basis Function (RBF), Sigmoid, and Linear. From the results of the trials carried out, it is known that the sigmoid kernel has the highest accuracy, which is 83.72%.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Prio Adi Ramadhani; Adhi Dharma Wibawa; E Endroyono

ICT Evolution Map Based on Indonesian Patent Documents Using Text Clustering Analysis

Trillions of research funds and many programs have been run by the Indonesian government to increase patent productivity so that nationally the technology growth can be boosted. On the other hand, the direction of research progress and technology development carried out in Indonesia has never been measured evolutionarily, causing the absence of a complete picture of the state of technological development in the country. This knowledge is essential for the government to recognize the directions of research funding so that the technology development program initiated by the government is based on the actual data. In this study, the analysis of patent documents was carried out using the technique of calculating the similarity among documents to cluster the patents that have similarities with each other. The number of documents involved was 194 patent documents. The similarity calculation is based on the cosine similarity value obtained from the word vector calculated using Word2Vec and TF-IDF models.

Density-based Spatial Clustering of Applications with Noise (DBSCAN) algorithm was used to cluster the data. For Keyword extraction, we use the Latent Dirichlet Allocation (LDA) topic modeling technique. These keywords are used to represent the core patent technology. From 105 clusters of patent data, 15 of them were detected as experiencing an evolution in ICT. This means that many research activities have been done by Indonesian scientists, but only 15% of them have shown some evolution. The rest of the 85% of the research ended up without further development.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Mardhani Riasetiawan

The Performance Evaluation of K-Means and Agglomerative Hierarchical Clustering for Rainfall Patterns and Modelling based on Climate Data

The state of rainfall can be identified by using several other climate data. This paper identifies rainfall patterns using other climate data such as temperature, humidity, and sunshine duration. Clusters using K- Means and Agglomerative Hierarchical Clustering (AHC) provide the range of rainfall into three clusters. The purpose of this paper is to analyze the rainfall through the other climate data using different clustering methods. Besides that, it also evaluates the influence of different variables that take effect on rainfall cluster division. This paper evaluates the performance of clustering algorithms using metrics such as silhouette score, Calinski Harabasz score, and Davies Bouldin Score. Silhouette score correlation between rainfall (RR) and duration of sunshine (SS) has the highest score 0.5258 using AHC. Silhouette score correlation between Rainfall (RR) and Average Temperature (Tavg) has the highest 0.5198 using AHC. Finally, the silhouette score correlation between Rainfall (RR) and Average Humidity (RHavg) has the highest score of 0.44 using K-Means.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Rachmawan Atmaji Perdana; Muhammad Nurkhoiri Hindratno; Ahmad Syafiq Kamil; Muhammad Rafi Juliansyah; Rully Kusumajaya; Mohammad Hamdani

Face Presentation Attack Detection using Color Spaces Features and Convolutional Neural Network

Authentication systems using facial biometrics are currently very easy to implement. The easy implementation of the system makes it easier for people to carry out spoofing attacks. This spoofing attack can use photos, videos and even use other people's face masks. To be able to recognize the existence of this spoofing attack requires good accuracy. One of the efforts to improve accuracy is to improve the results of feature extraction.
Feature extraction using color spaces has been extensively researched. The use of this color space is known to increase performances. Several studies have used several types of color spaces to perform texture analysis. in this study will analyze the use of color spaces such as YCbCr and HSV. These color spaces will be combined to get facial features. The color features were an input for classification methods such as ResNet50, VGG16, and MobileNetV2 so that they can detect spoofing attacks. Our experiments show promising result of this approach by achieving lowest EER of 3.62 % in CASIA dataset.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Erna Fransisca Angela Sihotang; Ditdit Nugeraha Utama; Afdhal Kurniawan

UML Design for Decision Support Model in Determining the Sustainability of Online Course Materials

The scenario of online learning is a very urgent need in the world of future knowledge. Since the Corona Virus Disease-19 pandemic, the world economy has started to plummet and caused many adults to lose their jobs. Not only that, many new habits called "new normal" have been created since the pandemic. The advantage is the flexibility and rapid development of the internet. Learning, work, meetings are done by applying physical distance even for now, most people prefer to do everything anywhere, anytime, and online. In 2020, the number of unemployed increased significantly. This reason makes people strive to improve their ability to meet job requirements by taking online courses. Online courses are a way that people can choose to improve their skills anywhere and anytime. The sustainability of online course material that offered to the course user and issued by the company will be discussed in this study. The novelty of this research is to obtain a decision support model based on fuzzy logic for determining online courses. The method used is decision making based on UML and fuzzy logic for the final decision. The fuzzy inference model process begins by determining the decision parameters then using fuzzification with absolute input then refracted with fuzzy criteria and ends with defuzzification with absolute output. There are two groups of parameters in this study, company profits which consist of 5 parameters and user benefits which consist of 9 parameters. Once the model is verified and valid, the final decision is useful for users looking for online course and also useful for the decision unit of online course companies in determining the sustainability of online course materials.

Session Title: Parallel Session 1-C

Chair: Dr. Alva Hendi Muhammad

Authors: Aizul Faiz Iswafaza; Siti Rochimah

Software Defect Prediction using a combination of oversampling and undersampling methods

Software quality can be improved by doing software testing, but the more features are developed the more resources are required, therefore software defect prediction (SDP) is introduced. Various kinds of machine learning methods are used to develop SDP. However, various kinds of problems arise in SDP activities, namely data redundancy, class imbalance and feature redundancy. In this study, a combination of oversampling and undersampling (COU) model will be proposed in an effort to solve the problem of data redundancy and class imbalance. The oversampling method used is RSMOTE and the undersampling method used is ENN. The application of the combination model will later provide a new set of datasets that are more balanced and cleaner from ambiguous, noisy and duplication of data. From the new data generated by the model, deep learning will then be applied as a prediction model. And the evaluation will be done by applying the f-measure measurement. The results of this study indicate that the COU model used gives good results in improving the quality of SDP. When compared with the average value generated by the RSMOTE model in making predictions, the COU model provides an increase in f-measure evaluation results by 11% where the average value obtained is 0.876.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Shahad Hathal Aldhafer; Mourad Ykhlef

Depression Detection In Arabic Tweets Using Deep Learning

In today's globalizing world, depression has become a serious mental problem that effects a great number of people. Substantial efforts have been conducted by countries and health professionals around the world to help detect this illness and provide necessary treatments. However, in Arab contexts, depression is not taken seriously and people who suffer from it are ashamed to seek help. Therefore, this research aims to use deep learning to detect depression from Arabic texts posted on twitter. Moreover, twitter was chosen as the platform in which data will be collected for three main reasons, namely, it allows public access for research purposes, it is extremely rich in data and lastly, it is used as a main social media network for Arabs. Different deep learning models were tested using a dataset of 18 K tweets and compared to SVM model. According to the findings, CNN model perform better at detecting depressed tweets than the SVM and RNN models.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Ditdit Nugeraha Utama

The Floating Fuzzy Logic based Evaluation Model for Appraising the Student Performance

Membership function (MF) in process of fuzzy logic is very meaningful. It depicts the core of the model. It can be adopted from the expert judgment and also coming from the configuration of data behavior. The study is an experimental research by analyzing time-series data behavior in developing the MF by using the programming language Python. The MF produced called as floating MF (FMF). Such a FMF operated to realize the fuzzy logic conception in evaluation model. The constructed model is a model in simply measuring the student's performance. By using the ten series-data of student's grade point average (GPA) and absence per annual (APS) values, the model can simulate the moving students' performance per semester. When compared to the conventional FL based model, the proposed model has a similarity average 85%.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Appogel F. Cagoco; Mudzna M. Asakil; Sayyedatel Janna M. Gubat

AuthenticTap: A Behavioral Biometric Tap-Based User Authentication Method for Mobile Application

Mobile devices have become an essential part of everyday lives. Our society has relied significantly on these mobile devices, accelerating the mobile industry's recent growth [13]. There are 6.648 billion smartphone users as of today, which accounts for 83.72% of the entire population of the world [12]. According to [7] due to this device's convenience and valuable contribution, it has become a ubiquitous device upon which people depend to facilitate their everyday activities. These activities may include browsing the Internet, such as reading, listening, watching, and recording video streams. Everyday tasks, including personal and business e-mail communications, online banking transactions, access to paperless prescription services, and route navigation, can also be performed ubiquitously with these devices [10]. Additionally, these smartphones include substantial internal storage, allowing users to save gigabytes of sensitive and essential data, such as personal images, contact information, call records, and private messages [2]. According to [13], while mobile device users appreciate the convenience of mobile devices, significant security and privacy concerns have been increasing due to their widespread use. Since mobile devices and mobile apps have complete access to users' sensitive information. As a result, many mobile devices and apps utilize user authentication approaches or methods to verify and authenticate users' identities before permitting them to perform more activities.

Results of the study show that AuthenticTap gathered high accuracy rates and high-precision rates at different tolerance levels, with the highest accuracy rate of 0.994 and highest precision rate of 0.982 at a 0.02 tolerance rate. On the other hand, the system gathered average to poor recall rates and F1-score with 0.410 and 0.485 at 0.06 tolerance rates as the best recall rate and F1-score of the method. The system has a high True Positive Rate garnering a rate of 0.88 and an excellent False Positive Rate of 0.12. In conclusion, the AuthenticTap is highly accurate and precise based on its accuracy and precision rate but based on the precision and sensitivity of the system, and the proposed method is only averagely proper. On average, attackers failed to break through the tap patterns of users 4.58 times out of 5 attempts and successfully replicated users' tap patterns on average of 0.42 times out of 5 attempts. Hence, the method works well in real-world scenarios.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Martin Machiko Mada; Nadiva Razak Saputri; Stephanie Ayu Br Keliat; Robertus Nugroho Perwiro Atmojo, RNP

The Analysis of Advertising Identification Through Measurement of User Activity on Smartphone Devices

Everything is now done digitally or online due to technological advancements, even advertising. Currently, there is an advertising identification feature to make it easier to advertise through its effectiveness and efficiency. Digital media advertising revenue is currently expanding in comparison to traditional media and even surpassing it. Tracking data is used by advertising features to match users with relevant ads. However, many smartphone users are still unaware of this capability and its implications for user privacy at this time. This study uses quantitative methods, probabilistic sampling and direct effects. The results of this study showed that user satisfaction and user trust on user loyalty have a positive and significant effect. The results of this study are also expected to make smartphone users more aware of features that involve their privacy data.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Mario Bkassiny

A Deep Learning-based Signal Classification Approach for Spectrum Sensing using Long Short-Term Memory (LSTM) Networks

Signal detection and identification plays an important role in cognitive radio (CR) and spectrum sensing applications. This paper proposes a deep learning (DL) technique for signal classification to identify the wireless signals in a certain radio frequency (RF) environment. The proposed approach is based on a long short-term memory (LSTM) neural network which can classify different radio signals based on their modulation type and pulse shape. We evaluate the classification accuracy of the LSTM network using both raw data and cyclostationary features as an input vector. We show that the classification accuracy of the raw data-based LSTM classifier outperforms the one of the cyclostationary-based classifier even under low signal-to-noise ratio (SNR) conditions.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Anggi Muhammad Rifai; Ema Utami; Dhani Ariatmanto

Analysis for Diagnosis of Pneumonia Symptoms using Chest X-Ray based on RESNET-50 Models with Different Epoch

Lungs are still one of the diseases that are a serious problem in the world. The disease can be caused by various things, such as viruses, bacteria, or fungi. Medical conditions including lung disease have many types and one of them is pneumonia. One of the ways to test lung health can use X-Ray images, because it has a fast process. The medical personnel are still analyzing the results directly by looking at the results of X-Ray of the patient's lungs and the methods that can be used in classifying one of which is the Convolutional Neural Network (CNN) method in processing the image for the solution. In this study, the best results were obtained using the Resnet-50 architecture with epoch 100 in the form of 99.50% accuracy and 2.25% loss.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Achmad Arwan; Siti Rochimah; Chastine Fatichah

Query Expansion Based On User Requirements Clustering for Finding Feature Location

Feature Location is an approach of how to determine the code area based on high level software artifacts. Use Case Scenarios (UCS) are requirements documents in software artifacts that contain many words. A sentence in a UCS is sometimes described by a sentence in other UCS, so capture the relationship among UCS may be advantageous in finding feature locations. The research contribution is how to find feature locations better by making an expansion to query based on UCS clustering. The method was clusterring the UCS using k-medoids clustering and index the source code using latent dirichlet allocation. The results was got 56.8% for the best recall rate.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Wiyli Yustanti; Nur Iriawan; Irhamah Irhamah

A Hybrid Evaluation Index Approach in Optimizing Single Tuition Fee Cluster Validity

The grouping of the socio-economic level of new students at the time of registration at public universities is a problem faced by all state universities. Identifying the right group will have an impact on the students and the university. The quality of the results of a valid grouping will give a sense of fairness to the parents of students in paying tuition fees. On the other hand, the university also expects that the results of a valid grouping will contribute to optimal revenue. This study aims to evaluate the cluster structure of a single tuition fee at the State University of Surabaya. The existing cluster structure is compared with the results of grouping using nine clustering methods, namely K-Mean, Hierarchical, BIRCH, DBSCAN, Mini Batch K-Mean, Mean Shift, OPTICS, Spectral Clustering, and Mixture Gaussian. The proposed evaluation method is a combination of three evaluation concepts, namely internal validity (Silhouette-Index), external validity (Rand Index), and the percentage conformity value to the expected income factor (Revenue-Index). These three indicators are then calculated as the average value for each clustering method as Hybrid-Index. The highest Hybrid-Index is shown by the Mini Batch K-Mean algorithm, with an average value of 0.64, so the Mini Batch K-Mean algorithm can be recommended as a method for grouping single tuition fees.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Gusna Ikhsan; Nanik Suciati

The Comparative Study of Adding Edge Information to Pix2pix Architecture for Face Image Generation

The image-to-image translation is part of image generation, which aims to transform the source image into the target image. The benefit of the image-to-image translation method in the forensic field is to recognize the face of the perpetrator of a crime through facial sketches. Pix2pix is a deep learning architecture for image-to-image translation that implements the Conditional Generative Adversarial Network (CGAN). Pix2pix can generate images well, although the resulting image is blurry in many cases. Modification of the Pix2pix architecture through the addition of edge information has been reported to improve the sharpness of the resulting image generation. This study aims to compare the performance of the modified Pix2pix architecture using various edge extraction methods, namely Laplacian, Sobel, and Prewitt. The comparison of the performance of the Similarity Structural Index (SSIM) on the Chinese University of Hong Kong (CUHK) faces student dataset shows that the modification of the Pix2pix architecture with the addition of Prewitt edge information produces the highest average value of 81.4%.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Dhani Ariatmanto; Muhamad Paliya Sadana; Mohammad Suyanto

Prediction of Indonesian Movies Popularity Using Machine Learning Techniques

This paper presents two models of machine learning for Indonesian movie's popularity prediction. The models used are K-Nearest Neighbors (KNN) and Random Forest Classifier. The dataset used in this paper is 1400 Indonesian movies collected from the IMDB database. First, the datasets are reduced by erasing the empty values. Next, the column rate ages with the similar meaning are combined into a new category and inserted into a new column. Feature engineering is used to transform the text variable into a numeric value. The feature selection of variance threshold removed all the low-variance values to obtain the adequate dataset. The experimental results show that Random Forest Classifiers achieved higher performance than the KNN Classifier to predict the popularity of Indonesian movies with accuracy of 98%.

