

PROGRAM BOOK

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- 369 Dr. Zhongyang Yu (Henan University of Engineering, China)
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- 184 Dr. Sanjay Singh (Manipal Institute of Technology, India)

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- 211 Dr. Zuharis Mansor (University of Kuala Lumpur British Malaysian Institute (UniKL-BMI), Malaysia)
- 212 Dr. Zulkifli Zulkifli (Aisyah University, Indonesia)

Welcome Message from the Chair

Honourable Guests, Distinguished keynote speakers, All of participants, Ladies and Gentlemen,

We proudly present the 2025 IEEE International Conference on Industry 4.0, Artificial Intelligence, and Communications Technology (IAICT 2025) held on July 3-5, 2025, with “**a Hybrid Event**” in-person gathering at Holiday Inn Resort Baruna Kuta-Bali, Indonesia and online conference (virtual conference) where **have physical keynotes, physical and online technical papers presentation**. It is our pleasure to welcome you to the conference which focuses on Industry 4.0 and Artificial Intelligence and Communications Technology. The conference has wide acceptances from researchers, scientists, students, and professionals around the globe.

Organized and sponsored by IEEE Indonesia Communications Society Chapter and Supported by Telkom University, IAICT 2025 has a strong foundation of bringing together industry and academia. IAICT 2025 has supported by 371 International Technical Program Committee (TPC) members from 55 Countries and 212 Reviewers from 48 Countries.

We received more than 276 submitted papers from 32 countries and 158 accepted papers after each paper has been carefully reviewed minimum by 3 international reviewers. Where average reviews/paper is 3.9 reviews. The acceptance ratio of submission is 57.24% to maintain the quality of the papers presented at the conference. Registered papers in IAICT 2025 are 126 papers, where the most dominant track paper is Artificial Intelligence:

- Artificial Intelligence : 83 papers;
- Communications : 15 papers;
- Industry 4.0 : 28 papers.

It is our goal to make IAICT 2025 as a wonderful forum to refresh knowledge, to explore the innovations and to disseminate information among researchers, scientists, students, and professionals on the latest developments of Industry 4.0 and their pillars including artificial intelligence and Communications technology. We have been striving to offer plenty of networking opportunities and to provide meeting and interacting with leading scientists and researchers, friends and colleagues.

We thank all those who have contributed to the success of IAICT 2025, such as organizing committee from Telkom University, Universitas Tanjungpura, and IEEE Communications Society Chapter Indonesia. We also say thank you to the TPC chair, the TPC members, TPC reviewers, keynote speakers and technical-sessions chair of IAICT 2025.

We have chosen Bali since we believe that Bali is always an exceptional location for leisure as well as for conference. It is renowned as one of the world’s most outstanding island which provides a unique and spectacular setting. Bali is always amazing for both local and international visitors. Here, we can find a variety of visitors from around the globe from those who love the panoramic beauty mountains, lakes, and to those who merely spend endless days on the beautiful beach.

We wish you a very successful conference and enjoy Bali!

Chair of IAICT 2025

Muhammad Nasrun
Telkom University & IEEE ComSoc Indonesia Chapter

Program at a Glance

Day	Time (UTC +8)	Activity
Day 1 July 03, 2025	07:45 AM - 08:00 AM	Registration
	08:00 AM - 08:15 AM	Opening Speech
	08:20 AM - 10:00 AM	Keynote Speech
	10:00 AM - 10:20 AM	Coffee Break
	10:20 AM - 12:00 PM	Paper Presentation 1 (ONSITE)
	12:00 PM - 01:00 PM	Lunch Break
	01:00 PM - 03:00 PM	Paper Presentation 2 (ONSITE)
	01:00 PM - 03:00 PM	Paper Presentation 2 (ONLINE Paralel Session)
	03:00 PM - 03:20 PM	Coffee Break
	03:20 PM - 05:00 PM	Paper Presentation 3 (ONSITE)
	03:20 PM - 04:50 PM	Papers Presentation 3 (ONLINE Paralel Session)
	05:00 PM - 06:30 PM	Break
	06:30 PM - 08:00 PM	Gala Dinner
	Day 2 July 04, 2025	08:00 AM - 10:00 AM
08:00 AM - 10:00 AM		Papers Presentation 4 (ONLINE Paralel Session)
09:40 AM - 10:00 AM		Coffee Break
10:00 AM - 12:00 PM		Papers Presentation 5 (ONSITE)
10:10 AM - 12:10 PM		Papers Presentation 5 (ONLINE Paralel Session)
12:10 PM - 01:00 PM		Lunch Break
01:00 PM - 03:00 PM		Papers Presentation 6 (ONSITE)
01:00 PM - 03:00 PM		Papers Presentation 6 (ONLINE Paralel Session)
03:00 PM - 03:15 PM		Closing Ceremony
Day 3 July 05, 2025	08:00 AM - End	Tour in Bali

Keynote Session



Prof. Dr. Lei Guo

Professor of Academy of Mathematics and Systems Science, Chinese Academy of Sciences (CAS),
and Director of the National Center for Mathematics and Interdisciplinary Sciences.