Session Title: Parallel Session 1-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: I Istiadi; Emma Sulistiarini; Rudy Joegijantoro; Affi Nizar Suksmawati; Kuncahyo Setyo Nugroho; Ismail Akbar

An Integrated E-Learning Fuzzy Expert System for Acute Pharyngitis Diagnosis

Many e-learning systems are implemented in the health sector for the learning process of prospective medical personnel. Expert systems are also implemented in the health sector to diagnose various diseases. This study tries to integrate an e-learning system with an expert system to diagnose viral and bacterial pharyngitis. System integration aims to optimize the knowledge base of the expert system to be used for the learning process. This study uses the Fuzzy Mamdani inference system to diagnose the type of acute pharyngitis. The test results using 25 test data obtained a system accuracy value of 84%. These results indicate that the system can diagnose well.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Wawan Firgiawan

Computation Time Analysis of D16 Algorithm for Surface Water Flow Direction Using Decision Tree

The D16 algorithm is one method for modeling the direction of surface water flow. The algorithm works by forming 16 flow directions in the search space. One of the data sources used for modeling the flow direction is Digital Elevation Model (DEM) data which consists of raster data in the form of a grid with X and Y as coordinate points and Z as the surface height. One of the challenges in the water flow direction modeling is the computational time of the algorithm to model the flow direction on DEM data. This research contributes to the existence of a computational model using a decision tree to solve the problem of finding the direction of surface water flow from the D16 algorithm. This study will compare the serial or Sequential computational model and the computational model with the decision tree that the author made to see the efficiency of the computational time of the D16 algorithm completion model. The test results show that the water flow direction modeling with a decision tree produces good results in terms of computational time compared to the serial program model, with an average computational difference of 10.866 seconds.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Farel Arden; Cutifa Safitri

Hyperparameter Tuning Algorithm Comparison with Machine Learning Algorithms

Hyperparameters are the foundation for optimizing the way machine learning algorithms suppose to learn. It is essential to have the optimal hyperparameter values for any learning algorithms. However, tuning hyperparameters can be difficult because it requires a rule of thumb and how to adjust them appropriately. This paper compares hyperparameter tuning approaches in various machine learning algorithms. Simulation results discussed six machine learning algorithms deployment, which is: Decision Tree, Gaussian Naive Bayes, Random Forest, LightGBM, Catboost, and XGBoost. For each mentioned algorithm, six hyperparameter tuning methods are embedded to evaluate their efficiency. The hyperparameter tuning approaches are random search, grid search, Bayesian Optimization, Genetic Algorithm, SHERPA, and Optuna. Future research will be able to forgo evaluating all hyperparameter tuning methods simultaneously after identifying the most efficient way for six machine learning algorithms.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Taraknath Paul

Internet of Things and Machine Learning Banking Business Model Using Neuro Fuzzy Technique

Traditional banking methodology is changing due to the Internet of Things (IoT) and Machine Learning (ML). The Internet of Things and Machine Learning has given birth to the thought process of smart home and smart city. Bank must come up with respective changes in its working, analysis and services phenomenon to meet the smart customer needs. This article aims towards the implementation and utilizations of the IoT and ML business model in the banking ecosystem. The business model addresses security, digital marketing, strategies to reach to offline customers, advisory board, quality assurance, product analysis and hiring or outsourcing external services in a collaborative manner. Banks have to redesign the business model with respect to meet the opportunities of IoT and ML. With the help of ML, the bank finds new ways of pre-approved lending with its products and earns profits. IoT and ML will suggest those customers who can be offered any banking product. These kinds of offerings will open new sources of income for banks and its sister concerns. Also, it will help in bad debt reduction. The ML model is fed with 957 random data and the model is performing well with an accuracy level of 73.5% on the platform of python.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Warsun Najib; Selo Sulistyo; Widy Widyawan

Trust Based Security Model in IoT Ecosystem

In recent studies, IoT devices can be seen as having a form of social relations. One form of social relations between IoT objects is the level of trust. A trust-based security model is an approach to creating a secure IoT environment. It can also be viewed as a method of determining the level of trust of an object in an IoT system. Confidence levels are obtained through calculations both directly and based on previous experience. The value of this belief calculation will be used as a recommendation of trusted objects. The main objective of this research was to design a trust-based security model on a network of non-infrastructure and limited resources, emphasizing to develop a trusted IoT ecosystem so that a secure environment would be established to run services within IoT systems and applications.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Alfi Y. Zakiyyah; Ivan Halim Parmonangan; Bryan Nicholas Kasodu; Zulfany Rasjid

CNN-based Drowsiness Detection with Alarm System to Prevent Microsleep

According to data from the World Health Organization, approximately 1.25 million people die every year from road traffic accidents. One of the underlying factors that often cause traffic accidents is drowsiness. It has a significant impact on performance, alertness, memory, concentration, and reaction speed which is crucial when driving. Drowsiness could further lead to microsleep which is very dangerous when driving. This study proposes a convolution neural network (CNN)-based system to monitor the driver's eyes and mouth separately to identify drowsiness. An alarm will be sounded if drowsiness is detected and therefore prevent microsleep. The result shows that the proposed system can predict closed eyes with 76% accuracy and 74% precision. In comparison, it achieved 62% accuracy and 65% precision for yawn detection.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Ruth Ema Febrita; Mohamad Ayatullah; Dedy Hidayat Kusuma; Dian Ridlo Pamuji

The IoT-based Water Monitoring and Billing System using Lora and Remotely-Controlled Water Valve

This study aims to introduce a new approach to the creation of a water billing and monitoring system. In this approach, a circuit containing a digital flowmeter and Lora components will be installed near a water line equipped with a water valve that can be remotely controlled. The digital flowmeter aims to measure the amount of water that comes out through the pipe, where the usage calculation results will be sent to the cloud server using the communication protocol provided by Lora. The novelty of this system is the use of the remotely-controlled water valve that can open and close the pipe flow automatically based on the changes in the user status from the server.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Moh. Zulfiqar Naufal Maulana; Daniel Siahaan

Use Case-Based Analytical Hierarchy Process Methods for Prioritizing Software Requirements

There are many factors that can cause the failure of a software project. One of them is the failure to identify and address the problems stakeholders face due to ineffective requirements engineering. Another factor is the failure to correctly determine the priorities of software requirements. Due to limited resources of software projects, it is essential to focus on the most important requirements to ensure software success. Therefore, requirement prioritization is a critical phase within the software development life cycle. This study proposes a method to prioritize software requirements based on the development of the Analytical Hierarchy Process (AHP) method. There are several limitations of the AHP method, namely suffering from scalability problems, time-consuming, and inconsistent due to the redundancy produced by the pairwise comparison. To address these limitations, we propose a method for requirements prioritization named the Use Case-Based Analytical Hierarchy Process (UC-Based-AHP), which aims to overcome the challenges faced by the AHP method by reducing the number of pairwise comparisons in the AHP method with the use of natural language processing (NLP) and previously created use cases. As a result, the prioritization process becomes faster and more reliable compared to the original AHP method.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Bayu Prasetiyo Utomo; Widy Widyawan; Muhammad Nur Rizal

A Systematic Literature Review of Machine Learning to Predict Location in Social Media

Predicting the location is a critical issue for conducting any analyses. Location analysis is one of analysis which processes Geographic Information (GI). Example in social media, users could include their posts or tweets with latitude and longitude using the Global Position System (GPS) in their devices. Unfortunately, not all users or content creators provide their latitude and longitude. As a result, we investigate the literature in journals and conferences while being aware of the best methodology and algorithm employed by current researchers. Based on the predetermined inclusion and exclusion criteria, thirty-six location prediction research articles published between 2013 and 2022 were kept and selected to be investigated further. A strategy for identifying, assessing, and interpreting all study materials accessible with the goal of responding to specific questions is known as a Systematic Literature Review (SLR). The SLR result show that the topic of location prediction is still high in publication level. User text post is the most popular approach used by researchers, followed by user information and user trajectory. Almost all reviewed paper use Twitter to get the social media data. It mostly caused because of the availability throughout the Application Programming Interface (API), tool library, and datasets on the internet. Out of the twenty-six ways, four of the most popular algorithms for predicting the location were found (RNN, LSTM, CNN and Random Forest). To raise the performance of machine learning classifiers for position prediction, some researchers combining any machine learning algorithms. Therefore, the researcher suggests to using any combined algorithm, approach, and source of data in social media to get deeper optimization of location prediction.

Session Title: Parallel Session 1-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Lilik Anifah; Hapsari Peni Agustin Tjahyaningtijas; Haryanto Haryanto

Pneumonia Identification on Chest X-ray Image using K-Means Based Active Contour

Pneumonia is a condition in which the lower respiratory tract is invaded by infective microorganisms, and this is the result of a complex event. The causative microorganisms are bacteria, respiratory viruses and fungi. The purpose of this study is to propose an image processing and artificial intelligence-based approach in identifying pneumonia. This approach uses active contour which is then identified using K-Means. This research phase is divided into several experiments, where each experiment applies several hybrid methods. Basically all experiments go through the same stages, namely preprocessing, segmentation, and identification. The difference between the three experiments is that each process is different. The first experiment in the preprocessing process used grayscale process, and binaryization, at the segmentation stage used morphology process, edge detection, and at the identification stage the K-Means approach was applied. The second experiment in the preprocessing process used dimension normalization, grayscale process, and adaptive threshold. The segmentation stage uses a morphological process, edge detection, and at the identification stage the K-Means approach is applied. The third experiment in the preprocessing process used normalization, and contrast adjustment. The segmentation stage uses active contour, morphology process, and edge detection. Meanwhile, the identification stage of the same method was applied to the first and second experiments, namely the K-Means approach. The results show that by using the method applied to the third experiment, the system accuracy is 92.5%. The contribution of this research is expected to be a decision support system in determining pneumonia.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Risa Rumentha Simanjuntak

Big Data Analysis on Issues and Innovations in Decade-Long E-Learning Studies

This paper presented a review of e-learning studies in the past ten years. Identification. selection, and critical appraisals were conducted in this present study to answer two questions. First, what developments and achievements in e-learning research. Second, what hinderance kept appearing in doing such research. Data mining enables the compilation of corpus for this study. Corpus for this study was 989 journal article abstracts from reputable journals in Computer Science. Identification and selection of data was gathered using AntConc 4.0.5 (2022). Data gathered provided information on recurring key words and context of the recurrence. Results showed several issues repeatedly appearing in e-learning studies and developments in the study. Pertinent problems in e-learning studies were also identified. In conclusion, the systemic literature review provides important information on the achievements, innovations, and developments in the decade long period. Implications on further studies and using the systemic literature review for practical use was discussed

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Hilal H. Nuha; Farrish Fauzan

Query Optimization for Room Temperature Sensor using Principal Component Analysis

In the Internet of Things (IoT), a lot of data is sent to the cloud for represents what happens to the device. To transmit data lot, it takes a lot of energy to do that activity. Therefore that, we need a way to save energy, namely by using query optimization. Query optimization is a process to analyze a query to determine what resources are used by the query and whether the use of these resources can be reduced without changing the output. Or it can also be said that query optimization is a procedure to improve the evaluation strategy of a query to make the evaluation more effective. In this paper, the authors propose a query optimization by using the Principal Component Analysis (PCA) method for save energy on the device. The author takes the case on the temperature sensor on a room.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Adi Aufarachman Putra Bambang Dwi; Ali Syahputra Nasution; Bayu Satya Adhitama; Fadillah Halim Rasyidi; Muhammad Thufaili Imdad; Nugroho Jatmiko; Suhermanto Suhermanto; Hidayat Gunawan; Rahmat Arief

Integration Development of Polar L-Band Orbit Multi-Satellite Data Receiver System

Remote Sensing Ground Station in Pekayon, Jakarta acquires and processes data from several low-resolution polar orbit meteorological satellites. Due to the operation and processing of data as well as software and hardware using systems from each individual satellite, making operations more complicated, application software was developed to integrate the HRPT (NOAA-18, NOAA-19) and AHRPT (MetOp-A/B/C) meteorological satellite acquisition systems that produce data products simply and automatically by not reaping conflicts between satellites when the acquisition time is the same or very close. This design uses Microsoft Visual C++ 2017 compiler, with Microsoft Fundamental Class. The development of this module integrates hardware (demodulator and ingest card) for satellite data reception and recording and uses freeware utilities to calculate the position and velocity of earth-orbiting satellites using the SGP4 (Simplified General Perturbations propagator) method. The software design can forecast multi-satellite acquisitions of polar orbits of up to 8 satellites sequentially up to 5 days ahead in tabular form. This paper demonstrates the system setup and synchronization for automatic satellite data reception and recording.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Sayed Muchallil; Khairun Saddami; Nazaruddin Nazaruddin

CNN Pre-Trained Model Performance Analysis For Vehicle Detection On Low Illumination

In this study, we compared and analyzed the performance of CNN pre-trained model for vehicle detection in badly illuminated situations and using moving cameras. We conducted experiments using five CNN architectures, namely Faster R-CNN, SSD-ResNet, YOLOv3, YOLOv4, and EfficientDet. The dataset used is a dataset that is taken independently by using a camera mounted on the observer's vehicle (data taker). The results of our experiment show that YOLOv4 used with a mean average precision (mAP) of 0.37 has the best performance compared to the other architectures. While the lowest performance is shown by Faster R-CNN and SSD-ResNet with mAP value of 0. YOLOv4 has good results because its architecture includes steps to recognize objects in various degradation conditions. (Abstract)

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Uswatun Hasanah; Budi Sunarko; Ulfah Mediaty Arief; Feddy Setio Pribadi;

Syafira Tantri Istikomah; Agung Adi Firdaus; Alifa Mauludyah Dzukha

Prediction of Student Satisfaction with Academic Services Using Naive Bayes Classifier

Academic service is an academic activity offered to a party (student) either directly or indirectly in the context of achieving academic goals. Student satisfaction as users of educational services is very important for the progress of a university. This is because student satisfaction will have an impact on their loyalty to the university. The prediction of student satisfaction is an important factor that determines the quality of a university. Data mining can optimize the process of finding information in large databases and finding previously unknown patterns. The method used is a prediction with a Naive Bayes Classifier using 85 datasets obtained from surveys using the SERVQUAL scale. There are 4 different experiments in datasets distribution for training and testing to find the best distribution. The best distribution result is 75% for training and 25% for testing with 95% accuracy. Research on predicting student satisfaction with academic services at the study program of PTIK of UNNES using the Naïve Bayes classification method produces a good model and website application that predicts student academic service satisfaction with an accuracy value of 95% and it is concluded to be a very good classification model.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Herman Yuliandoko; Panduardi Farisqi; Abdul Holik

Monitoring System of Greenhouse Based on WSN and Auto Flushing Sensor Mechanism

Indonesia is an agricultural country with agriculture as one of the mainstays of state income. However, currently the competition for agricultural production is very high, so it requires innovations in agricultural technology to increase the competitiveness of Indonesian food production. One of latest agriculture technology is Greenhouse. With Greenhouse it is possible to adjust temperature conditions, room humidity and other plant parameters. In Indonesia, this technology has begun to be widely used but is still very limited due to technological constraints and high costs. In a greenhouse there are tools that monitor plant parameters to support plant growth such as water pumps, sensors, dynamos, sprays. However, currently there are still many greenhouses that operate these tools conventionally. This causes greenhouse operations to take a long time and a lot of labor so that greenhouse operations are expensive and complicated. Therefore, Greenhouse innovation is needed with a flexible, easy and efficient system. In this research, innovation will be carried out with a Greenhouse monitoring system by implementing the WSN (Wireless Sensor Network). In addition, the use of sensors with auto flushing is done to prevent encrustation on sensor surface. Using WSN will increase the flexibility of data transmission and minimize energy use so that it can be applied in remote areas. Room temperature is also connected with blower as an automation mechanism to maintain wind circulation in Greenhouse. The monitoring of plan nutrition in Greenhouse is very important that why this research also study it

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Elvia Afkar

Prediction of Perceived Consumer Experience, Perceived Brand Engagement, and Gamification towards the Intention to Use Metaverse: An Extended TAM Approach

Metaverse technology is considered as the next big thing in this digital era and for companies to take part in its market potential, companies must understand the factors for its acceptance. While the technology acceptance is widely studied, the review of acceptance for metaverse technology is limited. This research aims to provide an empirical study on the technology acceptance for metaverse and identify key factors influencing consumers to adopt it. According to the literature review, the Technology Acceptance Model (TAM) is the most common framework used in the technology adoption area and therefore is used in this study. There are three factors adopted to formulate the hypotheses in influencing the consumer's intention to use metaverse technology of a consumer brand: first, perceived consumer experience, which is defined as perception of individual towards positive or negative experiences that are aligned with one's expectations in using technology, second, perceived brand engagement, which is defined as perception of individual on engagement towards a specific brand, and third, gamification which is defined as using elements of game in a non-game context . This quantitative research is carried out through a structured survey instrument and uses a convenience sampling technique. Data collected from 110 Indonesian consumer are analyzed using a structural equation model with Smart PLS software version 3.2.9. The findings show that all three factors, namely perceived consumer experience, perceived brand engagement and gamification, have positive and significant effect on the intention to use metaverse of the specific brand. Managerial implications for companies, contribution to academics and further studies are also described.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Hisyam Fahmi; Wina Permana Sari

Analysis of deep learning architecture for patch-based land cover classification

In recent years, the usage of computer vision methods for mapping land cover and land use has increased. Patch-based change detection may produce much superior results than pixel-based change detection and generate accurate change maps. Convolutional Neural Network (CNN) is an excellent option for remote sensing applications using hyperspectral data. This research examines and compares three CNN architectural models for land cover classification: LeNet-5, VGG-16, and ResNet-50. EuroSAT data derived from Sentinel-2A remote sensing imagery are utilized in this work. Comparing the three CNN architectures indicates that ResNet-50 has the highest validation accuracy, with a testing accuracy of 0.877, and a training time that is neither too quick nor too slow. The LeNet-5 model has the quickest training time but the lowest accuracy. VGG-16 has the longest training period yet has the highest test score of 0.878.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Jihadul Akbar; Ema Utami; Ainul Yaqin

Multi-Label Classification of Film Genres Based on Synopsis Using Support Vector Machine, Logistic Regression and Naïve Bayes Algorithms

Movies were still a very popular means of entertainment. The current distribution of internet users causes a large amount of movie data to be created and distributed online. The emergence of movie streaming services makes consumers very interested in using automatic film genre classification. In this study, a multi-label film genre classification will be carried out based on an English synopsis. Data were collected from the Internet Movie Database (IMDb) website. The amount of data used in this study was 10,432 lines of data obtained using scraping techniques on June 7, 2022. Researchers divided the dataset labels into 18 labels representing each genre. Feature extraction using TF-IDF and Stemming. The multi-label classification algorithm used is the Support Vector Machine, Logistic Regression, and Naïve Bayes Algorithms. Optimal parameter search using GridSearch of each algorithm. The optimum result in this study was obtained f1-score value of 0.58 using the SVM algorithm with TF-IDF feature extraction with stemming dataset, followed by NB with the f1-score value of 0.48 and LR with an f1-score value of 0.43

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Aisya Nur Aulia Yusuf; Prima Dewi Purnamasari; Fitri Yuli Zulkifli

Defected Ground Structure (DGS) Optimization of Microstrip Antenna Using Particle Swarm Optimization (PSO) for Gain Enhancement

Defected ground structure (DGS) is a method for enhancing antenna gain without having to increase the antenna dimension by modifying the structure of the antenna ground. However, the inductive approach is typically used when implementing the DGS technique, which is time-consuming and expensive in terms of computer resources. Therefore, machine learning techniques, particularly particle swarm optimization (PSO), are used to accelerate the DGS design process. In order to reduce the design time of DGS and improve the effectiveness of the design process, this study suggests a PSO-based DGS model to enhance the gain of microstrip antennas. The simulation results show that the PSO-based DGS microstrip antenna has a gain value of 2.82 dBi and a resonant frequency between 2.4 and 2.52 GHz. The proposed DGS design can improve the antenna's gain and bandwidth by 100% and 54.94%, respectively, compared to the original rectangular microstrip antenna.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Imam Tahyudin

Visualization of Frontend Data Logger IoT Technology using Vue.js Framework

The danger of spreading the new variant of COVID-19 still exists. It takes a new habit to prevent it. The World Health Organization (WHO) urges to minimize the spread of the COVID-19 variant, including by getting used to washing hands regularly. To support this call, the researchers carried out various innovations. One of them is through the application of Internet of Things (IoT) technology for routine hand washing. This research innovates by using an IoT tool that we named Amikom Purwokerto Hand Sanitizer (AMPUH). In addition to functioning as an automatic hand washing device, this tool is also capable of recording temperature data, number of users, controlling hand sanitizer liquid, and measuring saturation automatically. The recordings are stored through a data logger and processed through an IoT platform called ThingSpeak. ThingSpeak has the disadvantage of data visualization which is less attractive and informative. A website dashboard is needed to visualize the data contained on the ThingSpeak platform so that the display is more attractive and easier to understand. Therefore, this study aims to create a website dashboard that can provide information from the data stored on the ThingSpeak platform. The author focuses on the frontend by using the Vue.js framework. This framework has advantages such as being flexible (can be used in large- and small-scale websites), reducing repetitive code, and making the page display more dynamic. In building this frontend, we apply the Extreme Programming development method. Based on the results of the study, it showed that the implementation of the Vue.js framework on the AMPUH data logger frontend resulted in performance in accordance with expectations. Websites that are built produce attractive and informative visualizations.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Imam Tahyudin

Machine Learning Analysis for Temperature of Bioelectric Potential of Plant

Plants can respond to changes in their surroundings, such as temperature, humidity, and human behavior. This ability is due to photosynthesis and respiration in plants, resulting in low electrical signals. We focus on room temperature change by plant bioelectric potential detection. The temperature topic is interesting for the actual research because it is one of important factor in health aspect. This study aims to analysis of temperature of Bioelectric potential of plant using machine learning. This implementation identifies the plants' bioelectric potential in distinguishing three-room temperature categories: A, B, and C temperature. We conducted the experimental in room control. For the transformation process is using wavelet transform. Furthermore, the analysis process, we used the Decision Tree (DT), Support Vector Machine (SVM), Random Forest (RF), K-Nearest Neighborhood (K-NN), Naïve Bayes, and linear regression. Then, for the evaluation is using confusion Matrix. The result showed that the best level of transformation using Wavelet is 7th level for reducing the noise. Furthermore, the best accuracy of analysis process is using Decision tree which obtained 75%.