Short Bio:

Lei GUO, Professor of Academy of Mathematics and Systems Science, Chinese Academy of Sciences (CAS), and Director of the National Center for Mathematics and Interdisciplinary Sciences. He is a Fellow of IEEE, Member of CAS, Foreign Member of the Royal Swedish Academy of Engineering Sciences, and Fellow of the International Federation of Automatic Control (IFAC). In 2014, he was awarded an honorary doctorate by the Royal Institute of Technology (KTH), Sweden. In 2019, he was awarded the Hendrik W. Bode Lecture Prize by the IEEE Control Systems Society “for fundamental and practical contributions to the field of adaptive control, system identification, adaptive signal processing, stochastic systems, and applied mathematics”. His current research interests include adaptive (learning, filtering, control and games) theory of stochastic systems, control of uncertain nonlinear systems, game-based control systems, multi-agent complex systems, and man-machine integration systems, etc. For more information, please visit <http://lsc.amss.cas.cn/guolei/english/grjj/>

Topic:

Adaptive Learning-based Feedback Control of Uncertain Dynamical Systems

Learning and feedback are two fundamental mechanisms for addressing uncertainties in dynamical systems. Learning underpins the design of adaptive systems, while feedback makes it possible for these systems to keep their desired performance in open environments plagued by various uncertainties. This keynote will present foundational results on adaptive systems that integrate online learning with feedback control. First, we revisit the celebrated self-tuning regulator (STR) in adaptive control of uncertain linear stochastic systems, wherein the STR is designed by combining a recursive least-squares estimator with a minimum tracking variance controller. Despite its intuitive structure, the global convergence of this adaptive system remained a longstanding open problem in control theory. Next, we examine the theoretical rationale underpinning the widespread industrial success of proportional-integral-derivative (PID) control for nonlinear uncertain systems and introduce a novel, robust online learning-based design framework. Finally, we explore fundamental questions concerning the inherent capabilities and limitations of feedback mechanisms in nonlinear systems, defined here as the ensemble of all feasible feedback strategies. This talk synthesizes classical and contemporary perspectives to elucidate the synergistic potential of learning and feedback in tackling complex dynamical uncertainties.



Dr. Nasimuddin

Research and Development (Antenna System), Principal Scientist at Institute for Infocomm Research, A*STAR

Short Bio:

Dr. Nasimuddin (M'2003-SM'2009) earned his M.Tech. and Ph.D. from the University of Delhi in 1998 and 2004, respectively. He served as a Senior Research Fellow at the University of Delhi from 1999 to 2003 and as an Australian Postdoctoral Research Fellow at Macquarie University from 2004 to 2006. Currently, Dr. Nasimuddin is a Principal Scientist at the Institute for Infocomm Research (I2R), A*STAR, Singapore. With over 255 published papers, three granted patents, and four additional patents filed, Dr. Nasimuddin is a prolific contributor to the field. He has also edited three books, including a notable volume on microstrip antennas. Recognized as the top 2% of world scientists in 2023 and 2024, he is esteemed for his work as a distinguished speaker, reviewer, and organizer of special sessions and conferences. As Senior Member of IEEE and IEEE APS, Dr. Nasimuddin has received several accolades, including the URSI Young Scientist Award (2005) and IEEE AP-T/APPL Exceptional Performance Reviewer certificates. He serves as an Associate Editor for the IEEE Open Journal of Antennas and Propagation (OJAP) and is actively involved with editorial boards of leading journals in Antennas and Propagation. Additionally, he was the Chair of the IEEE Singapore MTT/AP Joint Chapter from 2021 to 2022.

Topic:

Next-Generation Circularly Polarized Antennas for Future Communications: Innovations, Applications, and Emerging Trends

This talk delves into the latest advancements in compact, wideband circularly polarized (CP) microstrip antennas, with a particular emphasis on metasurface-enabled designs. We will explore cutting-edge methodologies that drive innovation in CP antenna technology, highlighting how metasurfaces are revolutionizing antenna performance by enhancing key metrics such as gain, axial ratio bandwidth, and size reduction—without compromising polarization purity. The session will cover the transformative role of these antennas in modern and emerging wireless systems, including satellite communications, IoT networks, and 5G/6G infrastructures. By unpacking both theoretical frameworks and practical implementations, attendees will gain a comprehensive understanding of how these novel antenna architectures are paving the way for high-performance, future-ready communication systems. The talk will conclude with insights into current challenges, open research directions, and the broader impact of CP antennas on next-generation wireless technologies.

Technical Paper

Papers Presentation Session Day 1: July 3, 2025

Papers Presentation 1 - Onsite

Paper	Authors
Graph-Driven Feature Selection for ECG Classification: Leveraging Structural Dependencies Between Leads	Siredj Eddine Benaichouche (Computer Science Department University of Science and Technology Oran - Mohamed Boudiaf, Oran, Algeria) and Samir Brahim Belhaouari (College of Science and Engineering Hamad Bin Khalifa University, Education City, Qatar Foundation Doha, Qatar)
Implementation of Smart Contracts with Blockchain Technology in Building a Web 3.0-Based Decentralized Finance Crowdfunding System on the Ethereum Network	Fachrul Ali Nurfadillah, Nanang Trianto, Sepha Siswanto, Setiyo Cahyono, and Ferdinan Setyo Puji (National Cyber and Crypto Polytechnic, Indonesia)
An Adaptive Resolution High-Speed Acquisition Architecture Based on Wideband Spectrum Sensing	Xuetao Liu, Kuojun Yang, Peng Ye, Wuhuang Huang, Zhixiang Pan, and Chengyang Li (University of Electronic Science and Technology of China, China)
Seamless Insertion and Playback System for Targeted Advertisement Exploiting Digital Cueing Signal over Commercial IPTV Service	Hyunchul Joo, Juhan Bae, and Taeyoung Na (SK Telecom, Republic of Korea)
LLMs for Microservice Generation: Capabilities, Challenges, and Advancements	Raffaele Spista, Bruno Crispo, Paolo Giorgini, Alessandro Marchetto, and Giuseppe Riccardi (University of Trento, Italy)

10:20 PM **Graph-Driven Feature Selection for ECG Classification: Leveraging Structural Dependencies Between Leads**

Authors: Siredj Eddine Benaichouche (Computer Science Department University of Science and Technology Oran - Mohamed Boudiaf, Oran, Algeria) and Samir Brahim Belhaouari (College of Science and Engineering Hamad Bin Khalifa University, Education City, Qatar Foundation Doha, Qatar)

Abstract: The precise identification of ECG patterns serves as an essential requirement for developing automated cardiac diagnosis systems. This research introduced a graph-based feature selection approach that depends on ECG-lead structural relationships to enhance diagnostic precision. Rather than treating all the leads equally, an adjacency matrix is formed based on lead correlations, and features are extracted from the upper triangle of the matrix. The methodology selects important lead interactions so that only the most relevant features influence the classification. Two models are proposed: One for binary classification (normal vs abnormal) and another for multi-class classification of the abnormality types. The binary classification model reaches an accuracy of 97.61%, an F1-score of 97.62%, a precision of 96.60%, and a recall of 98.66%, which shows that the model is highly accurate in distinguishing between normal and abnormal signals. The multi-class classification model has an accuracy of 91.78%, an F1-score of 91.92%, a precision of 92.30%, and a recall of 91.54%. These results demonstrate the effectiveness of the proposed approach in improving ECG classification by prioritizing meaningful lead interactions.

10:40 PM **Implementation of Smart Contracts with Blockchain Technology in Building a Web 3.0-Based Decentralized Finance Crowdfunding System on the Ethereum Network**

Authors: Fachrul Ali Nurfadillah, Nanang Trianto, Sepha Siswanto, Setiyo Cahyono, and Ferdinan Setyo Puji (National Cyber and Crypto Polytechnic, Indonesia)

Abstract: Crowdfunding is a popular method for raising funds but current platforms face issues like lack of transparency, security risks, and centralized control. This research explores the use of smart

contracts and blockchain technology to address these weaknesses by creating a decentralized, secure crowdfunding application. Blockchain ensures reliability, prevents data tampering, and eliminates single points of failure. Additionally, the system introduces a simple majority approval mechanism, requiring at least 50%+1 of donors to approve fund withdrawals, enhancing transparency. Using the Scrum development method, this study demonstrates that blockchain-based crowdfunding can offer greater security, transparency, and data integrity.

11:00 PM **An Adaptive Resolution High-Speed Acquisition Architecture Based on Wideband Spectrum Sensing**

Authors: Xuetao Liu, Kuojun Yang, Peng Ye, Wuhuang Huang, Zhixiang Pan, and Chengyang Li (University of Electronic Science and Technology of China, China)

Abstract: To acquire more complex signals with several GHz bandwidth, a high-speed acquisition system with a high sampling rate and resolution is needed to improve acquisition accuracy. The traditional Time Interweaving (TI) and Digital Bandwidth Interweaving (DBI) architectures can improve the sampling rate of the acquisition system, but they cannot improve resolution. Therefore, an adaptive resolution high-speed acquisition architecture is proposed. Based on the wideband spectrum sensing, the dynamic adjustment of the sampling rate and resolution is deployed according to the frequency of the input signal under the three modes which are 20GSa/s with 12bits, 10GSa/s with 13bits, and 5GSa/s with 14bits. Compared with the traditional 20GSa/s, 12bits acquisition architecture, acquiring signals within 2GHz, the signal-to-noise ratio(SNR) increases 6.34dB, the effective number of bits (ENOB) increases 1.05, and for signals within 4GHz, the SNR increases 3.15dB, the ENOB increases 0.52. Experimental results show that this architecture can effectively improve the system's acquisition accuracy.

11:20 PM **Seamless Insertion and Playback System for Targeted Advertisement Exploiting Digital Cueing Signal over Commercial IPTV Service**

Authors: Hyunchul Joo, Juhan Bae, and Taeyoung Na (SK Telecom, Republic of Korea)

Abstract: In this paper, we propose a seamless insertion and playback system for targeted AD (ADvertisement) exploiting digital cueing signal over commercial IPTV (Internet Protocol TeleVision) service. In the proposed system, back-end AD server prepares AD assets in advance considering all the encoding parameters of live IPTV program contents. The digital cueing signal inside a watching live IPTV program contents enables STB (Set-Top Box) device to identify AD playback section accurately. STB device then extracts appropriate AD contents from pre-downloaded AD assets and adjusts their MPEG (Moving Picture Experts Group)-2 TS (Transport Stream) attributes so that it performs the seamless playback of AD contents and live IPTV program contents. Test results demonstrate excellence of the proposed system in terms of resource usage and playback delay on commercial IPTV network.