Session Title: Parallel Session 1-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Amin Al Ka'bi

A Proposed Method for Using Artificial Intelligence in Developing Higher Education

Higher education has delved into a new stage of rapid development focusing on quality improvement, while encountering new challenges and obstacles. In this research work, an artificial intelligence algorithm for education improvement is proposed. Firstly, deep feature abstraction in temporal and special dimensions is performed using Long Short-Term Memory (LSTM) artificial neural network and convolutional networks. Consequently, multiscale attention fusion techniques are used to improve the articulateness of the characteristics and come up with better recommendations with the assistance of multilayer perceptron. Moreover, the proposed model helps in improving the cognitive capability of students and enhances their overall quality of perception. Moreover, it has been proven that the performance of the proposed model provides better recommendation outcomes and better robustness compared to existing models through conducting extensive experiments based on real data.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Karunika Diwyacitta; Ali Syahputra Nasution; Yuvita Dian Safitri; Hidayat Gunawan; Bayu Satya Adhitama; Sugiyanto Sugiyanto; Arif Hidayat

Design Development of Circular Microstrip Antenna for C-Band Himawari-8 Satellite Application

Microstrip antenna is expected to be used as part of satellite data reception system since it is more compact, low profile and lightweight than any conventional antenna. This study proposed development circular microstrip antenna with feed line to be implemented in C-band Himawari-8 satellite data reception system. It started with a single circular microstrip antenna then array 2x2. The substrate used is FR-4 with 4.3 dielectric constant, both ground and patch used are copper. Simulation results show that the 2x2 array antenna has better performance than single patch antenna although its bandwidth is slightly lower than single patch. The gain of 2x2 array antenna reached 12.37 dB. The width and length of 2x2 array antenna patch is 94.19 mm and 88.49 mm respectively with radius 9.93 mm. In general, the performance value of 2x2 array antenna in simulation has meet the requirements. Furthermore, the process could be continued to design 4x4 array microstrip antenna. After that, the design could be fabricated and integrated to parabolic antenna as a replacement of feed horn antenna which is being used currently for C-band Himawari-8 satellite data reception system.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Mihuandayani Mihuandayani; Tesalonika Palilingan; Michel Tomatala

Case-Based Reasoning for Dengue Hemorrhagic Fever Diagnosis Using Manhattan Distance

Dengue hemorrhagic fever (DHF) is a disease caused by infection with the dengue virus. This disease can get worse if it doesn't get the right treatment. Treating or preventing the disease from getting worse requires the expertise of an internal medicine specialist to diagnose the disease. Due to the limited availability of internal medicine specialists in some areas, this disease is often ignored or only treated with ordinary drugs given by nurses. For this reason, a system is needed that can assist medical officers in diagnosing dengue fever and provide the right type of treatment for patients. Technology has gone through many developments, especially in the advancement of the field of Artificial Intelligence. Case-Based Reasoning (CBR) system used in this study is a branch of artificial intelligence that was designed by applying the Manhattan Distance method to the process of finding the shortest distance between new cases and the basic knowledge with the predetermined threshold. Cases that have a further value that exceeds the threshold will be submitted to a revision suggestion which will correct the type of DHF treatment based on the symptoms provided by the doctor. The evaluation in this study was carried out from a comparison of expert diagnoses with the system and resulted in an accuracy of 90.48%. This proposed system can facilitate the process of diagnosing dengue disease effectively.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Abba Suganda Girsang

Recommendation News For Journalist Based on Twitter Data Using CNN

Getting the update news fast is important for journalist. This study uses Twitter data which is fast and rich information for get the update news and useful for journalist. This study starts from collecting data from Twitter, then predicting the category of tweet using convolution neural network (CNN) algorithm. With convolution neural network data, Twitter can categorize 10 news categories that mention news to official Twitter media on Twitter social media. Scenario data in predicting news by dividing the data based on 70% training, 15% validation, and 15% testing. Then the data is converted into vector form where the convolution neural network predicts the data in vector form. The results show that, the convolution neural network is able to conduct the good performance based on the values of accuracy, precision, recall and f1 score. It also compares by the other methods

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Zulhalim Zulhalim; Wahyu Catur Wibowo

Designing Inter-Organizational Collaborative Knowledge Sharing System for Indonesian MBKM Policy

Indonesian Merdeka Belajar Kampus-Merdeka (MBKM) policy has begun to be implemented in 2021. As a new policy, many stakeholders are not optimal in managing knowledge in personnel, organizations and between organizations involved in MBKM activities. This study proposes a Knowledge Sharing System (KSS) design solution for MBKM activities that answers the research question of how to design KSS for Indonesian MBKM policies. The data collection process involved 80 respondents consisting of lecturers, students and coordinators at universities, schools, industry and government. This research uses User Centered Design (UCD) method by adopting Soft System Methodology (SSM), Fishbone Analysis with Knowledge Management (KM) Diamond components, UML modeling, Balsamiq Wireframe design tools, and Fleiss Kappa formula. The evaluation stage for 10 evaluators consisting of students, lecturers and the head of the study program resulted in a design solution with a value of 0.55 on the Fleiss Kappa formula, which means it is quite accepted by the evaluators.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Phie Chyan; Andani Achmad; Ingrid Nurtanio; Intan Sari Areni

A Deep Learning Approach for Stress Detection Through Speech with Audio Feature Analysis

Stress, a change in psychological reactions from a calm state to an emotional state, is a psychological problem that can negatively impact a person's physical and mental condition. Daily life that is full of pressures can be a stressor that triggers the stress. Various artificial intelligence-based technological approaches are currently used to detect stress through multiple indicators, one of which is using speech. In this study, a deep learning model based on CNN architecture was developed to detect stress through voice recording using various sound features extracted in the signal domain. The performance evaluation of the model was demonstrated using an open-source dataset (Crema-D and TESS), and the best accuracy value was 97.1% in performing binary classification on stressed and unstressed labeled speech. The highest accuracy was obtained from experiments using various combinations of sound features in the signal domain using a combination of Mel Spectrogram and MFCC features. This evaluation result shows that the deep learning model with the appropriate sound feature extraction can accurately detect stress through voice recording.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Roby Tristiantoro; Andani Achmad; Syafaruddin Syafaruddin

System of Breath Analyzer based on Metal-Oxide Semiconductors

This paper present the development of a breath analyzer system by designing a calibration method and measurement chamber for measuring exhaled breath gas. It provides a concept of accurate sample measurement and calibration methods. The design system of the breath analyzer optimized the gas sensor role to measure several gas variants produced by human breath. Gas concentration measurement was performed using the Matlab GUI app and optimized gas concentration reading in parts per million (ppm) using the proposed program. This system is made for work with low power and is cost-efficient. With this method, there will be more comfortable and efficient for people to monitor their health condition.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Widhi Setya Wahyudhi; Harjanto Prabowo; Mohammad Hamsal; Boto Simatupang

Digitalization Strategy through Gamification and Innovation Culture to Enhance Heavy Equipment Practitioner's Performance

Many studies have discussed the effect of gamification implemented in the world of education, but there is still few research that discusses more deeply how gamification implemented in big data analytics affects the performance of heavy equipment engineers in coal mining contractors in Indonesia. Today's technological developments have developed very quickly, one of which is the implementation of big data technology. Big data analytics has 3 main dimensions namely variety, velocity & volume, especially in the maintenance management of heavy equipment is used as a decision-maker in carrying out predictive maintenance. However, there are still few studies that analyze how the influence of the gamification method used in big data analytics and the impact on engineer performance. The combination of big data analytics with gamification methods needs to be supported by a supportive environment, one of which is by implementing an innovation culture in the organization. So this research purposes to understand the role of innovation culture & gamification in big data analytics on employee performance, especially heavy equipment engineers in coal mining contractor companies in Indonesia. In this research, the sampling technique was constructed on the probability of selection using the probability sampling method with a simple random sampling technique. The process of defining the amount of samples with the slovin principle. In determining the sample taken from 119 respondents, from heavy equipment engineers spread across several regions in Indonesia. The test is carried out using the smartpls 3.2.9 software which tests the outer model & inner model. Testing the outer model by observing at testing the reliability and validity of the instrument with the Outer Loading, Cronbach's Alpha, Composite Reliability (Pc) indicators, Average Variance Extracted (Pvc), and Discriminant Validity as well as hypothesis testing in the inner model testing. The test results show that the relationship between gamification in big data analytics and innovation culture is confirmed to be significant and has an influence on heavy equipment engineer performance. From the test, it was found that the greater the gamification in big data analytic and innovation culture possessed by the engineers, the higher the employee performance.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Fairuz Iqbal Maulana; Yaya Heryadi; Lukas Lukas; Wayan Suparta; Yulyani Arifin

Social Media Analysis using Sentiment Analysis on COVID-19 from Twitter

The development of the internet is getting faster, participating in encouraging the emergence of new and innovative information. In filtering the various information that appears, we need a recommended system to perform well for users in today's internet era. A well-performing recommendation system in question is a reliable recommendation algorithm. This algorithm is fundamental to analyzing various information, such as responses on social media based on user behavior data related to the topic of COVID. This data is crawled from tweets on social media Twitter. The data analysis algorithm obtained uses Python, which is then visualized in the form of a diagram. The processed data is user comments on Twitter, and the text data is analyzed using Python, using more than 60000 data sets taken to form visualizations and conclusions. From sentiment analysis, polarity and subjectivity data are obtained to be analyzed, which are negative, neutral, or positive. The result is that the analyzed datasets show more neutral ones. Finally, sentiment analysis helps people effectively conclude vast and complex data.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Andi Amirul Asnan Cirua; Ingrid Nurtanio; Syafaruddin Syafaruddin

Scheduling Job Machines with Swap Sequence to Minimize Makespan Using Spider Monkey Optimization Algorithm

Scheduling problem is identical to duration or makespan. Scheduling problems are included in NP-Hard. In machine scheduling, job, machine, and processing time parameters are given. Metaheuristic algorithm is suitable to solve this problem. The Spider Monkey Optimization algorithm is presented in this study. The main characteristic of the SMO algorithm is the process of fission and fusion in the search for a solution, the addition of the Swap Sequence method is also carried out. The results showed that the Swap Rate parameter gave good results in the search for solutions. A smaller swap rate provides more search space, but increases computation time. the average makespan of the small dataset la01 is at swap rate = 0.2 is 672.00, at swap rate = 0.5 is 676.47, and at swap rate = 0.8 is 681.25. The computation time of dataset la01 at swap rate = 0.2 is 2.70 second, at swap rate = 0.5 is 2.32 second, and at swap rate = 0.8 is 1.72 second. we compared SMO and GA on 10 datasets and concluded that SMO provides a better solution for 10 datasets but requires more computational time than GA. The addition of the swap sequence method causes the process time to find a solution to increase but gives better results. Genetic algorithms focus on random solutions, selection, and mutation This proves that the addition of the swap sequence method gives good results but provides a large computation time.

Session Title: Parallel Session 1-G

Chair: Mrs. Rhisa Aidila Suprapto

Authors: Gerhard P. Tan; Geoffrey T Salvador; Shaila Marie Aguilando; Kim Ryan Francisco; John Paolo Garbin; Angelo Gonzales; Jayron Mampusti; Jerico Tantoy

IoT-Based Automatic Irrigation and Fertilizer Application System for Capsicum Frutescens

Modern technologies are introducing a method of farming that is more efficient, less costly, consumes less time and effort, and requires less manpower and it is called smart farming. Farmers don't have reliable information on their resource use since they often only water and fertilize the plants as needed; as a result, overuse or underuse may have an impact on plant development. Therefore, the researchers want to develop a system that can offer an agricultural monitoring solution that automatically switches the irrigation and fertilizer application system to active and inactive states depending on the data obtained. In order to create and implement the system, the researchers developed two systems: the separated and combined automatic irrigation and fertilizer application systems. The researchers periodically take measurements of the height of the plants that were planted and the volume and weight of the consumed water and fertilizer to record the growth rate of the plants and the amount of water and fertilizer consumed in each system. After that, the comparison between the two systems is examined to better know their efficiency and effectiveness. Based on the results of the study, the separated system consumes less water and fertilizer than the combined system. The separated system also provided better results for plant growth than the combined system. The separated system is also proven to be more efficient than the combined system due to having a higher ratio of plant growth per fertilizer consumed and a higher ratio of plant growth per water consumed.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Viany Utami Tjhin; Pia Dinari

Does User Satisfaction Play a Role in the Sustainability of Contact Tracing Application Intention?

Various countries have developed contact tracing applications to prevent the spread of COVID-19 outbreaks. For example, Indonesia launched a government surveillance technology named PeduliLindungi as a contact tracing application for COVID-19. This empirical paper aims to assess the explanatory power of the Expectation-Confirmation Model (ECM) by adding three new constructs, perceived security, perceived privacy, and effort expectancy, concerning the users' continuance usage of contact tracing applications. A survey instrument was developed for PeduliLindungi application users, with survey participants (N=535) recruited from Indonesia. The study tested the model using partial least squares structural equation modeling. The results showed that effort expectancy is the most significant factor in continuance intention mediated by satisfaction. Meanwhile, perceived privacy does not affect continuance intention mediated by satisfaction.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Adri Gautama; Adian Fatchur Rochim; Luhur Bayuaji

Privacy Preserving Electronic Health Record with Consortium Blockchain

Every patient has health record, it was written as statement of patient's conditions, treatments and medications, and nowadays it is become digitalized, it can be copied and shared easily, but the nature of EHR is private, not for public, private between patients and healthcare provider. Privacy preserving can be done by implementing Blockchain network for storing EHR, only authorized users or nodes can access and write data to the network. New block in blockchain created as per consensus among nodes, every node can join a blockchain network if it is public, to meet a consensus required resources intensive cryptographic challenge, in private blockchain, only selected can join and involved in the network or specific transaction. In healthcare, data privacy is the main concerned, need a secure, scalable, and efficient blockchain hence implementing consortium blockchain is perfect match for EHR where multiple healthcare provider can operate in a single platform to conduct transaction or sharing EHR among members. This study analyzes 15 articles derived from IEEE Explore, Science Direct and Scopus by implementing screening with keyword Consortium Blockchain and EHR and proposing new blockchain model accommodating solution for challenges on access, storage, sharing, privacy and performance.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Mera Kartika Delimayanti; Utami Puji Lestari; Wiwi Prastiwinarti

Development of Integrated Web Application for Fishery Trading in Indonesia

Indonesia is strategically located and has more sea and water than land, so it has a huge potential for marine fishery resources. The potential for implementing the Blue Economy in Indonesia is very wide open. The Blue Economy is a way of thinking about development that is based on the economic value of Indonesia's marine resources. This adds value to the supply chain, directly or indirectly, and could improve people's lives. However, we know that fishermen have a weak bargaining position in selling their fish catch, sometimes sold through mediators/bonded money systems or directly at fish auctions/TPI without going through an auction. Because of this, fishermen and fishermen's cooperatives need an open-source software application to help them track and report their finances, such as the number of fish caught, sales, loans (debt), expenses, and profits. This study aims to show an application called Electronic Fish Solution that can keep track of and report on entities and business processes in fishermen's cooperatives and fishing businesses. This research develops a prototype of a fishing trading application to make it easier for fishers to market their catch. In software development, the research method is based on prototyping and testing usability with the UAT (User Acceptance Testing). This study used a web-based app that can be easily accessed from computers and phones. The UAT score was analyzed and calculated, and the result was 77.25. This means that the fisherman's app works perfectly and can be accepted by users.