11:40 PM **LLMs for Microservice Generation: Capabilities, Challenges, and Advancements**

Authors: Raffaele Spista, Bruno Crispo, Paolo Giorgini, Alessandro Marchetto, Giuseppe Riccardi (University of Trento, Italy)

Abstract: This paper examines the transformative potential of Large Language Models (LLMs) in automating the generation of microservices, highlighting their capabilities, applications, and associated challenges. While LLMs such as GPT-3, GPT-4, and GPT-4o demonstrate remarkable advancements in automating software engineering tasks, offering enhanced productivity, scalability, and efficiency, critical challenges persist. These include dependency management, adherence to architectural patterns, and mitigating security vulnerabilities like SQL Injection and improper error handling. Through systematic experimentation, this paper evaluates the performance of LLMs across properties such as correctness, scalability, security, and efficiency. Key contributions include the demonstration of GPT-4o's notable advancements in generating scalable and secure microservices, driven by enhanced training methodologies, curated datasets, and security-aware prompts. The paper also emphasizes strategies for overcoming remaining challenges, proposing a roadmap for advancing LLMs as reliable tools in modern software development practices, particularly in security-critical and scalable microservice architectures.

Papers Presentation 2 - Onsite

Paper	Authors
The Influence of Generative AI on Student Performance in Higher Education	Marvin, Vincent Salim, Jonathan Hans Immanuel, and Henkie Ongowarsito (Bina Nusantara University, Indonesia)
Echoic Flow in Robotics: a Novel Approach to Low-Cost, Adaptive Navigation Systems for Dynamic Environments	Ashardi Abas, Mohd Mokhzani Ibrahim, and Abu Bakar Ibrahim (University Pendidikan Sultan Idris, Malaysia)
OFDM Technique Analysis for Underwater Communication Systems	Laily Fajarwati, Titiek Suryani, Wirawan, and Dicky Ihza Permana Putra (Institut Teknologi Sepuluh Nopember, Indonesia); Endang Widjiati and Bagus Fadhilah Nur Imani (National Research and Innovation Agency, Indonesia)
Development of a Social Network Analysis Application to Identify Influential Subgroups of Networks and Users Involved in Spreading Negative Issues	Yogi Ibnu Prasetya, Nurul Qomariasih, Rheva Anindya Wijayanti, Syahrizal Yonanda Mahfiridho, and Ferdinan Setyo Puji (Politeknik Siber dan Sandi Negara, Indonesia)
Indoor Positioning Using Smartphone Sensors: a LIDAR and IMU-Based Approach	Son Nguyen Trong and Igor Goncharenko (Ritsumeikan University, Japan); Yanlei Gu (Hiroshima University, Japan)
Adaptive Analog Front-End ArchitectureBased on Spectrum Sensing Technique in Broadband Acquisition System	Ming Wei, Duyu Qiu, Shulin Tian, Kuojun Yang, Chengyang Li, and Aijun Chen (University of Electronic Science and Technology of China, China)

01:00 PM The Influence of Generative AI on Student Performance in Higher Education

Authors: Marvin, Vincent Salim, Jonathan Hans Immanuel, and Henkie Ongowarsito (Bina Nusantara University, Indonesia)

Abstract: Generative AI, such as ChatGPT, influences student performance remains a subject of ongoing debate. While some studies explain its role in enhancing learning experiences, others warn of potential drawbacks, such as reducing critical thinking and academic integrity. This research aims to explore the potential impact of generative AI on student performance and generative AI usage, focusing on factors like perceived usefulness, ease of use, and facilitating condition. The data will be collected through questionnaires distributed to students from a university, specifically those majoring in Information Systems, Computer Science, and Digital Business. Through the research, these findings suggest that institutions must focus on improving ease of access, providing training, and aligning AI tools with diverse academic needs to maximize the benefits of AI tools. It is suggested that further studies should investigate the long-term effects of generative AI on student performance, considering both its potential benefits and challenges.

01:20 PM Echoic Flow in Robotics: a Novel Approach to Low-Cost, Adaptive Navigation Systems for Dynamic Environments

Authors: Ashardi Abas, Mohd Mokhzani Ibrahim, and Abu Bakar Ibrahim (University Pendidikan Sultan Idris, Malaysia)

Abstract: Autonomous navigation in robotics increasingly draws inspiration from biological systems, particularly echolocation used by species like bats and dolphins. This study explores the application of echoic flow, a mathematical model derived from biological echolocation, to enhance autonomous robotic guidance. The research employs two Arduino robots with ultrasonic sensors to achieve real-time collision avoidance and synchronized movement. A leader-follower dynamic is implemented, where the leading robot is manually controlled, and the follower robot autonomously adjusts its speed and trajectory using echoic flow data processed through MATLAB algorithms. Experimental results demonstrate that the follower robot maintains a safe distance, avoids collisions, and dynamically adjusts to obstacles, confirming the practicality of echoic flow for enhancing robotic navigation. Future research could extend these findings by exploring more

complex environments and integrating additional sensory modalities to advance autonomous robotic systems.

- 01:40 PM** **OFDM Technique Analysis for Underwater Communication Systems**
Authors: Laily Fajarwati, Titiek Suryani, Wirawan, and Dicky Ihza Permana Putra (Institut Teknologi Sepuluh Nopember, Indonesia); Endang Widjiati and Bagus Fadhillah Nur Imani (National Research and Innovation Agency, Indonesia)
Abstract: Orthogonal Frequency Division Multiplexing (OFDM) has been widely used in communication systems due to its robustness against multipath interference and efficient bandwidth utilization. However, its application in underwater acoustic communication requires careful analysis due to the unique characteristics of underwater channels. Underwater environments are characterized by significant multipath effects caused by signal reflections from the water surface, seabed, and underwater objects, as well as refraction due to variations in the speed of sound. These phenomena lead to challenges such as Inter-Symbol Interference (ISI) and high attenuation, which degrade signal quality and increase error rates. In this context, analyzing the performance of OFDM in underwater environments is critical. Key considerations include the impact of limited bandwidth, in this study is constrained to 12 kHz, raising questions about how many subcarriers can be effectively utilized while maintaining orthogonality and minimizing interference. This research focuses on optimizing OFDM parameters, particularly the number of subcarriers and the cyclic prefix (CP) length, to address these constraints and ensure reliable data transmission. Experiments conducted in the Hydrodynamics Laboratory of the National Research and Innovation Agency validate the OFDM system design under controlled underwater conditions. The results aim to provide a framework for maximizing the efficiency and reliability of underwater communication systems in dynamic channel environments.
- 02:00 PM** **Development of a Social Network Analysis Application to Identify Influential Subgroups of Networks and Users Involved in Spreading Negative Issues**
Authors: Yogi Ibnu Prasetya, Nurul Qomariasih, Rheva Anindya Wijayanti, Syahrizal Yonanda Mahfiridho, and Ferdinan Setyo Puji (*Politeknik Siber dan Sandi Negara*, Indonesia)
Abstract: Social Network Analysis (SNA) is a method used to analyze social activities. Such methods can be useful to help identify influential subgroups of networks and users who engage in similar or related behavior. The SNA built in this research focuses on finding perpetrators who spread negative issues. So, SNA can help the performance of the National Cyber and Crypto Agency (BSSN) in carrying out the task of controlling information on Twitter. Currently, SNA at NCCA still uses different application at the retrieval stage and the analysis stage. The aim of this research is to provide an efficient application for analyzing social networks on Twitter. This application has four features, namely features for retrieving data from Twitter, processing data, visualizing social networks, and analyzing networks. The author use the snsrape tool to retrieve data from Twitter, as well as the igraph and plotly tools to visualize social networks. Network analysis by the application is carried out based on the values of degree centrality, closeness centrality, betweenness centrality and eigenvector centrality.
- 02:20 PM** **Indoor Positioning Using Smartphone Sensors: a LIDAR and IMU-Based Approach**
Authors: Son Nguyen Trong and Igor Goncharenko (Ritsumeikan University, Japan); Yanlei Gu (Hiroshima University, Japan)
Abstract: The use of indoor positioning technology has become essential for various applications such as navigation, location-based services, and asset tracking. This paper presents a novel approach for indoor positioning utilizing a combination of smartphone built-in sensors and Normal Distributions Transform (NDT) algorithm utilizing lidar sensor data from an iPhone. Our method combines accelerometer, gyroscope, and magnetometer data from the smartphone to estimate the user's initial position, which is then dynamically refined using the Normal Distribution Transform (NDT) algorithm, which aligns LiDAR-derived point clouds with pre-existing 2D maps, thereby enhancing the accuracy of the position estimates. We evaluated the performance of our approach in a real-world indoor environment. Our results demonstrate that our proposed method significantly

improves positioning accuracy compared to traditional methods. This study illustrates the potential of utilizing lidar sensor data from smartphones for indoor positioning and the advantages of combining multiple sensor modalities for improved accuracy. Our approach contributes to the development of practical and low-cost indoor positioning systems using only smartphones

02:40 PM **Adaptive Analog Front-End ArchitectureBased on Spectrum Sensing Technique in Broadband Acquisition System**

Authors: Ming Wei, Duyu Qiu, Shulin Tian, Kuojun Yang, Chengyang Li, and Aijun Chen (University of Electronic Science and Technology of China, China)

Abstract: The traditional high-speed acquisition system will collect and process signals within the full bandwidth range, however, the measured signal usually presents sparse characteristics in the frequency domain with high-frequency and narrowband characteristics, which leads to not only wasting the bandwidth resources of the acquisition system during the acquisition process, but also introducing noise outside the bandwidth range of the measured signal. Therefore, to reduce the influence of noise outside the effective observation bandwidth, this paper proposes an adaptive analog front-end architecture based on spectrum sensing technology for broadband acquisition systems. Based on the digital spectrum sensing technology, the spectral components of the measured signal are extracted, the bandwidth of the analog front-end is adaptively adjusted by combining the analog down-conversion and the analog variable principal oscillation technology to achieve the optimal observation bandwidth of the signal to be measured, and the noise outside the effective observation bandwidth is suppressed by using an adaptive analog filter bank to ultimately achieve the purpose of improving the performance of the broadband acquisition system. The acquisition system is tested and verified, and the effective bit number of the adaptive analog front-end bandwidth mode is improved by 0.5 to 1.5 bits compared to the full bandwidth mode in the test of a DC to 20 GHz single-tone sine wave signal.