Session Title: Parallel Session 2-I

Chair: Mr. Kumara Ari Yuana

Authors: Mokh Sholihul Hadi; Dyah Lestari; Soraya Mustika; Muhammad Alfian Mizar; Adi Izhar Che Ani; Yohannes Pandi Sihombing

Aquaponic Plant Control and Monitoring System Using Iot-Based Decision Tree Logic

Aquaponics is an agricultural model that combines fishing and crop cultivation in a symbiotic environment. In an aquaponics system, plant nutrients are produced by decomposing the ammonia contained in fish waste by decomposing bacteria in the nitrogen cycle. Additionally, hydroponics must consider other factors such as temperature, pH, and lighting to maximize plant and fish growth. Regular monitoring of these parameters will help maximize plant and fish growth in your aquaponics system. However, urban populations tend to be busy, making regular monitoring difficult. Based on this problem, a system was developed that can automatically control water temperature, water pH, lighting, and fish feeding in hydroponics. The developed system can also monitor the current state of important parameters in aquaponics agriculture such as water temperature, water pH, light intensity, air temperature and humidity. This monitoring can be done in real time via the website application. The water temperature and pH control in this system is based on decision tree logic that can classify control decisions with 95.41% accuracy.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Abdulrahmat E Ahmad; Kusrini Kusrini; Sudarmawan Sudarmawan

Usability Evaluation of Office Stationery Procurement Service and Management System Using System Usability Scale

One of the factors that influence the success of a website is usability. The higher the level of usability of a website, the more the website is accepted by users and vice versa. In the Regional Office of the Directorate General of Taxes of North Sulawesi, Central Sulawesi, Gorontalo and North Maluku, there is an application called Office Stationery Procurement Management and Equipment Services (LALAMPA). LALAMPA is an application that aims to cut the duration of service and simplify the process of requesting office stationery, can display information on the availability of office stationery in real time and can monitor the distribution of office stationery. To determine the feasibility of the application offered for use, this research proposes measuring the usability level of the application using the System Usability Scale. The System Usability Scale has ten statements that serve as evaluation tools and consists of three assessment indicators, namely acceptability, grade scale, and adjective rating. Each statement serves as a measure of the usability level of the application. A questionnaire containing 10 statements from the System Usability Scale method was distributed to 25 respondents who are users of the LALAMPA application. The usability evaluation of the LALAMPA application using the System Usability Scale method concluded that the application received a B+ grade for usability because the SUS score was 78.4. The interpretation results of the approach based on the nature (Adjective), this LALAMPA application is included in the "Good" category, and the level of acceptability is included in the "Acceptable" category, which indicates that this application can be widely accepted by users.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Annisa Maulidia Damayanti

Conveyor trainer module for item sorting equipment based on height in the PLC laboratory

Technological developments in industry are very advanced and modern. Especially for industry used automated or controlled systems in a production process, one of which is the use of Programmable Logic Control (PLC). To confront the discrepancy between education and industry, a control and automation system is needed for the development of learning methods. A system of PLC-based trainer modules can be used as a hands-on learning media in the PLC lab. Once students complete their training, they will be easily immersed in the world of work in today's evolving industry. Broaden students' knowledge and deepen their skills in the field of control and automation systems. This system uses PLC with conveyor belt to sort items by height and all PLC data displayed on a Human Machine Interface (HMI).

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Hasri Wiji Aqsari; Dedy Dwi Prastyo; Santi P Rahayu

Clustering Stock Prices of Financial Sector Using K-Means Clustering With Dynamic Time Warping

An investor is a person who invests money in a business a profit. Investment instruments in the capital market include stocks, bonds, warrants, rights, mutual funds, and various other derivative instruments. According to the IDX, the number of stock investors has increased to 3,988,341 SID as of June 24, 2022, an increase of more than 536 thousand SID or 15.6% from the previous year. Every investor wants to benefit from the shares they own. So it is necessary to consider which groups have price fluctuations. In this study, data on stock prices of financial sector companies are used for the period. The variables used are open, close, and HML (High Minus Low) stock prices. The method used is K-Means clustering with Dynamic Time Warping (DTW). DTW was chosen because it is a non-linear sequence alignment distance, so it is considered suitable to be applied to stock data in the form of time series data. Show that the open and closed stock price data are into 2 clusters.

Session Title: Parallel Session 2-D

Chair: Mrs. Gardyas Bidari Adninda

Authors: Mehi Zulqaida Harisandy; Diana Purwitasari

Forecasting Revenue from Electricity Sales of Household Customers using Various Methods

Electricity is one of the most important part in the development of a region. The development of sustainable accompanied by rapid technological advances and an increase in living standards can bring about the increase consumption of electrical energy by customers. Revenue from sales, like revenue from providing services, is recorded when there is an increase in assets as a result of the company's business activities with its customers. The data used are the sales of electrical energy of household customers, both pre-paid and post-paid customers monthly for 5 years back. This paper aims to forecast the revenue from electricity sales of household customers using various method of algorithms, such as k-nearest neighbor, random forest, linear regression, gradient boosting and adaboost. As the result shows that random forest is the best method with the higher of R2 value.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Sri Mega Sakti; Arif Dwi Laksito; Bety Wulan Sari; Donni Prabowo

Music Recommendation System Using Content-based Filtering Method with Euclidean Distance Algorithm

For some people listening to music can soothe the heart and soul, especially if we listen to music that suits our favorite. There are problems faced by listeners when choosing the music they want. The right solution to help determines the selection of music that suits the user's mood by building a music recommendation system with user's mood types. A recommendation system is used to make predictions about a product or object. In this study, the authors used the content-based filtering method to find music recommendations and used the mood model of James Russel's Circumplex as a reference for user mood. With input from the user's mood, it will be processed using the Euclidean distance algorithm to calculate the distance from the item to other items and get the top-n recommendation with the smallest distance. The output of this study is the top 10 songs with the smallest distance according to user mood input. Furthermore, an evaluation of the recommendations using the NDCG technique was carried out, and an average NDCG value of 0.95235 was obtained closer to 1. It means the recommendations given are very relevant.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Isra Andika Bakhri; Hari Purnomo Sidik

Realtime Rocognition Of Handwritten Lontara Makassar Using Yolov5 Algorithm

Nowadays, handwriting pattern recognition has developed rapidly, including handwritten letters for ancient characters. The machine can be trained to read each letter. The use of lontara letters in South Sulawesi still exists today. To introduce lontara letters interactively, the author tries to research real-time reading of handwritten lontara letters to support these expectations. The results of this study succeeded in making this and getting satisfactory results with the evaluation value of precision rate (P) of 95.2%, recall rate (R) of 95.2%, and mean average precision (mAP) of 95.9%.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Nita Nur Qarinah; Lavilerio Lamuna; Arya Maulana Ibrahimy; Brian Pamukti

Performance of Underwater Visible Light Communication (UVLC) using Quasi Cyclic Low-Density Parity Check (QC-LDPC)

This research proposed the performance of Under- water Visible Light Communication (UVLC) system using Quasi Cyclic Low-Density Parity Check (QC-LDPC), by comparing it with Regular Low-Density Parity Check (R-LDPC) and the uncoded system. The transmission medium that used in this simulation is a clear ocean channel and uses a 500 nm wavelength as the transmitter. We consider to use simple modulation using On-off Keying Non-return to Zero (OOK-NRZ). Based on the extensive simulation with propagation distance 1-10 m, we found that UVLC system using QC-LDPC codes improved system performance with an optimum BER distance of 8% compared to R-LDPC and 17.39% compared to uncoded system. In addition, for SNR performance of UVLC system using QC-LDPC obtained an advantage of ±1 dB compared to R-LDPC and ±2 dB compared to uncoded system.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Rashed H Alhudaib

Influence of Bulk PV Penetration on Power System Transient Stability

The rapid growth of PV power penetration into power system grids has raised several technical issues about their influence on the steady-state as well as transient performance of the power systems. The influence of PV generation on power system grid depends on the size of PV penetration, and whether it is centralized or distributed (clusters). Additional technical challenges are due to the weather-dependent nature of the PV generation. Cloud-induced fluctuations of bulk PV generation have considerable impact on power system transient. This research concerns with the impact of large PV penetration on the power system transient stability. The rapidly increasing integration of PV energy sources into the grid can change the way power systems operate and respond to system disturbances. This is because the available inertia from synchronous machines, which helps in damping system oscillations, is reduced as an increase in PV is accompanied by a decrease in conventional generators. This aspect of high penetration of PV has the potential to affect the rotor angle. The system with increased PV generation is mathematically modeled to represent PV generation connected to the power system grid at the transmission voltage levels. Transient stability studies are performed under various operating conditions, for different penetration levels, using MAT- LAB/SIMULINK programs.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Dharaka Pranamya Mahadhika Damar; Siti Sa'adah; Gia Septiana Wulandari

Classification of Toddler Nutritional Status Using Radial Basis Function Neural Network

Nutritional status is one of the toddlers' health indicators. Parents without knowledge about toddlers' nutritional status might cause negative outcomes for toddlers' nutrition. Toddlers with bad nutrition might have negative effects on their bodies. Hence, it is necessary to observe toddlers' nutritional status, which can be done by using three anthropometric measurements; weight for age (WFA), height for age (HFA), and weight for height (WFH). A data distribution index is needed for the measurement process, but parents cannot have it. Therefore, a personalization engine implementation using machine learning classification was needed to provide the measurement to make it convenient to find out toddlers' nutritional status. This research's objective is to classify the toddlers' nutritional status based on three anthropometric indexes measurement using the Radial Basis Function (RBF) Neural Network algorithm. The classification model's performance was tested using different layers and epochs parameters to discover and obtain the highest accuracy. The highest accuracy in the WFA index obtained was 91.58%, with layers used 36 and epochs used 2000 and 2200. The highest accuracy in the HFA index obtained was 92.11%, where 144 layers and 2000 epochs are used. The highest accuracy in the WFH index obtained was 90.00% with 108 layers and 2400 or 2600 epochs. The result shows that the RBF classification is able to classify toddlers' nutritional status with anthropometric indexes with high accuracy.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Pima Hani Safitri; Chastine Fatichah; Nafa Zulfa

Two-stage classification of pap-smear images based on deep learning

After years of discovery, the cancer cervix is still a significant worldwide threat that can be detected early using the pap-smear test. The pap-smear is a screening procedure to find a candidate or positive cancer cell. Recently this process has been done using deep learning, especially Convolution Neural Networks (CNN). The Herlev dataset with seven class data is one of the public datasets that has been researched. Since the high similarity of pap-smear images, previous research has modified the data into two large categories to provide a good result. However, they still require some improvement in the original seven-class classification. We proposed the two-stage classification based on deep learning on pap-smear images, which classified the dataset into five classes, then reclassified them into three classes. In the end, the dataset has been classified into seven classes following the original dataset. This research uses various types of CNN, such as VGG types, ResNet, MobileNet, and EfficientNet. As a result, this proposed method gives 78.73% accuracy in test data, increasing the accuracy to 26.77% more than the onestage classification. Due to the data augmentation technique, this method provides an accuracy of 90.98% by combining three data types. In further research, this method could be an idea to classify other high-similarity data cases, such as medical images.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Sumarni Adi; Aji Syahroni Ardianto

The Best Problem Transformation Method in Multi-Label Classification Text for Thesis Abstract

Improvement in research is one of the missions of the Informatics Study Program at Amikom University, Yogyakarta. The thesis data is increasing every year, classification is one method that can be used to obtain added information from this case. The classification that suits this case is the multi-label classification. The multi-label classification with the Problem Transformation approach is a flexible approach. In this study, a comparison of the Problem Transformation methods, namely Binary Relevance, Label Powerset, and Classifier Chain was carried out with the Multinomial Naïve Bayes algorithm as an estimator. As a result, the Classifier Chain method gives results that tend to be better with the value of Hamming Loss is 0.0321 and accuracy 64.60%.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Dedy Ariansyah

Enabling Interoperability of Digital Twin in the Maintenance phase of Lifecycle

In today's digitalization era, asset management has evolved following the rapid adoption of information systems and digital technologies. In the maintenance phase of the asset, Digital Twin (DT) emerges as an effective approach to improve failure recognition and structural damage prediction through DT-driven Prognostic and Health Monitoring (PHM). As a result, DT allows the asset manager to proactively plan maintenance strategies to improve the availability of the assets. However, to reduce asset downtime in a cost-effective and time efficient manner, DT for maintenance phase needs to be integrated with other software systems that manage the provision of maintenance service and spare parts such as computerized maintenance management system (CMMS) or Enterprise Resource Planning (ERP). Nevertheless, many of the developed DT in PHM were not equipped with semantic data model and hence, lacks interoperability with other systems (e.g., other DT or non-DT system) and limits the effective use of the DT. To qualify as an effective DT, it needs a semantical-enabled interface to connect with data and models from various domains to enable DT-driven decision-making. This paper leverages a rule-based ontology reasoning model to enable DT interoperability with other maintenance software systems. The results depict that the developed model paves a way for an effective use of DT-driven systems in asset maintenance management.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Farrell Yodihartomo; Chintya Wijaya; Regina Dionne Aurelia Hadiprodjo

Success Factors of E-Learning Effectiveness at Higher Education in Indonesia: A Review

E-learning is a student-centered education system which enables students to study anything from anywhere and anytime according to their learning goals. Since the COVID-19 pandemic constrained people to commute, e-learning has been massively implemented to enable educational activities. This study aims to investigate the e-learning success factors and its influence on e-learning effectiveness in higher education. The systematic Literature Review (SLR) has taken into account in order to identify e-learning success factors. Through analyzing the selected literatures, extraction of e-learning success factor domains has been attempted based on the influencing factors and its impact. In addition, this study also outlined the prioritized success factors that need to be considered in order to enhance the e-learning effectiveness.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Khaerunnisa Hanapi; Arief Setyanto; Anggit Dwi Hartanto

Comparison of ResNet50 and SqueezeNet1.1 for Plastic Bottles and Cans Classification

Waste problem is one of crucial global issue. Population growth, government regulations, people behavior and many other factors affect the waste management problem. This has a huge impact on the livability of the people in the neighborhood and maintaining a clean environment as well as managing waste is particularly challenging. Plastics and cans are the types of waste that are very difficult to recycle, so by using a reverse vending machine (RVM) these problems can be overcome. The critical point of RVM is the ability to recognize the type of waste. Deep learning has been successfully overperforms in many computer vision tasks, more specifically image recognition. Squezeenet and ResNet are two convolutional based deep learning algorithms. This study aims to compare the performance of two methods for plastic bottles and cans classification using SqueezeNet 1.1 and ResNet-50. From this research results, highest accuracy of SqueezeNet 1.1 is 92,5% with mean performance 1.518 sec and 97.5% for ResNet-50 wih 6.298 sec mean performance.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Pradio Eka Putra; Achmad Hidayanto

Factor Influenced the Acceptance of e-Health from Health Care Personnel and Patient Perspective: Systematic Literature Review

e-Health projects have typically been seen as opportunities for fundamental reforms in the public health care system to reduce the massive demand and supply of health care. However there are still many factors and challenges from health care personnel and patients themselves that cause there is still low application and utilization of e-Health in the society. Acceptance of the use of technology in the health industry can be a factor that can accelerate the implementation of e-Health in society. This study aims to summarize the factors that influence e-Health acceptance from the perspective of health care personnel and patient. Through a systematic literature review process, 13 relevant papers were found to be discussed in order to find the answer. Seven factors were found that most influenced acceptance from the perspective of health care personnel with the ease of use is the main factor, while eight factor found from the patient's perspective with factors that most influence acceptance are ease of use, usability & usefulness, and trust.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Ainul Yaqin; Ahlihi Masruro; Yoga Nawassarief

Analysis Sentiment of President Vladimir Putin on Twitter Social Media Using Multinomial Algorithm and Bernoulli

Sentiment analysis is one of the most critical factors influencing people's perspectives when judging a person's appearance or character. Russian President Vladimir Putin is one of the world's most powerful figures. Since the conflict between Russia and Ukraine, many people have been drawn to the figure of Vladimir Putin. The opinion that develops in the community about Vladimir Putin is both positive and negative sentiments. Many people have an opinion about using social media. Social media that is often used by people is Twitter. Opinions contained on Twitter can be used to assess the public image of figures by using sentiment analysis techniques. The method used in this study is multinomial Nave Bayes with Bernoulli Naïve Bayes. This study will compare the level of accuracy between the two. From the results of testing and this research, the value of the multinomial Nave Bayes algorithm gets an accuracy rate of 76%, while the Bernoulli algorithm gets an accuracy rate of 74%

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Ivan Rifky Hendrawan; Ema Utami; Anggit Dwi Hartanto

Comparison of Word2vec and Doc2vec Methods for Text Classification of Product Reviews

Word Embedding is the optimal tool for many Natural Language Processing (NLP) tasks, especially those that require native input as a text feature. In this study, we will try to compare the performance of Word2vec and Doc2vec on unbalanced review text data using XGBoost, which in the end will look for which combination is suitable for processing unbalanced data Word2vec Produces high-performance values. Doc2vec has a better advantage over Word2vec with the condition that we will know the closeness between the review sentences, not the closeness of words anymore. Based on experiments, the performance of Word2vec and Doc2vec paired with the XGBoost Algorithm was able to classify unbalanced datasets with an average F1 Score value of 0.9342 for Word2vec and 0.9344 for Doc2vec. Word2vec and Doc2vec are more powerful when processing large data. This is due to the small number of datasets Word2vec cannot capture the similarity of word meanings well.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Zasli Afandi Baharuddin; Elyas Palantei; Intan Sari Areni

An Electronically Steerable Antenna Designed for Accurate DoA Determination of U-NII-2-Extended WLAN Devices

An accurate way for determining the location of the beam source that illegally generated from WLAN devices causing harmful interference to TDWR U-NII-2-Extended band requires an effective method and powerful equipment including antenna part. Research reports regarding the construction of the directional finding antennas in this band is very less number released. An intelligent ESPAR antenna design was constructed in this study to perform two critical tasks, i.e. for direction and location determinations of the radiation source causing interferences. An electronically beam steerable antenna was implemented in such away using a digitally controlled PE42424 SPDT switch connected directly to each parasitic element. This allows each parasitic part enable to stay in one of the two states, i.e. ON and OFF. The RF switch circuit was designed on the plated-through-hole PCB structure. In the ON state, this connect the parasitic elements and the grounding part in order to reflect the induced RF signal of each elements to all OFF-stated parasitic directions. Numerical computations of the designed antenna exhibit the consistent radiation of the main beampattern to vary every 45° direction angle. The maximum gain achieved was up to 8.76 dBi. The reflection coefficient and VSWR obtained through the numerical assessment were -22.3 dB and 1.53, respectively.