Papers Presentation 2 – Online Breakout Room 1

Paper	Authors
5G NR Coverage and Capacity Planning at 26 GHz: Insights from Urban Micro Model Simulation	Ade Kurniawan, Heroe Wijanto, and Alfin Hikmaturokhman (Telkom University, Indonesia)
A Comparative Analysis of Fingerprint Classification: Traditional Machine Learning with KMCG vs. Deep Learning Approaches	Winnie Gift Odongo, Ronald Mwangi, And Richard Maina Rimiru (JKUAT-Africa, Kenya)
A Comparison of Computational Approaches for Sentiment Analysis on Public Opinions About Education in Indonesia	Vira Fitriyani, Felicia Arief Wibowo, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia)
A Novel IoT-Based River and Estuary Monitoring System for Salinity Intrusion Early Warning	Tinh Tran Van, Duc Bui Viet and Quang Tran Minh, Hoang Tran Manh and Nghia Duong Tan (Hanoi University of Science and Technology (HUST), Vietnam); Khang Tang Chi (International School HCM City, Voetnam)
A Novel Narrative Analysis Approach for Digital Content Using Natural Language Processing	Moses Bolarinwa Odutusin (Staffordshire University, UK) and Hassan Malik (University of East Anglia, UK)
A Review: Performance Analysis of Single Board Computer Technology as an IoT System	Erfan Rohadi, S.T., M.Eng., Ph.D, Cahya Rahmad., S.T., M.Eng., P.hD, Septian Enggar Sukmana., S.Pd., M.T, Ahmad Afifuddin Zakki. S.Kom. and Denny Nur Ramadhan (State Polytechnic Of Malang, Indonesia); Prof. Ir. Aida Sartimbul, M.Sc., Ph.D. (Brawijaya University Malang, Indonesia); Assoc Prof. Ir Ts Dr Kismet Anak Hong Ping, Dr. Annie anak Joseph, and Assoc. Prof. Ts. Dr Dayang Azra Awang Mat (Universiti Malaysia, Malaysia); Mohammad Faried Rahmat., S.ST., M.Tr.T (Balitar Islamic University, Indonesia)
5G NR License Fees on 900 MHz in Surabaya for Cellular	First Ad'ha Safira Maussyta, M. Muhsin, Arrizky Ayu Faradila Purnama (Telkom University, Indonesia)
A Study on Determinants Influencing the Adoption of Buy Now, Pay Later (BNPL) as a Payment Method Using the Technology Acceptance Model 2: Indonesian Case	Nadinda Naura Syifa, Yakob Utama Chandra, and Ang Swat Lin Lindawati (Bina Nusantara University, Indonesia)

01:00 PM **5G NR Coverage and Capacity Planning at 26 GHz: Insights from Urban Micro Model Simulation**

Authors: Ade Kurniawan, Heroe Wijanto, and Alfin Hikmaturokhman (Telkom University, Indonesia)

Abstract: Indonesia is actively advancing towards the 5G era, a technology that not only delivers high-speed connectivity but also supports complex applications. The purpose of this study is to use a coverage and capacity planning approach to develop a 5G NR in the Mampang Prapatan District. The research utilizes a 26 GHz frequency with a 100 MHz bandwidth. Simulations were performed with network planning software and applied a line-of-sight (LOS) propagation model. The simulation adhered to the 3GPP TR 38.901 standard, specifically using the Urban Micro (UMi) model. The simulation results indicate that 33 gNodeB sites are required in accordance with coverage planning, while capacity planning suggests the need for 36 sites. The parameter histogram shows that the average SS-RSRP from the simulation is -96.38 dBm, and the average SS-SINR is 1.37 dB. These analysis results suggest that the 5G NR signal strength and quality in the area fall within the "Normal" category, making it feasible to implement 5G networks in this region.

01:15 PM **A Comparative Analysis of Fingerprint Classification: Traditional Machine Learning with KMCG vs. Deep Learning Approaches**

Authors: Winnie Gift Odongo, Ronald Mwangi, And Richard Maina Rimiru (JKUAT-Africa, Kenya)

Abstract: This study presents a novel comparative analysis between traditional machine learning (ML) methods-enhanced through the rarely utilized Kekre's Median Codebook Generation (KMCG) technique-and modern deep learning approaches for fingerprint classification. For the traditional ML pipeline, models including Support Vector Machine (SVM), k-Nearest Neighbors (KNN), Random Forest (RF), and XGBoost were evaluated using features extracted via the KMCG algorithm. Notably, this study explores the under-researched application of KMCG in fingerprint classification, revealing that a configuration with a codebook size of 2 and window size of (16, 16) yields the best performance at 77.20% feature-level accuracy. Among these models, SVM attained the highest classification accuracy at 70.2%. On the other hand, the models that applied the transfer learning concept, MobileNetV2, InceptionV3, and DenseNet201, showed much higher efficiency. In this paper, MobileNetV2 achieved a peak classification accuracy of 91.72% and peak precision of 95.92%, indicating that deep feature hierarchies and pre-trained representations are beneficial in identifying the complex and abstract geographical patterns of fingerprints. The studies presented indicate that KMCG can be helpful in further developing biometric feature extraction, as well as highlighting the importance of deep learning for achieving high classification accuracy of fingerprints. This work helps to understand the tradeoff between reporting results in traditional ML and deep learning, and is useful to develop modern biometric systems.