Session Title: Parallel Session 1-H

Chair: Mr. I Made Artha Agastya

Authors: Dewi Kusuma Wati; Amil Ahmad Ilham; Andani Achmad; Ingrid Nurtanio

VGG-16 and VGG-19 Architecture Models In Lie Detection Using Image Processing

There are a number of different ways to detect lies, including polygraphs, LVA, and VSA. However, the polygraph analyzes the reactions thought to be connected to lying rather than detecting lies. Validity and reliability testing for VSA and LVA has been conducted, but the results are unsatisfactory and undesirable. Developing a lie detection methodology using the CNN method is the purpose of this study. We used a publicly available data set in the form of a video, converted it into frames form, and then used a confusion matrix for validation. We designed two CNN architecture models, the VGG-16 and VGG-19 by adding augmentation and dropout, and three optimization algorithms, Adam, RMSprop, and Adadelta. The study found that the precision acquired from the VGG-16 model, specifically Adam + VGG-16 has great performance, as achieved from 18 combinations combining the VGG-16 and VGG-19 models with different optimizations

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Marco Ariano Kristyanto; Hudan Studiawan; Baskoro Adi Pratomo

Evaluation of Reinforcement Learning Algorithm on SSH Honeypot

The honeypot is a tool to detect the attacker's activity and can be used as a diversion. But the growth of attacking techniques makes the attacker realize they are interacting with a honeypot, not a real server. Previous research discusses the concept of an adaptive honeypot to make the honeypot more adaptive to the attacker because the growth of cyber attack techniques make attacker realize the presence of the honeypot. To realize the idea, researchers combine the honeypot with the reinforcement learning (RL) algorithm to create a honeypot that can learn from attacker behavior. In this research, we measure the impact of the RL algorithm on the SSH honeypot. The result is that the attacker and honeypot interaction is longer than before.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Rizqi Sukma Kharisma; Kusrini Kusrini; Uyock Anggoro Saputro; Mulia

Sulistiyono; Majid Rahardi; Bernadhed Bernadhed; Elik Hari Muktafin

ADX: IOT-Based Integrated Smart Control System for Prevention of Airborne COVID-19 Spread

Enclosed spaces are places with a higher potential for spreading the COVID-19 virus. This is because the COVID-19 virus can be carried in the air. Closed space makes the air last longer in the space. Moreover, closed spaces are widely used, such as homes, schools, malls, offices, places of worship, etc. So for closed spaces, serious attention must be given to avoid the spread of the virus. ADX is an IoT-based tool equipped with UVC rays that can kill viruses, including the COVID-19 virus. This tool can be controlled remotely, manually, or on a timer. So that the device can be activated first before the closed space is used. This study also compares the ESP8266, ESP32, and ESP001 microcontrollers in supporting the development of IoT-based ADX tools. The results of this study with an accuracy of the IoT ADX system of 96.10% and the average response time is 1.47 seconds.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Mia Rosmiati; Gita Indah Hapsari; Manggar Mahardikan

The Simulation Of Monitoring System Of Elephant Location In The Forest Using Internet Of Things

Elephants are animals whose population is decreasing every year throughout the world, this is because many people who take benefits to use elephant body parts to be used as medicine or accessories, because of this small number the International Union for Conservation of Nature (IUCN) has classified Asian elephants as endangered animals. Based on data from the Indonesian Elephant Conservation Forum (FKGI), the total elephant population in 2016 is estimated to be around 1,724. FKGI also noted that more than 700 elephants have died in the last 10 years. The large number of poaching of wild elephants in the forest is due to the lack of forest rangers who can monitor the movement of elephants in the forest. In addition, the lack of adequate communication tools causes the difficulty in sending the position of elephants in the forest in real time, So by the system that integrating the LoRaWan communication module with the Raspberry Pi, all stakeholders can monitor the movement of elephants in the forest in a real time even though there is no internet connection. The maximum distance for one observation point that can be observed by the receiver is 1000 m with an average data sending time of 60 seconds. So the number of repeaters needed to observe the movement of elephants in the forest becomes less

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Fadjar Rahino Triputra; Bagus Bhakti Irawan; Rifqi Fajar Giyana; Widar Dwi Gustian; Leli Lailatul Jannah; Azrizal Akbar; Maristya Rahmadiansyah; Muhammad Putra Rasuanta

Performance of Low-cost GPS-RTK for Navigating AGV Outdoors

Nowadays, low-cost GPS-RTK device has an accuracy of 1 cm level. Therefore, the device can be used for navigating AGV outdoors autonomously, following the programmed track. Using two low-cost GPS-RTK receivers separated at a distance on the AGV, an absolute bearing value of AGV can be calculated and obtained to follow the path between two setup waypoints. This work evaluates the performance of the low-cost GPS-RTK devices, especially to know the devices' characteristic of updating data rate to track the route at various speeds while turning the curve, which is a critical point in controlling the AGV movements. Experiment results show that higher bearing error occurs as the AGV speed increases when making a turn.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Hawwin Mardhiana; Rizqa Amelia Zunaidi; Ahmad Ihsan Fuady; Adek Dhea

Resmi Purbantari; Fidelia Adinda Syafani

ITTS Mart: Mobile Application Design using Lean-UX

This paper describes a study on developing a mobile-based trading application prototype. ITTelkom Surabaya has a rooftop that produces hydroponic and aquaponic products; those who want to take advantage of the mobile platform to sell ITTelkom Surabaya's rooftop products and no platform supports it. Therefore it is necessary to develop a system in the form of a mobile application that is expected to be marketed optimally. The research uses the Lean UX method because it has techniques to design products faster with minimum resources. Evaluation is carried out on the design results to determine the level of usability according to the perspective of potential users. The usability testing results show six research variables, namely Trust, Informational Fit-To-Task, Web Appearance, Entertainment, Government Policy, and Transaction Capability, showing a significant difference between expectations and experience or dissatisfaction when using the ITTS MART application. Only one variable that shows the value of the difference is not substantial, namely Response Time. The conclusion is that respondents are satisfied with the time to access the page on the ITTS MART application.

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Handy Wicaksono; Jason Halim

A Deep Learning Approach for Basic Human Activity Recognition with YOLOv4-tiny

The regression of the elderly body condition over time causes the elderly to be more susceptible to illness and other accidents. When the elderly experience illness or an accident such as a fall, it is necessary for the family to realize this and take prompt treatment immediately. However, with relatively many elderly people in Indonesia choosing to live independently, it will be difficult for families to find out and provide help instantly. Therefore, in this study, the authors form a model for recognizing basic human activities with deep learning-based computer vision that can be implemented in a supervisory system in a room. A deep-learning approach is needed because of the complexity and variance of body postures and forms of human activities. However, the deep learning approach requires extensive resources and computational capabilities. Therefore, the model is formed by the YOLOv4-tiny method, one of the tiny versions of YOLO. Model training using the author's laptop and model inference testing was carried out on the Jetson Nano and the author's laptop to compare the inference time between the two devices. We investigate the performance of the YOLOv4-tiny model application on the Jetson Nano and a laptop, as well as the accuracy of recognizing human activities. This study shows that this particular vision-based human activity recognition model formed using YOLOv4-tiny as a deep learning method can be applied using Jetson Nano as an embedded device in real-time, with a speed of about 20 frames per second, mAP@0.50 of 99.04%, and an average F1-Score of 94.18%.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Nadia Ristiani; Nur Saida; Rahmat Noor Fauzi; Helmy Yusuf Darmawan; Agung Sanubari; Prihatin Oktivasari; Rika Novita Wardhani; Riandini Riandini

IoT Home Medical Check-up System Application and Database Design

Non-Invasive Home Medical Check-up is a medical device made using non-invasive methods in checking blood sugar, uric acid, cholesterol, and body temperature. This tool uses MAX30105 sensors to check uric acid, blood glucose, and cholesterol levels, and MLX90614 to check body temperature. This tool can be connected to an android application to make it easier for users to review previous checks. Making applications using MIT APP INVENTOR and using the PostgreSQL database. To ensure everything is as expected, tests are carried out to send and store data on the results of checking tools to the database and displayed in the application. Data transmission testing is carried out by determining the time delay of sending the device to the database using the internet network, and the average delivery in the experiment is 0.0206 seconds. integration testing is done by comparing data in the database with the application by means of the user must enter the correct and appropriate ID, it is obtained that the value of the results that come out on the tool matches what is displayed in the application and stored on the history screen.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Yanisa M Rahman; Yoanes Bandung

Phone Call Speaker Classification using Machine Learning on MFCC Features for Scam Detection

With the expansion of information and communication technology, human vulnerability to security threats is increasing. One of those threats is phone call-based fraud. Numerous researches on phone scam detection have been conducted. However, the proposed methods still have flaws, including identity spoofing, voice impersonation, and the risk of user's privacy leakage. The lack of datasets is also a problem, particularly in the Indonesian language, where our research focuses. In this paper, we construct a phone call voice dataset from YouTube videos and conduct experiments on voice classification using machine learning and MFCC features in order to build a scam detection system that classifies speakers based on their voices and uses them as identifiers to build reputations. Support Vector Machine is the most accurate of the four machine learning classifiers we compare, achieving 94.46% accuracy using 68 MFCC features.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Ditdit Nugeraha Utama; Ika Dyah Agustia Rachmawati; Heraldo Yusron Purwantono

Fuzzy Decision Support Model on Virtual Plant Computational Modelling of Water Spinach (Ipomoea aquatica. Forssk) in Farming Business

Using soil as a planting medium (conventional system) raises several problems, such as the need for large agricultural land, but the available land is limited. This problem is triggered by an increase in demand for nutrients needed by the body to support daily activities, one of which can be met by consuming green vegetables, such as Water Spinach. To solve this problem, a hydroponic wick system or a wick system can use that is simple and easy to care for. Water Spinach (Ipomoea aquatica. Forssk) vegetables are easy to grow and care for. Nutrients contained in 100 grams of Water Spinach, energy: 29 kcal, protein: 3 grams, Fat: 0.3 grams, carbohydrates: 5.4 grams, calcium: 73 mg, phosphorus: 50 mg, iron: 3 mg, vitamin A: 6300 IU, vitamin B1: 0.07 mg, vitamin C: 32 mg. In addition, a combination of disciplines such as mathematics, computer science, plant science, biology, and statistics can be used. This combination of knowledge is known as Plant Computational Modeling (PCM), which uses the Growth Grammar Interactive Modeling Platform (GroIMP) with the Functional Structural Plant Modeling (FSPM) method. The virtual plant model was successfully built, the results were divided into two parts, such as single plant and multi-plant. Plant computational modeling and DSM can help deal with agricultural problems. By using a plant dataset, the GroIMP-FSPM platform, and fuzzy logic, the model could help researchers in making a better decision based on BEP evaluation. The minimum numbers of plants cultivated were 650 plants in one harvest period in order to gain a desirable profit. We recommend to cultivate even more plants in one harvest period to gain even higher profits.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Okyza Maherdy Prabowo; Suhono Harso Supangkat; Eueung Mulyana; I Gusti

Bagus Baskara Nugraha

Comparative Analysis of Anomaly Classification Method for Flood Prediction in Smart City Platform

The term "smart city" refers to a city that addresses issues using information and communication technology. Through the utilization of this information technology, smart cities can become data producers as well as data consumers. All the data produced by the smart city is gathered onto a single data platform. The information that was gathered can be applied to the study of a variety of urban issues, including floods, which is one of them. The sensors used to forecast the weather can also be utilized to look for unusual patterns, which can help with flood prediction. This work presents a comparative analysis to evaluate which anomaly classification algorithm is the most effective in predicting flooding. For this investigation, we use data obtained from an actual weather radar installed in a city in Indonesia. In addition, we compared our findings to those of any other readily available datasets. Based on the results, we can choose several classification algorithm with the best selected evaluation metric

Session Title: Parallel Session 2-E

Chair: Mr. Aditya Maulana Hasymi

Authors: Ariska Fitriyana Ningrum; Agus Suharsono; Santi P Rahayu

Comparison Vector Autoregressive and Long Short Term Memory for forecasting Air Pollution Index In Jakarta

The Air Pollutant Index (API) is a number without units that describes the condition of ambient air quality at a particular location. The purpose of the API is to provide the convenience of uniformity of ambient air quality information to the public at a certain location and time. API monitoring is carried out based on meteorological data that affect ambient air concentrations. On the DKI Jakarta SILIKA website, there is no feature to see ISPU predictions even though this feature is useful for the community. The advantage of predicting ISPU is that the public can anticipate early related to air quality conditions that will occur, including air pollution. In the time series study, multivariate time series predictions were made on the correlated ISPU parameters. Conventional methods such as Vector Autoregressive. The VAR model is a development of the Autoregressive (AR) model where more than one endogenous variable is used in the VAR model. Artificial Intelligence forecasting methods such as Long Short-Term Memory can be used to forecast multivariate time series. The results showed that the LSTM model had the smallest RMSE value for the prediction of pm10, which was 15.038, and pm25, which was 15.437. Modeling for multivariate time series can be done with conventional methods such as VAR. However, in this study, a deep learning algorithm, namely Long short-term memory, was tested to solve multivariate time series cases.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Gunadi Emmanuel; Meyliana Meyliana; Achmad Hidayanto; Harjanto Prabowo

A Literature Review: Drug Supply Chain and Neural Networks

The drug supply chain is an important variable that will be asked when there is a shortage of drugs. The distribution and storage of drugs require accurate predictions to support the drug supply chain. Many methods have been studied to obtain a high level of prediction accuracy. One of the methods used is an artificial neural network to recognize the pattern of drug demand. It is important to find breakthroughs in artificial neural network technology to anticipate drug shortages. This study seeks to identify and find challenges from previous research in drug supply management and drug demand prediction by utilizing neural networks over the past five years. From the seven sources used, 34 articles were selected based on inclusion criteria and keyword searches according to Kitchenham's systematic review methodology. The discussion areas of the selected articles are 29% in the Logistics and Inventory area, 20% Risk - Resilience, and 18% for Drug supply chain planning which is a description of the research development area. Integrated development provides room for the use of neural networks in these three correlated areas. The model of implementing the neural network in maintaining the continuity of drug shortages is always associated with the policies taken by the drug supply chain management in hospital pharmacies to anticipate drug shortages.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Imaduddin Farih; Dedy Dwi Prastyo

Forecasting Electricity Consumption Based On Economics And Social Indicators Using VAR Model With Exogenous Variable: Evidence From East Java Province

Economic conditions are very important to get attention. Economic growth is one indicator of community welfare in a region. Indonesia is an archipelagic country with 34 provinces, where each province has different social, cultural, and geographical conditions, so country-level economic conditions have not been able to fully describe the economic conditions in each region. One of the region's economic indicators is Gross Regional Domestic Income (GRDP). In addition, other factors are considered to affect economic indicators, such as the total population in the area and electrical consumption. Of course, it needs to be analyzed to obtain knowledge regarding the relationship between these variables. Modeling for analysis is done through a combination of statistical techniques and economic theory. Time series data used as material analysis from 1991 to 2021. In this study, multivariate time series analysis was used with the Vector Autoregressive (VAR) model through several testing stages such as stationarity, cointegration, residual, causality, and others to obtain the form of optimal models. From the analysis process that has been carried out, the results show that the growth of electricity consumption influences the growth of GRDP but not vice versa (unidirectional causality). This shows that policies related to the availability of electrical energy and the use of electrical energy will be able to have a positive influence on GRDP growth. In addition, the model produced in this study can be used to forecast GRDP growth and electricity consumption which the government and related parties can use in planning economic policies and supplying electricity.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Elfandry Bayunanda; Ema Utami; Dhani Ariatmanto

Facial Expression Classification Analysis Using Facial Images Based On Resnet-50V2

Emotion is one of the ways to express feelings, it can be shown through facial expressions or body movements. One of the easiest ways to tell someone's emotions is by looking at their facial expressions. But to detect emotions on human faces using computers and get high accuracy results is a challenge for computers to do. Facial emotional expression works with color segments and facial points that form patterns. Facial emotions work to describe the condition of the sender of the message to the recipient of the message. Emotions have a role as a supporting indicator in communicating in addition to the intonation of speech. The purpose of this research is to classify human emotions using Convolutional Neural Network (CNN) with ResNet-50v2 arc

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Diana Purwitasari; Safitri Juanita; I Ketut Pumama; Muhammad Raihan;

Mauridhi Hery Purnomo

Identification Semantic Text of Indonesian Medical Terms from Question-Answer Data

The increasing distribution of health information on the internet impacts the search process, which is increasingly complex due to many semantic words. This study examines the process of semantic text, especially in medical terms, using a collection of doctor's answer texts stored in an online health consulting service provider in Indonesia. Then we selected 108 pairs of medical terms in Indonesian based on a collection of doctor texts annotated by the medical team with biomedical NER, with 60 pairs of similar words and 48 pairs of dissimilar words. Then we process the dataset with a semantic text model using a Word Embedding approach named FastText and BioWordVec. The BioWordVec model is divided into 2 approaches: BioWordVec using Indonesia dataset. Meanwhile, BioWordVec-2 uses the process of translating the dataset into English. This study contributes to finding an automatic semantic text detection tool using the Word Embedding approach and proposes the best model to identify semantic text in pairs of similar Indonesian medical terms. We compared the performance of 3 Word Embedding models (FastText, BioWordVec, and BioWordVec-2) using accuracy, specificity, sensitivity, and AUC methods. The results show that the BioWordVec-2 model performs better than other models' identifying similar pairs of Indonesian medical terms.

Session Title: Parallel Session 2-J

Chair: Mrs. Bety Wulan Sari

Authors: Umme Hani Irin; Sajib Barua; Md Minhajul Azmir; Tasnuva Hassan; Dewan Mohammed Rashid

Process Variation's Effect on various threshold Voltage assignments in 6T SRAMs and their corresponding Layout Designs in 12nm FinFET Technology

This paper gives an overview of SRAM design requirements and optimization methodologies for different threshold voltage devices. We look into how different SRAM read and write design options are impacted by the threshold voltage (Vt) changes brought on by process-voltage-temperature (PVT) variations. We investigated several approaches to achieve reliable threshold functioning. Additionally emphasized how different SRAM designs are impacted by process modifications. Here, nine different types of SRAM bit cells are analyzed for various threshold parameters to provide the optimal bit cell selection. Performance for read and write operations as well as power consumption are compared between these architectures. All simulations were performed using 12nm CMOS technology, and Cadence Tool was used to develop these designs. To reduce leakage current without compromising performance, it has been observed that higher-Vt devices in cross-coupled latches and lower-Vt devices in access transistors are favored. In terms of read and write performance as well as power consumption, this article analyzes the performance of nine different kinds of SRAM bit-cells.

Session Title: Parallel Session 2-A

Chair: Dr. Tonny Hidayat

Authors: Dian Nova Kusuma Hardani; Hanung Adi Nugroho; Igi Ardiyanto

An Automatic Brain Tumor Segmentation Using 3D Residual U-Net

A brain tumor is a group of abnormal neuronal cells that can spread and modify brain structure. Brain tumors are one of the most devastating disorders ever identified. Appropriate diagnostic and surgical planning for brain tumor patients increases survival rates and treatment options. Precise brain tumor segmentation determines surgical site and diagnosis. However, proper segmentation of brain tumors is difficult due to the diverse forms and appearances of brain tumors. This study provides a method for segmenting subregions of brain tumors using a ResU-Net model. The proposed model successfully combines encoding residual blocks using the identity mapping part of the U-Net model to enhance the learning process. It is meant to improve the comprehensive training method and resolve the gradients issue. Using the BraTS 2020 benchmark dataset, the proposed model was assessed. The results proved the superiority of the proposed technique, with Whole Tumor, Tumor Core, and Enhancing Tumor earning dice scores of 0.914, 0.903, and 0.882, respectively.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Yusril Bagas Panji Pamukti; Majid Rahardi

Sentiment Analysis of Bandung Tourist Destination Using Support Vector Machine and Naïve Bayes Algorithm

Bandung is the capital of West Java, also known as a famous tourist destination. Many places have been visited by many tourists. After their visit, they usually write their opinions about the place they visited on their favorite social network. People's opinions towards a particular object can contain any emotion, both positive emotion, and negative emotion. One of favourite social networks right now is Google Maps. Google Maps is a navigation system developed by Google. Google Maps reviews contain texts, images, and ratings. Sentiment analysis is a process that analyzes people's opinions of the entity from the text pattern. Sentiment Analysis classifies an opinion into positive or negative sentiment using the Sentiment Analysis System. This study uses the Support Vector Machine and Naïve Bayes methods to classify people's opinions. The results show that the Support Vector Machine has a higher accuracy of 90.31% and 77.20% for Naive Bayes.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Yuyu Wahyu; Riyani Jana Yanti; Suisbiyanto Prasetya; B. Berlian Surya Wicaksana; Bagus Edy Sukoco; Fildha Ridhia; Aloysius Adya Pramudita

24 GHz FMCW Radar for Non-Contact Respiratory Detection

Non-contact measurement of human vital sign such as respiration and heartbeat is more preferable conducted to maintain the patient comfort and hygienic aspect in using the device. The non-contact measurement device of vital signs using Frequency Modulated Continuous Wave (FMCW) radar has been developed. The phase detection concept has been elaborated in improving the capability of FMCW to detect the small displacement for a non-contact vital sign. Laboratory experimental has performed and the results show that the developed 24 GHz FMCW radar can generate breathing patterns based on phase differences.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Ainul Yaqin; Majid Rahardi; Ferian Fauzi Abdulloh; Kusnawi Kusnawi; Slamet Budiprayitno; Siti Fatonah

The Prediction of COVID-19 Pandemic Situation in Indonesia Using SVR and SIR Algorithm

The COVID-19 epidemic, which initially surfaced at the end of 2019, has since expanded to every corner of the globe and has had profound impact on all facets of human existence. This case started to emerge in Indonesia in the end of February 2020, and up until this point, there has been a spike in new cases. Researchers have run a number of models and projections for COVID-19 cases in Indonesia, but the results are not yet entirely reliable. Predictions produced at the national level must take into account these variations in patterns because this is likely related to the distinct patterns in each region. In this study, the prediction process will be conducted cases COVID-19 by using the SVR algorithm and mathematical models to predict reproduction numbers. The modeling is done based on the SIR model whose parameters are estimated based on the data. Testing result by using 3 kernels is different on each test, prediction of data cases the level of mistake room are by using Kernel ' RBF ' with a value of C = 1E3 and gamma = 0.1 with the value of MAPE and MSE respectively are 4.5% and 4.2

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Binu A

A Performance and Power Characterization study of Memoization and Tabulation methods in Graph Neural Networks by assessing Dynamic Programming Workloads

Machine learning solutions for daily life using the ubiquitous computing environment require new efforts to improve software designs' energy efficiency without affecting performance. Recent advances in
graph neural networks have become a game-changing method in machine learning in Ubiquitous systems. Graph neural network considers being good in certain Ubiquitous systems learning use-cases to solve reasoning jobs. At times, graph neural networks are related to align with dynamic programming approach, a frequently used method to solve problems observable from nature.Dynamic programming is a flexible way to handle several sequential choices in uncertain conditions. This method aims to quantify acceptable rules for resolution that decide the best possible decision.
This paper presents a research direction to explore the possibility of adopting Memoization and Tabulation methods used in Dynamic Programming Workloads for optimizing performance and power consumption of ubiquitous computation in graph neural networks. As a proof of concept, we perform experiments on selected dynamic programming problems where the computation resembles graph neural network. The findings shows the practical feasibility of adopting dynamic programming improvement methods with algorithmic optimization in graph neural networks.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Fariz Ardin Adhiyaksa; Nanik Suciati

The Impact of Keypoints Normalization on SIBI Recognition using Modified Shift-GCN

Sign language is a form of non-verbal communication usually used by someone who is speech impaired or deaf to communicate with others. There have been many efforts to develop sign language recognition. However, the dataset is mainly limited to images containing the hand area with static poses. In a previous study, Modified Shift-Graph Convolutional Network (Modified Shift-GCN) performed well on American Sign Language Recognition (ASL) with a relatively simple graph dataset without tracking and normalization. In this study, we explore the implementation of Modified Shift-GCN to recognize the Indonesian Sign Language (SIBI) on a more complex graph dataset combining the hand and body graphs with dynamic poses. We investigate the effect of key-point tracking and normalization on the performance of the Modified Shift-GCN on sign language recognition. The experiments using 10-folds cross-validation show that the normalization yield an average accuracy of 97.9%, superior to that without normalization with an average accuracy of 55.3%.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Hoang-Kha Huynh; Hoang-Anh Pham

HEAT Routing Algorithm for Multi-hop Communication in IoT-enabled LoRa-based Wireless Mesh Networks

There may be many routing algorithms that could be employed in a wireless mesh network. Each algorithm has its own advantages and disadvantages. While proactive routing algorithms can quickly provide up-to-date routing information which helps reduce the routing latency, reactive routing algorithms help reduce routing overhead but instead increase the routing time. On the other hand, some routing algorithms try to provide end-to-end communications despite the high routing overhead and low scalability but some others are designed for the ease of scaling up without providing end-to-end communications. This paper presents a revised HEAT routing algorithm for multi-hop communication in LoRa-based wireless mesh networks expected to provide higher scalability for IoT-based applications. Both software and hardware are also implemented for performance investigation.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Taufik F. Abidin; Zaki Fuadi; Gandhi Rifal

Predicting Missing Values of Well Logs and Classifying Lithology using Machine Learning Algorithms

Data acquisition through drilling activities in a well in the upstream oil and gas industry requires large costs. In planning the drilling activities, it is necessary to consider the technical and cost aspects. This study successfully predicted the value of the DT curve using the Gradient Boosting Regressor method on well log data with parameters max depth=10 and n_estimators=1000. The MSE value of the predicted DT curve for the X01 well-log data is 1.057887, and the Y08 well-log data is 1.091699. The relatively small MSE value indicates that the predicted value of the DT curve is close to the actual value. Using the Norwegian dataset, this study also successfully compared several machine learning models in determining lithology categories. The results show that the Random Forest model has the best F1 value of 0.941, and the Decision Tree has the worst performance with an F1 value of 0.906.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Wildan Azka Fillah; Diana Purwitasari

Prediction of Water Quality Index using Deep Learning in Mining Company

The quality of mine water produced by the mining process at the mining company has an Internet-of-things-based measuring tool. The quality of mine water is a standard that must be met by the company to the regulator, in this case the government, so that the quality of mine water is maintained. From the perspective of environmental maintenance, it is necessary to apply lime so that mining water
can be carried out and can meet the specified standards. The impact of passing the quality standard is the temporary suspension of mining. And the maintenance process that is currently being carried out is still a reactive action.
An effective process for implementing mine water quality maintenance planning by predicting mine water quality based on historical water quality data. The data that has been obtained is time series data that is obtained every thirty minutes in some areas in the company. Forecasting using ARIMA methods has been used for many years. In recent years, artificial intelligence techniques such as neural networks and machine learning have been developed for time series analysis. Recently, artificial neural networks (ANN) and repetitive neural networks (RNN) have shown more accurate prediction results than traditional prediction methods. Long Short Term Memory (LSTM) is an RNN model that uses past data (long term) to predict current data (short term).
The results of this research are predictions of water quality using ARIMA, SVR, and LSTM. It shown that LSTM algorithm gave the best result with lower error than ARIMA. This result can be used by related company to make preventive maintenance for mining water, so that the company will not violate the rules that have been determined.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Muhamad Fathurahman; Chandra Utomo; Irfan Wahyudi; Samsuridjal Djauzi; Gerhard Reinaldi Situmorang; Putu Angga Risky Raharja; Kevin Yonathan; Budi Santoso Santoso; Arry Rodjani

Cloud-Based Architecture for Early Detection and Postoperative Monitoring of Hypospadias Patient in Indonesia

Covid-19 Epidemic has significantly changed the way of hypospadias patient is delivered to healthcare services, particularly after hypospadias repairs (post-operative care). Some studies reported that using telemedicine scheme by sending digital documentation of such as images and videos through cell phone, the assessment of post-operative monitoring of hypospadias patient can be done. However, this approach raises various concerns to be handled, such as managing digital documentation of hypospadias patient, analyzing the data, and the security of individual's health information. This study proposes a design of cloud-based architecture for early detection and post-operative monitoring of hypospadias patient to address the concerns above.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Mohamad Atok; Prilyandari Dina Saputri; Pratnya Oktaviana

Time Series Forecasting for Double Seasonal Event: A Simulation Study Approach

The objective of this study is to compute the model for forecasting the data which contain a non-multiplicative double seasonal pattern. This study analyzes the food material demand simulated data which contains two types of seasonal, i.e. a weekly Gregorian calendar with 7 days in each cycle and a weekly Javanese calendar with 5 days in each cycle. Two methods on the simulation dataset are presented. In the first method, the time series regression is combined with the seasonal ARIMA model. The second method applied the two-stage seasonal ARIMA with the different orders of seasonal. These two methods are aimed to remove the different seasonal cycles successively. As the result, the time series regression as preprocessing combined with seasonal ARIMA provides better accuracy compared to the double seasonal ARIMA model, based on the value of RMSE and MAE. This implied that time series regression is able to conceive the pattern of the different seasonal cycles.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Sitti Amallia Suhandini; Asep Suhendi; Linahtadiya Andiani; Shindi Marlina Oktaviani; Inka Purnama Sari

Priority Based Automatic Electrical Load Control for the Prevention of Electrical Overload in Household Installations

Electrical energy plays a significant role in supporting human activities, one of which is in the household sector where electricity demand is relatively high. One of the problems that occur in households is the MCB trip due to overload. An electrical monitoring and automation system is needed for household utilities to monitor the use of electrical energy and prevent MCB trips. The monitoring system utilizes the PZEM004T module and is integrated with IoT so that energy consumption monitoring is carried out in real-time. Electricity costs are also calculated. Load trip automation is prioritized based on current control to prevent overload. The lowest priority load will trip to prevent MCB trips and limit energy consumption. The measurement of the amount of electricity by PZEM004T displayed on the IoT platform has a current error of 4.4%, respectively. In addition, data transmission traffic is considered so that the data displayed is in accordance with the actual situation with delay, jitter, packet loss, and throughput obtained at 103.4 ms, 103.4 ms, 0%, and 61.06 kbps, respectively. The load trip is precise in deciding the lowest priority load to the higher priority load until a current is less than equal to 5 A.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Nur Sahid; Kusrini Kusrini; Anggit Dwi Hartanto

Implementation of Face Emotion Detection In Classroom Using Convolutional Neural Network

Emotion detection is one of the most complex and challenging in computer visuals because of the significant variation caused by changes in facial appearance, lighting, and facial expressions. The results of tests conducted by Amanullah et al. on the classification of emotions using the Convolutional Neural Network showed an accuracy value of 81.92% for training and 81.69% for testing but still had a fairly large error rate of 75.60% based on the validation loss results. In this study, the research carried out is to learn more about detecting human emotions based on facial expressions using the convolutional neural network method, where the data used for the data training process is in the form of image samples from the FER 2013 dataset. The convolutional neural network method has sub-methods in object detection orientation called the Haar Cascade Classifier method. In the face detection stage, faces are detected through images captured by the camera in real-time, and the next step is the emotion classification stage which implements the concept of a convolutional neural network algorithm to classify the input image into seven categories of emotions that were previously stored in the FER2013 dataset. The study was conducted with three camera positions, namely right in front of the students and the left and right corners of the front of the class. The parameters used to see facial recognition results are accuracy, precision, and recall. The camera used is a camera with HD quality. This research is expected to be used by teachers to detect students' emotional conditions during class learning.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Wahyuning Hanifah Aprillia; Andry Alamsyah

Comparison of Predictions Foreign Currency Exchange Rates (USD, JPY, EUR, GBP, CHF, CAD) to Rupiah (IDR) using Artificial Neural Network and Long Short-Term Memory

A country's currency exchange rate always moves, fluctuating erratically. Many researchers have tried to predict currency exchange rate movements to make informed decisions. We aim to determine the price prediction of foreign exchange rates against the Rupiah (IDR) and determine whether there are significant differences between the accuracy values of Artificial Neural Network (ANN) and Long Short-Term Memory (LSTM) methods for predicting exchange rates. It helps solve the problem of the instability of currency exchange rates over time. In this study, the steps began with collecting the data to use. Furthermore, transforming data and pre-processing data followed by performing data analytics using the ANN and LSTM. We compare the two methods to obtain the best result by measuring Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE) values. We predict six foreign exchange rates (USD, JPY, EUR, GBP, CHF, and CAD) against Rupiah exchange rates (IDR) using historical data for 25 years, from January 01, 1996, to December 31, 2021, to get the best parameter based on the RMSE and MAPE evaluation results. From the parameters result, exchange rate prediction using LSTM gave the best RMSE and MAPE results.

Session Title: Parallel Session 2-B

Chair: Mr. Yoga Pristyanto

Authors: Atina Dwi Palupi; Riky Aditya Nazir; Tisky Anisha Azwen; Boma Rizkiko; Pinka Prabangkara

Government Process Re-engineering in The Implementation of SPBE (Design and Measurement): A Case Study of Independent Intensive Learning Information System for Construction, Ministry of Public Works

In order to improve the life quality of citizen, the Indonesian Government accelerates infrastructure development, one of which is build the capacity of the construction workforce (nakerkons) through training. The main problems of the current state of the national Nakerkons include: the vast territory of Indonesia with the condition of the workers who are spread unevenly makes it difficult for the workers to get access to self-capacity development; Government budget limitations mean that the number of training activities in the construction sector cannot be carried out comprehensively.

Based on these conditions, the government needs to innovate in the context of SPBE in order to increase the capacity of the national Nakerkons. This is realized by building an information system, named SIBIMA-Kontruksi. This innovation was carried out on conventional training into ICT-based independent training and the provision of Knowledge Management aimed at expanding access to the provision of knowledge in the construction sector for the construction service community.