01:30 PM **A Comparison of Computational Approaches for Sentiment Analysis on Public Opinions About Education in Indonesia**

Authors: Vira Fitriyani, Felicia Arief Wibowo, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia)

Abstract: This study investigates sentiment analysis of education-related tweets in Indonesia. The dataset comprises 484 manually labeled tweets, exhibiting a significant class imbalance, with 65.5% negative, 29.1% neutral, and only 5.4% positive sentiments. Term Frequency-Inverse Document Frequency (TF-IDF) and Word2Vec were evaluated in combination with Support Vector Machine (SVM), Naive Bayes, and Long-Short Term Memory (LSTM) models. Experimental results demonstrated that the optimized SVM with linear kernel and TF-IDF vectorization achieved the highest accuracy of 80%, while Naive Bayes reached 75% after hyperparameter tuning, LSTM models showed consistent but lower performance at 66% accuracy across both vectorization methods. The study reveals the effectiveness of traditional machine learning approaches, particularly SVM with TF-IDF vectorization, for sentiment analysis of Indonesian educational tweets, while also highlighting challenges posed by class imbalance in the dataset. These findings contribute to advancing sentiment analysis approaches for Indonesian language social media data, especially in the educational domain.

01:45 PM **A Novel IoT-Based River and Estuary Monitoring System for Salinity Intrusion Early Warning**

Authors: Tinh Tran Van, Duc Bui Viet and Quang Tran Minh, Hoang Tran Manh and Nghia Duong Tan (Hanoi University of Science and Technology (HUST), Vietnam); Khang Tang Chi (International School HCM City, Vietnam)

Abstract: This paper presents an advanced Internet of Things (IoT)-based monitoring system designed to detect and provide early warnings of salinity intrusion in river and estuary environments. The system integrates cutting-edge salinity and temperature sensors, ESP32 microcontrollers, and the MQTT communication protocol to ensure real-time data collection and remote monitoring. The proposed architecture enhances traditional monitoring systems by enabling wireless communication, automated data processing, and user-friendly alert notifications via Telegram. Performance evaluation demonstrates the effectiveness of the system in providing accurate and timely salinity intrusion warnings, making it a valuable tool for environmental monitoring and disaster prevention. The experimental results indicate that the system achieves a salinity measurement accuracy of 0.5 ppt, with a response time of less than 10 seconds. The real-time data transmission via MQTT ensures stable communication with an average latency of 200 ms. The

power consumption analysis reveals that the system operates efficiently with an average power usage of 2.5W, allowing for extended field deployment. Comparative analysis with conventional monitoring methods highlights a 40% improvement in early warning accuracy and a 50% reduction in data transmission delays. These findings confirm the feasibility and reliability of the proposed system for large-scale environmental monitoring applications.

02:00 PM **A Novel Narrative Analysis Approach for Digital Content Using Natural Language Processing**

Authors: Moses Bolarinwa Odutusin (Staffordshire University, UK) and Hassan Malik (University of East Anglia, UK)

Abstract: In today's digital world, the unprecedented volume of online content is shaping global narratives, influencing opinions, policies, and cultures in real-time. Many researchers proposed narrative analysis algorithms but cannot automate the content selection and require manual interventions. Another key issue is the limited applicability across diverse domains, leading to inefficiencies and biases in handling large, unstructured datasets. There is a significant need to develop novel approaches to enable narrative analysis from vastly available digital content for better decision-making, analysing social trends, and addressing misinformation and bias. This paper uses the abstractive summarization approach to improve narratives' identification, selection, analysis, and presentation. The research aims to develop a narrative analysis algorithm using natural language processing techniques to automate the selection of digital media content, improve accuracy, and reduce bias. The proposed approach shows an 87% accuracy in story arc identification with discourse enhancement, while significantly reducing the time required for content selection and analysis.

02:15 PM **A Review: Performance Analysis of Single Board Computer Technology as an IoT System**

Authors: Erfan Rohadi, S.T., M.Eng., Ph.D, Cahya Rahmad., S.T., M.Eng., P.hD, Septian Enggar Sukmana.,S.Pd., M.T, Ahmad Afifuddin Zakki. S.Kom. and Denny Nur Ramadhan (State Polytechnic Of Malang, Indonesia); Prof. Ir. Aida Sartimbul, M.Sc., Ph.D. (Brawijaya University Malang, Indonesia); Assoc Prof. Ir Ts Dr Kismet Anak Hong Ping, Dr. Annie anak Joseph, and Assoc. Prof. Ts. Dr Dayang Azra Awang Mat (Universiti Malaysia, Malaysia); Mohammad Faried Rahmat., S.ST., M.Tr.T (Balitar Islamic University, Indonesia)

Abstract: The development of Internet of Things (IoT) technology has driven the demand for cost-effective server solutions capable of managing large volumes of data, thereby creating efficiencies in data management to support smart digitalization. In recent years, the advancement of Single Board Computer (SBC) technology, such as the Raspberry Pi and Tinkerboard, has emerged as an alternative solution for providing energy-efficient IoT server infrastructure with relatively good performance for handling large data sets. The advantages offered by these devices make Single Board Computers a viable option for IoT servers. These small, low-power devices can provide the necessary computing resources to support a wide range of IoT applications, from edge processing to data aggregation and analysis. In this study, the researcher evaluates several Single Board Computer products as IoT servers, including Raspberry Pi 3, Raspberry Pi 4, and Asus Tinkerboard, using a case study on room sensor monitoring based on the Internet of Things. The testing results indicate that the Raspberry Pi 4 performs well for running IoT applications at a lower cost, achieving a CPU response time of 62 seconds, while the Raspberry Pi 3 has a CPU response time of 96 seconds and the Tinker Board responds in 64 seconds. This research will provide valuable recommendations for IoT developers and readers in selecting the right Single Board Computer for their environmental sensing projects.