Related to this, this study aims to deliver the Design of Government Process Re-engineering and measurement. The data were collected by observed the condition of the existing business process. This study has been conducted by using Consolidated Methodology. The results of the Value Added Analysis can be seen that percentage of VAR increased from 78.60 % in the as-is business process to 80% in the to-be business process. In addition, the measurement of the Process Complexity Analysis (PCA) of the as-is business process is 1.512 whereas PCA of the to-be business process is 660. It indicates that to-be business process is more efficient than previous business process.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Abdullah Faqih Septiyanto; Yuni Cahyaningsih; Riyanarto Sarno; Fadlilatul Taufany; Siti Halimah Larekeng; Kelly Rossa Sungkono; Karlina Syahruddin; Endang Gati Lestari; Sholiq Sholiq

An Improved Method for Prioritizing Polymerase Chain Reaction (PCR) Primer Design in Sanger Sequencing

Designing primers is a challenge for researchers to design primers that can amplify sequence genes. Primer design has several parameters considered, namely primer length, thermal melting temperature (TM), and guanine-cytosine content (GC-content). Therefore, bioinformatics is needed to help design primers more informatively by showing the parameter values of the primer design. One of the programs used to design primers is Primer3Plus. Primer3Plus can create several primer designs. Thus, Primer3Plus requires an expert to choose a primer pair that fits with the primer length, TM, and GC content parameters. This research proposed an improvised method for prioritizing design primer pairs from the Primer3Plus results to obtain the most suitable primer pairs according to the specified parameters. Before being processed into Primer3Plus, the gene sequence is split into several sequences with a length of around 1000bp to suit Sanger Sequencing (SGS). Therefore, the primers designed from each sequence can amplify all parts of the gene sequence. In this research, the sequence gene used was the Sorghum bicolor phytochrome A (PHYA) gene from the National Center for Biotechnology Information (NCBI). Implementation using Python with the Biopython library. The results of this study prove that prioritizing primers can recommend the best primer pair based on primer length, TM, and GC content parameters with a product size of 900-1000bp for PCR and sequencing using SGS.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Abba Suganda Girsang

Optimized LightGCN for Music Recommendation Satisfaction

With the large amount of information available on the internet, recommendation tasks have grown to be more crucial than ever. Businesses that store digital media on the internet such as video streaming and music streaming platforms, benefit a lot from recommendation systems. A simple yet powerful recommendation system that can give better recommendation performance is always being sought after. Light Graph Convolution Network (LightGCN) is a simplified version of Graph Convolution Network (GCN) for collaborative filtering in recommendation systems. LightGCN architecture includes only the most essential part of GCN for collaborative filtering that is the neighborhood aggregation, it removes the feature transformation and nonlinear activation because both of them contribute little to no effect to the recommendations. The focus of this research is to optimize LightGCN by tuning the hyperparameters using exhaustive search (grid search). The optimized LightGCN model is able to outperform LightGCN by more than 140% in music recommendation

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Vivien Arief Wardhany; Subono Subono; Alfin Hidayat; Sari Wiji Utami; Dewi Setyaning Bastiana

Arduino Nano 33 BLE Sense Performance for Cough Detection by using NN Classifier

Coughing is the body's natural response to expelling substances and particles from the airways to prevent entry into the lower airways. As the advancement of Artificial intelligence technology has now applied in various fields. One of them is in the field of artificial health intelligence which is currently widely used to recognize various symptoms disease. In this research, a cough detection system will be designed and made by using cough sound data obtained by using Arduino 33 BLE Sense and Edge Impulse for development. Arduino Nano 33 BLE Sense consists of multiple built-in sensors such as 9-axis inertial, humidity, temperature, barometric, microphone, gesture, proximity, light color and light intensity sensors. The cough sound detected by the microphone of Arduino Nano 33 BLE Sense with 57 total of cough sound then processed for classification using machine learning edge impulse tools. The cough sample sounds are given 4 types of labels, namely cough (batuk), cough with noise (batuk bising), silence (hening), Noisy (bising) and the result of classification using neural network in Edge impluse are 73,6% for accuracy and 0.86 for loss.

Session Title: Parallel Session 2-F

Chair: Mr. Anggit Ferdita Nugraha

Authors: Hakan Sel; Metin Celik

Defining the Variables of a Remote Operation Monitoring Systems Onboard Unmanned Surface Vessels

Studies on the development of remote operation and maintenance tracking systems in USVs (Unmanned Surface Vessels) are becoming widespread. In this study, the variables are determined to conduct data acquisition as an initial stage of a statistical analysis to control on pH level of main engine cooling system onboard unmanned surface vessel. It is so critical to manage an advance statistical solution for this operational case. The numbers of 13 variables (i.e. RPM, exhaust temperature, oil pressure, etc.) are identified to construct an operational data framework. As a further research, the study will focus on collecting real-time data onboard USV.

Session Title: Parallel Session 2-C

Chair: Dr. Alva Hendi Muhammad

Authors: Anranur Uwaisy Marchiningrum; Albarda Albarda

Digital Twin for Predictive Maintenance of Palm Oil Processing Machines

When industrial equipment in the palm oil processing process is damaged, the problem that often occurs is machine downtime which results in the cessation of the palm oil processing process. The turbine engine is one of the machines that often suffers damage which has a major impact on the cessation of the palm oil processing process. The application of predictive maintenance using digital twins will be able to reduce and overcome the risk of force downtime in the event of damage to the machine. The digital twin concept focuses on the characteristics of a turbine engine so that it can represent physical objects in digital form. Meanwhile, predictive maintenance focuses on parameters that affect turbine engine damage, as well as data obtained from sensors, such as temperature data, capacity, and normal engine time to critical engine time. The application of digital twins for predictive maintenance of turbine engines in palm oil processing requires five stages, namely, building digital twins, acquiring and exploring data, pre-processing training data, developing predictive models, and implementing algorithms. After applying the digital twin for predictive maintenance of turbine engines, researchers can obtain turbine engine maintenance times and know the condition of the engine in real time.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Mhd Arief Hasan; Riyanarto Sarno; M Syauqi Hanif Ardani

Improvement Of E-Nose Sensor Signal Using Mva, Fft, Dwt Methods On Pineapple Fruit Maturity

In this study, we built an Electronic Nose to detect pineapple ripeness. We made a prototype E-Nose in a wooden crate. Inside the box, we built the E-Nose using 9 MQ sensor circuits connected to the Arduino Microcontroller. Then in the crate we give an object, namely a pineapple with three maturity levels (Ripe, Half Ripe and Young) each weighing 1kg placed in three different positions (05cm, 20cm and 35cm) from the position of the sensor array (E-nose). We convert the signal output results into ppm units. We compared the value of each fruit signal based on the level of ripeness and distance using E-Nose. We use several signal processing methods (wavelets) for signal processing. Then we make improvements to the signal generated using wavelet. The wavelet methods used here are Moving Average, Fast Fourier Transform (FFT) and Discrete Wavelet Transform (DWT).

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Handy Wicaksono; Indar Sugiarto; Petrus Santoso; Glenn Ricardo; Jason Halim

Towards Autonomous Robot Application and Human Pose Detection for Elders Monitoring

Some elders prefer to stay at home compared to a nursing home. They can be assisted by several technologies such as a robot, smart home, and smartwatch for their safety and comfort. When an elder has an abnormal vital sign or abnormal pose, a notification email can be sent to the caregiver, and a mobile robot can move autonomously toward the elder. This paper describes the experimental results of the navigation of an autonomous mobile robot, the human pose detection by a camera, and the heart rate reading by a smartwatch. The integration concept of those subsystems for elders monitoring, utilizing MQTT protocol, is also explained.

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Subono Subono; Alfin Hidayat; Vivien Arief Wardhany; Ika Noer Syamsiana

Doopler Ultrasound Sense Performance for Cardiotography (CTG) Fetal Baby Heartbeat Detector Using Arduino Mega Pro Mini

the limitations of data examination equipment for pregnant women at risk, health workers supporting the program are limited and lack high mobility, so that the purpose of the program, namely early detection of patients with high risk pregnant women, is deemed less effective. The solution in the form of research is the creation of an Internet of Things-based Mobile CTG Kit innovation to measure fetal heart rate, fetal activity, and uterine contractions. So that it will help medical personnel in determining the right action for pregnant women at risk during the pregnancy process until birth. In the use of CTG devices using Doppler Ultrasound and arduino, the measurement results obtained from biomedical signals with an error factor of 4%

Session Title: Parallel Session 2-K

Chair: Dr. Dhani Ariatmanto

Authors: Nur Uddin; Surya Gunanta Tarigan; Khalid Abdul Mannan

A Low-Cost IoT System for Monitoring Air Quality in Indoor Working Places

This paper presents a development of internet of things (IoT)-based indoor air quality monitoring system. The system is purposed to monitor quality of air in offices. It is to assure the health and safety of the working place which is especially being a big concern during the COVID-19 pandemic. Implementing the IoT concept allows to do monitoring from anywhere at anytime. A prototype of the monitoring system is built using three major components, such as an air quality sensor (BME680), a microcontroller (NodeMCU ESP-12), and an IoT cloud platform (ThingSpeak). The experimental test result shows that system was able to monitor the air temperature, air humidity, air pressure, IAQ (indoor air quality) index, carbon dioxide quantity, and VOC (volatile organic compound). These data is presented real-time in a web application and accessible from anywhere by using computers or smartphones.

A Hybrid Evaluation Index Approach in Optimizing Single Tuition Fee Cluster Validity

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***Abstract*— The grouping of the socio-economic level of new students at the time of registration at public universities is a problem faced by all state universities. Identifying the right group will have an impact on the students and the university. The quality of the results of a valid grouping will give a sense of fairness to the parents of students in paying tuition fees. On the other hand, the university also expects that the results of a valid grouping will contribute to optimal revenue. This study aims to evaluate the cluster structure of a single tuition fee at the State University of Surabaya. The existing cluster structure is compared with the results of grouping using nine clustering methods, namely K-Mean, Hierarchical, BIRCH, DBSCAN, Mini Batch K-Mean, Mean Shift, OPTICS, Spectral Clustering, and Mixture Gaussian. The proposed evaluation method is a combination of three evaluation concepts, namely internal validity (Silhouette-Index), external validity (Rand Index), and the percentage conformity value to the expected income factor (Revenue-Index). These three indicators are then calculated as the average value for each clustering method as Hybrid-Index. The highest Hybrid-Index is shown by the Mini Batch K-Mean algorithm, with an average value of 0.6420, so the Mini Batch K-Mean algorithm can be recommended as a method for grouping single tuition fees.**

Keywords — clustering, clustering validity, hybrid evaluation, rand index, silhouette index

I. INTRODUCTION

The determination of a single tuition group for both students and universities is very important. An evaluation of the grouping structure that has been carried out by the State University of Surabaya will be evaluated in this study. By looking at the results of the internal validity of the existing clustering structure, further improvements will be made to the cluster data structure through machine learning methods. The machine learning method used is the unsupervised learning method. Research for single tuition fees (STF) based on unsupervised learning using Fuzzy C-Means and Simple Additive Weighting methods [1],[2]. Several unsupervised methods, especially for clustering problems, namely K-Mean, Agglomerative or Hierarchical, BIRCH, DBSCAN, Mini Batch K-Mean, Mean Shift, OPTICS, Spectral and Mixture Gaussian will be implemented. The use of this method is possible because the library is already available in the Scikit Learn module.

The results of grouping with these algorithms are then evaluated using an internal validity index using the Silhouette index and an external validity index using the Rand Index. Several researchers who have conducted studies on comparison of the validity of clustering in recent years include Khairul [3] presents an analysis between external and internal cluster validity indices with similar finite index ranges for ten datasets. Hasna [4] and Joonas[5] also conducted experiments to evaluate many clustering validity indices. In addition, this study proposes a new evaluation indicator, namely the revenue function, that considers the number of members in each group and the cost weight of each group. This indicator is called the Revenue Index (R-Index). Furthermore, the three validity index values are totaled, and the average value is computed for each algorithm. The average value in this research is called the Hybrid Evaluation Index (HE-Index). It is expected that the highest HE-Index value will produce the most optimal cluster model.

II. RELATED WORKS

A. Clustering Algorithm

Clustering is an unsupervised learning method that is widely used in various fields. This algorithm aims to group data points based on their equations. In theory, data points that are in the same group should have similar properties or characteristics, while points that are in different groups should have very different properties or characteristics. Some algorithms for clustering problems that are commonly used can be explained as follows [6]:

1. K-Mean
   The advantage of this algorithm is that it is easy to learn and simple because basically this algorithm only calculates the distance of each data to the center point of the cluster. However, the K-Means clustering algorithm still has a weakness, it needs to determine the number of clusters first. K-Means algorithm also starts with a random selection of cluster centers and can generate different clusters when running data.
2. Hierarchical
   This method forms a hierarchy based on a certain level to resemble a tree structure. Thus, the grouping process is carried out in stages or stages. Usually, this method is used on data that is not too large, and the number of clusters to be formed is unknown. In the hierarchical method, there are two grouping strategies: agglomerative and divisive.
3. BIRCH
   BIRCH stands for Balanced Iterative Reducing and Clustering using Hierarchy is an integrated hierarchical grouping algorithm. BIRCH introduces two concepts, namely feature clustering (CF) and clustering feature tree (CF tree) which are used to describe cluster summaries [7].
4. DBSCAN
   Density-Based Spatial Clustering of Applications with Noise or abbreviated as DBSCAN is a density-based clustering algorithm similar to mean-shift only slightly better than the previous algorithm. DBSCAN has several advantages, including not needing to determine the

number of clusters at the beginning, being able to identify outliers as noise, and forming clusters of various sizes and shapes. The disadvantage of this algorithm is that it does not work well when the clusters have varying densities due to the setting of distance thresholds and minimum points [8],[9].

5. Mini Batch K-Mean
   When clustering very large data sets, this algorithm, a variant of the K-means algorithm, may be used instead of the K-means algorithm. Because it does not cycle over the complete data set, it occasionally outperforms the traditional K-means algorithm when working with huge data sets. The key benefit of adopting the mini-batch K-means technique is that it makes locating clusters less computationally expensive. Although you might choose to use the K-means technique, you should employ the mini-batch method when working with huge data sets.
6. Mean Shift
   The means shift clustering algorithm is a sliding-window-based algorithm that will identify dense point areas. This clustering algorithm is a centroid-based algorithm, so the purpose of this algorithm is to find the center point of each cluster. Unlike the previous algorithm, this algorithm does not need to select the number of clusters because this algorithm can automatically find the optimal number of clusters.
7. OPTICS
   In general, the way the OPTICS algorithm works is the same as the DBSCAN algorithm. The parameters that are owned are the same, namely the epsilon parameter (eps) and the minimum points parameter. However, in the OPTICS algorithm, there are two new terms that were not previously available in the DBSCAN algorithm, namely core distance and reachability distance.
8. Spectral
   The Spectral Clustering algorithm uses Laplacian Matrix calculations. The calculation of the Eigen Vector is obtained from the Laplacian Matrix (L), and the data grouping is done based on the threshold process on the Eigen Vector with the second largest Eigen Value [10],[11], [12],[13].
9. Mixture Gaussian
   This algorithm has two main advantages, first is that it is much more flexible in terms of covariance. Second, using probability so that it can have several clusters per data point. So, if a data point is in the middle of two overlapping clusters, you can easily identify its class by comparing the percentages.

B. Evaluation Performance

In general, there are three basic criteria to investigate the validity of the results of clustering, namely external criteria, internal criteria, and relative criteria [14]. The first two approaches involve statistical and computational testing, while the third, namely relative criteria, does not involve statistical testing. The basic concept of measuring clustering validity is to find out whether the data comes from a random distribution or not [15].

1. Internal Validity
   The purpose of the internal criteria is to evaluate the clustering structure generated by a clustering algorithm through the number and features inherited from the data set. To apply internal criteria, there are two situations: (a) hierarchical clustering scheme (hierarchical clustering method) and (b) non-hierarchical clustering scheme (partition-based/central point-based method). The idea for validating the hierarchical clustering scheme is to use the so-called cophenetic matrix $\mathbf{T}_c$ and then use the cophenetic correlation coefficient to measure the degree of similarity between $\mathbf{T}_c$ and the proximity matrix $\mathbf{T}$. The cophenetic matrix $\mathbf{T}_c$ is defined such that the elements $\mathbf{T}_c(i,j)$ represent the degree of closeness between two points X_i and X_j are found around the same cluster for the first time [16].
2. External Validity
   External validity criteria aim to measure how well the grouping results match previous knowledge about the data. It is assumed that prior information cannot be computed from $\mathbf{X}$. Perhaps the most used forms of external information are classes (categories) and class labels for objects associated with $\mathbf{X}$. This information is usually obtained through manual classification. So, in principle an external criterion is an index designed to measure the similarity between two partitions which only considers the distribution of points in different groups and is not used to measure the quality of this distribution[17] There are two approaches that can be taken, the first is to evaluate the resulting clustering structure of S, by comparing it with an independent partition of the $\mathbf{T}$ data that is constructed according to intuition or previous information about the clustering structure of the data. Then, the second approach is to compare the proximity matrix $\mathbf{T}$ with the partition matrix $\mathbf{T}$.

III. METHOD

The proposed methodological framework for this research can be described in Fig 1.

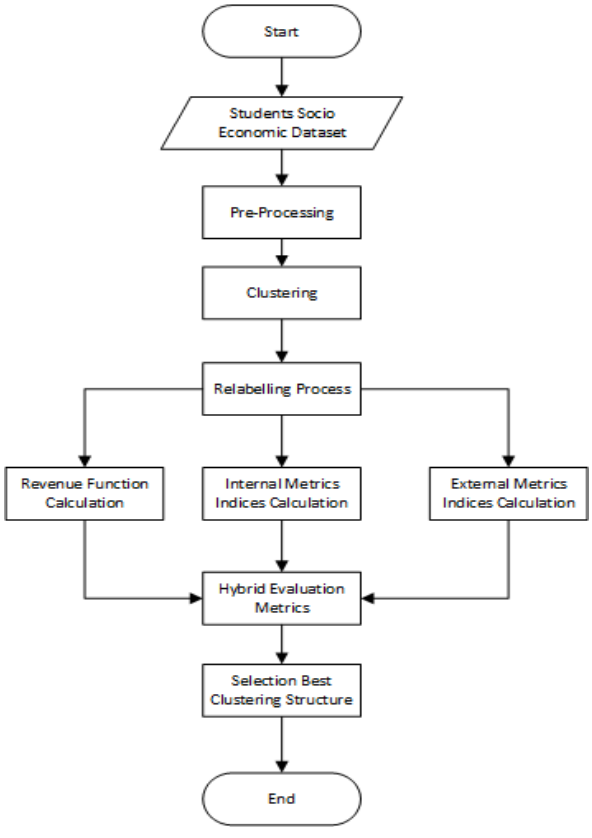

Fig. 1. The Proposed Method

The phase in this study is started with the preprocessing phase, modelling with clustering algorithms, relabeling process, and performance evaluation.

A. Dataset

The data used in this study is the socio-economic data of new students from 2017 to 2021 at the State University of Surabaya with a total of 15,875 rows. The number of groups of single tuition fees determined is 8 classes. The descriptive statistics of tuition fee at the State University of Surabaya according to Government Regulation of the Ministry of Research, Technology and Higher Education No. 22 of 2015 (in million) can be seen in Table I.

TABLE I. DESCRIPTIF STATISTICS OF SINGLE TUITION FEE (IN MILLION)

Statistics	K1	K2	K3	K4	K5	K6	K7	K8
MEAN	0.5	1	2.4	3.48	4.55	5.62	6.68	7.73
MINIMUM	0.5	1	2.4	3.12	3.84	4.56	5.28	6.00
MAKSIMUM	0.5	1	2.4	4.14	5.88	7.62	9.36	11.10
STDEV	0	0	0	3.08	6.16	9.33	12.46	15.70

B. Pre-Processing

Prior to the clustering process, the conversion process from categorical data to numeric data is carried out. This is because socio-economic data comes from student entry data through a registration system that has a categorical type. After becoming numerical data, then the process of normalization and dimension reduction is carried out using the principle component analysis (PCA) method.

C. Clustering

At this stage, the clustering process is carried out from the data that has been normalized and in the component variables. To facilitate visualization, clustering was carried out based on the first and second components of the PCA results. In this process, cluster modeling is carried out using 9 algorithms, namely the K-Mean, Agglomerative or Hierarchical, BIRCH, DBSCAN, Mini Batch K-Mean, Mean Shift, OPTICS, Spectral and Mixture Gaussian algorithms.

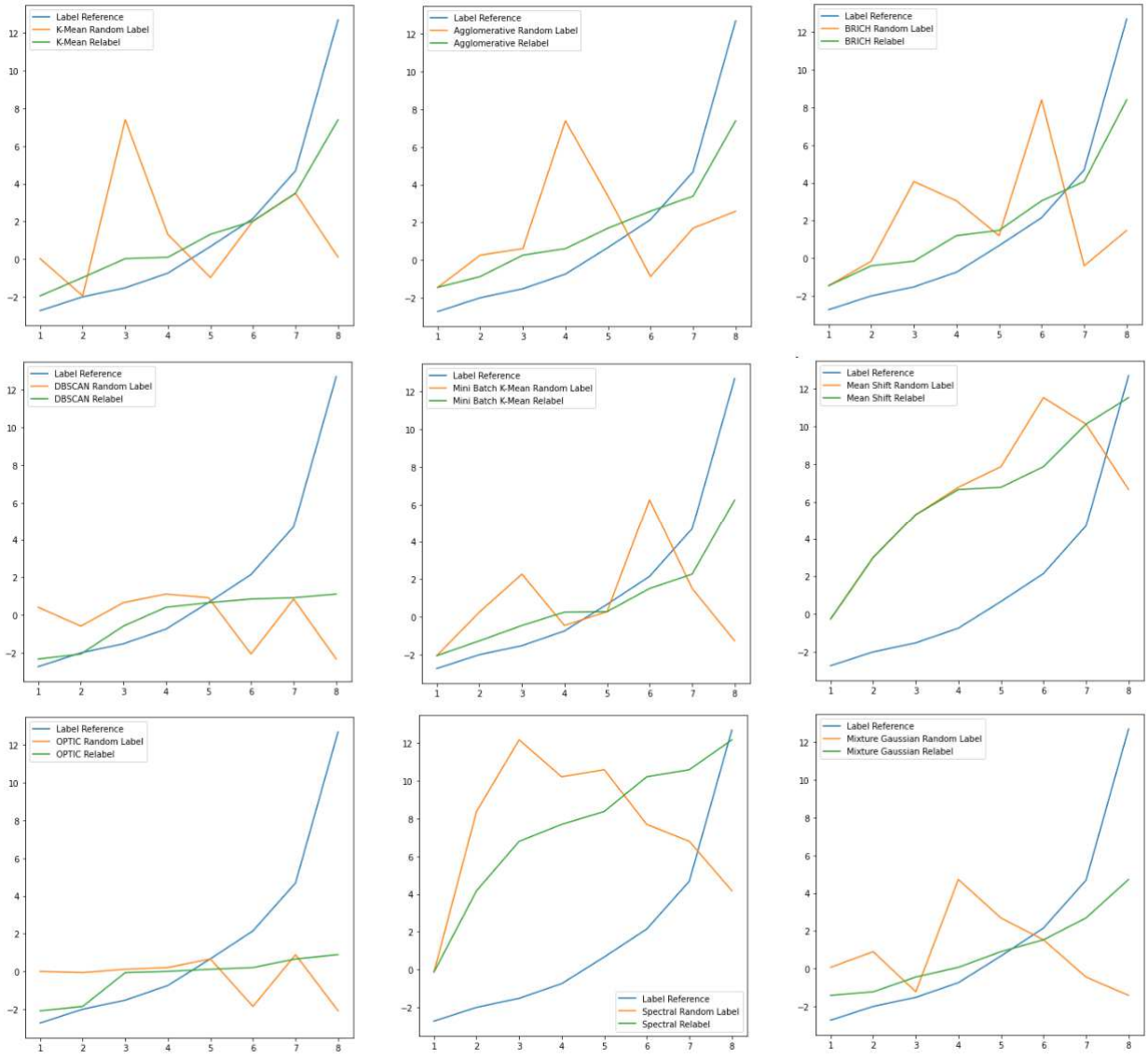

Fig 2. The Pattern Matching Between Reference Label and Random Label

D. Relabelling Cluster

The relabeling process is the stage of re-labeling the labeling results through a clustering algorithm. This stage is done because the label given by the cluster algorithm is random. Meanwhile, the determination of the label in the STF case study has an impact on income for the university and the burden of costs that must be incurred from the student side. Thus, this labeling process becomes important to give meaning to the labels generated from the algorithm. The method used in this study is to use the dominant variable in the first PCA component. The dominant variable in this component is the father's income, which shows an upward trend pattern as shown in Fig.2. This upward trend indicates that the higher the STF value, the greater the parent's income.

E. Proposed Performance Evaluation

This research proposes a hybrid method of evaluating clustering performance. The internal validity used is the silhouette index bye eq (1) [18], [19] and the external validity uses the Rand Index y eq (2).

$$Sill-index = \max_{k} \frac{1}{N} \sum_{i=1} \frac{b(i)-a(i)}{\max\{b(i),a(i)\}} \quad (1)$$

where,

$a(i) = d(i, \mu C_i)$ and $b(i) = \min_{C_j \neq C_i} d(i, C_j)$

While the equation of Rand-Index [20], [21] can be formulated as eq (2). It is a measure of the percentage of correct decisions.

$$Rand-index = \frac{TP+TN}{TP+FP+FN+TN} \quad (2)$$

In addition to the two validity indices, this study proposes a new measure called the Revenue (R) Index, where this revenue index measures the suitability of the revenue obtained from the clustering results with the existing revenue. Suppose the existing revenue is expressed by R, then the Revenue Index can be formulated by eq (3).

$$R-index = \frac{\sum_{i=1}^{k} in_i}{R} \times 100\% \quad (3)$$

Where i is STF group level and n_i is the number of members of the i-th STF group. Next, the Hybrid Evaluation HE) Index value will be calculated with the formulation as in equation (4)

$$HE-Index = \frac{Sill\text{-}Index+Rand\text{-}Index+R\text{-}Index}{3} \quad (4)$$

The interpretation of all the index values is that the higher the index value, the more valid the result of grouping the data. This means that each data point has been grouped into the right cluster.

IV. RESULTS AND DISCUSSION

In this section, the results of exploring the existing cluster structure will be explained through the results of internal validity checks using the Silhouette index value. The results of the internal validity measurement produce a value of -0.0274, which means that many data points fall into the wrong group. Visually, it can be seen in Fig. 3 how the to scatter data is based on the STF group.

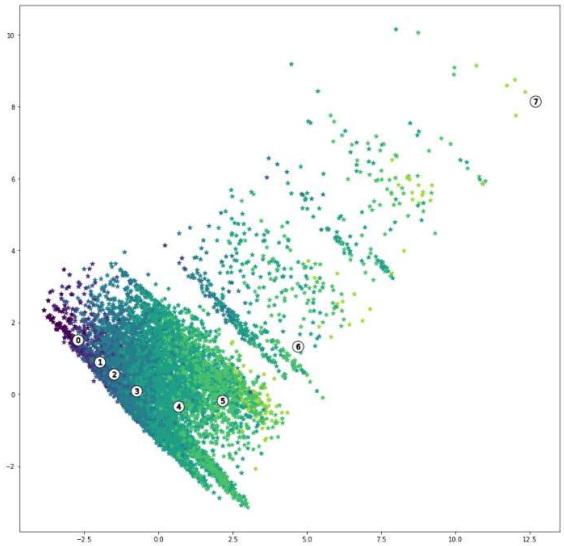

Fig. 3. Scatter of Existing Single Tuition Fee Cluster

In Fig.3, there is much overlap between groups, so the boundaries between one group and another are not visible. The existing data structure will be used as a baseline to find STF data groupings with a better structure. In this instance, the group's point density is higher, and the boundaries between groups are more precise. In Fig. 4, the highest Silhouette index value was obtained by clustering with the spectral algorithm. The next rank is followed by the results of Mean Shift and K-Mean, while the results of the BIRCH and Mini Batch K-Mean algorithms show that the Silhouette index values are not much different.

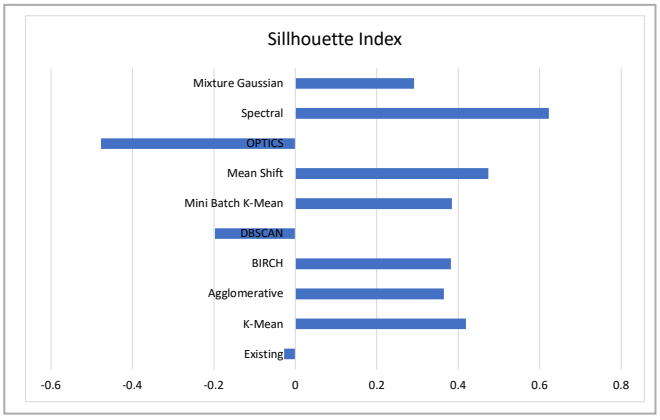

Fig. 4. Silhouette Index Existing Cluster vs Cluster based Algorithms

The silhouette index value is in the range of -1 to 1. Consider the case where the silhouette coefficient value is near to 1, suggesting improved data clustering. In contrast, if the silhouette coefficient is close to 0, the data clustering is deteriorating. The Rand-Index measurement in Table II shows that the results of clusters with centroids (K-Mean and Mini Batch) and hierarchies (Agglomerative and BIRCH) have a higher degree of similarity with the reference cluster.

TABLE II. VALIDITY SCORE FOR CLUSTERING ALGORITHMS

Clustering Algorithm	Silhouette Index	Rand Index	Revenue Index	Hybrid Evaluation Index
K-Mean	0.4191	0.6930	0.7318	0.6146*
Agglomerative	0.3646	0.6835	0.6488	0.5656
BIRCH	0.3815	0.6659	0.6430	0.5635
DBSCAN	-0.1970	0.5386	0.8265	0.3894
Mini Batch K-Mean	0.3842	0.6939	0.8478	0.6420*
Mean Shift	0.4737	0.3642	0.2593	0.3657
OPTIC	-0.4771	0.3414	0.9214	0.2619
Spectral	0.6223	0.3225	0.2360	0.3936
Mixture Gaussian	0.2911	0.6771	0.7796	0.5826

The Rand-Index value ranges from 0 to 1, where if the value is close to 1, the cluster results are more like the existing cluster. Scatter of clustering result can be shown in Fig.5.

Furthermore, when viewed from the distribution of the number of members of each clustering result multiplied by the weight of the cost factor to produce a revenue index, the OPTICS algorithm has the highest R-Index. By seeing that there is a considerable enough variation in the measurement results of each validity metric, a calculation is carried out that combines the three validities using equation (2). The proposed cluster performance evaluation formulation has found that the clustering algorithm using Mini Batch K-Mean gets the highest HE-Index value with a value of 0.6420. As with other cluster validity measures, the closer to a value of 1 the better the cluster structure. This value means that the clustering results have a reasonably homogeneous structure within the cluster, have a pretty good resemblance to the existing cluster, and are not too much different from the revenue value expected by the university.

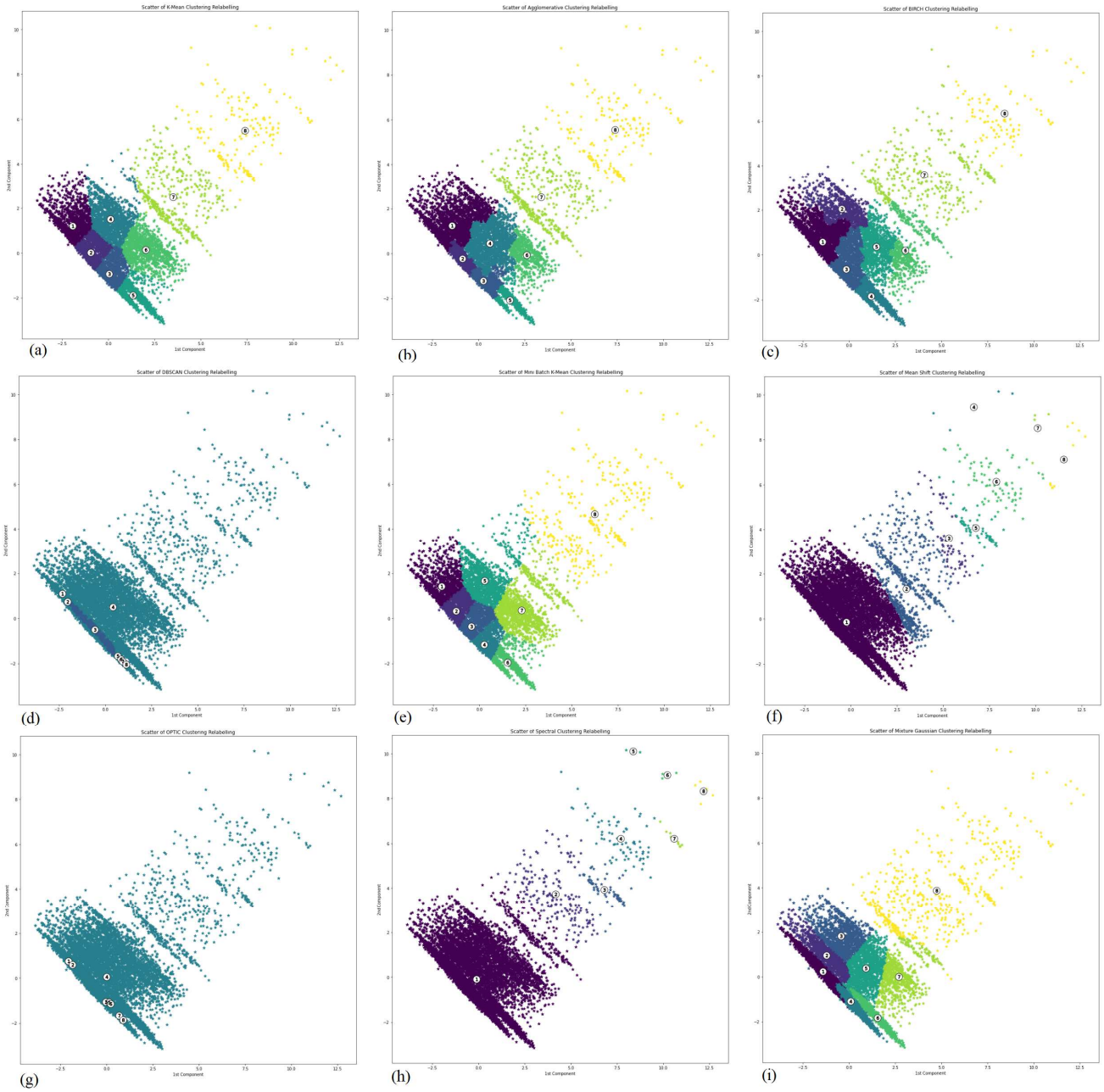

Fig. 5. Scatter Data of Clustering Algorithm

V. CONCLUSION

This study concludes that the proposed hybrid evaluation index can help provide recommendations in choosing a clustering algorithm method that can accommodate three indicators, namely the homogeneity indicator in the cluster (Silhouette Index), the cluster similarity indicator with the reference cluster (Rand Index) and the suitability indicator with the expected income (Revenue Index). Based on implementation of nine types of algorithms, it is found that the Mini Batch K-Mean algorithm is the most recommended for grouping single tuition fees on the socio-economic dataset of new students at the State University of Surabaya. The clustering results with the Mini Batch K-Mean algorithm get a Hybrid Evaluation Index value of 0.6420, which means that the three aspects of clustering validity indicators have an average value of more than 0.5 (close to 1).

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