02:30 PM **5G NR License Fees on 900 MHz in Surabaya for Cellular**

Authors: First Ad'ha Safira Maussyta, M. Muhsin, Arrizky Ayu Faradila Purnama (Telkom University, Indonesia)

Abstract: Frequency is a limited resource, so there is a need for regulation and license fees for each frequency. In 5G New Radio, the N8 Band or 900MHz frequency is generally used for cellular purposes. The

payment of frequency spectrum licenses in Indonesia is regulated in the Minister of Communication and Information Technology Regulation No. 17/2005. To prevent two entities from using frequency in the same time, regulation is essential for the telecommunications sector. License fees are the mechanism used to control frequency usage. Based on the analysis, the change of components in the calculation of BHP ISR formula results can be done by applying a top-down approach that changes the I_b index. The result of this study analyzes the new price that corresponds to the ideal BHP value for operator companies and is expected to make more efficient use of the frequency. The highest OER used as a benchmark is still within the ideal OER range of 62.78%. The analysis of the recommended new price is that the larger the bandwidth, the more expensive the license price will be.

02:45 PM **A Study on Determinants Influencing the Adoption of Buy Now, Pay Later (BNPL) as a Payment Method Using the Technology Acceptance Model 2: Indonesian Case**

Authors: Nadinda Naura Syifa, Yakob Utama Chandra, and Ang Swat Lin Lindawati (Bina Nusantara University, Indonesia)

Abstract: In Indonesia, the fintech sector is experiencing rapid growth, particularly with the rising demand of 'Buy Now, Pay Later' (BNPL) services. This payment model facilitates consumers to purchase goods and payment method with deferred payments, meeting a growing demand for flexible financial solutions. Despite its growing popularity, there remains a limited understanding of the underlying determinants driving BNPL adoption in this unique market. This study explores these factors through a Technology Acceptance Model 2 (TAM2) lens, which includes both social and cognitive dimensions that influence perspectives of utility and usability. Using a quantitative cross-sectional research design, data were collected from 424 BNPL users via an online survey. The analysis reveals that factors including subjective norms, job relevance, output quality, result demonstrability, perceived ease of use, and perceived usefulness exerts a major influence on users' attitudes and behavioral intentions toward adopting BNPL. In particular, perceived usefulness and ease of use were found to be critical determinants influencing positive attitudes and intentions. These findings provide actionable insights for BNPL providers to refine their marketing strategies and enhance user engagement, thereby promoting more responsible adoption of financial technologies in Indonesia.

Papers Presentation 2 – Online Breakout Room 2

Paper	Authors
Enhancing the Accuracy of Chili Plant Disease Classification Using Convolutional Neural Networks and Image Augmentation	Ni Lokeswari Sasmita Puri and Dita Pramesti (Telkom University, Indonesia); Hanif Fakhrrurroja (Telkom University and National Research and Innovation Agency of Republic Indonesia, Indonesia)
Artificial Intelligence as a Tool to Improve the Quality of Job-Ready Graduate Skills in Higher Education	Zamroni (Islamic University Samarinda, Indonesia); Rhini Fatmasari (Faculty of Teacher Training and Education (FKIP) UT, Indonesia); Rasyidi (Institute of Islamic Religion Tafaqquh Fiddin (IAITF) Dumai, Indonesia); Hasan Baharun and Dinda Febrianti Putri (Nurul Jadid University, Indonesia); and Tustiyana Windiyani (Pakuan University, Indonesia)
AI-Based Multi-Sensor Fusion for High-Precision Obstructive Sleep Apnea Diagnosis Using Sleep Center PSG3 Secondary Data	Frisa Yugi Hermawan, Aries Subiantoro, and Abdul Halim (Universitas Indonesia, Indonesia); S. Syafii (King AbdulAziz University, Saudi Arabia)
Analyzing User Experience in Indonesian Investment Platforms: a Hybrid Approach Using Sentiment Analysis and BERTopic Modeling	Andi Rifan Ghaffar Herdany and Tanty Oktavia (Bina Nusantara University, Indonesia)
Analysis of Network-Wide Ad Blocker Using Mikrotik RouterBoard and Raspberry Pi for Enhancing Network QoS	Abdurrasyid Malvin Nugraha, R. Muhammad Rizqi Erlangga, Fellica Clara Cindy, Nyoman Karna, and Arif Indra Irawan (Telkom University, Indonesia)
Analyzing Employee Sentiment of Companies via Social Media and Job Sites for Informed Job Hunting	Clifford Allen Ebaya, Clint Earl Ebyan, Mark Jover R. Dela Cruz, Marinelle C. Manaligod, and Annjeannette Alain D. Galang (Mariano Marcos State University, Philippines)
AR-BEiT: Adaptive Regression BEiT for Predicting Roasted Coffee Beans Agtron Score	Aubrey Theodore Godeliva Sitepu, Bryan Chandra, Hans Jonathan Zebua, and Hidayaturrahman (Bina Nusantara University, Indonesia)
Artificial Intelligence (AI) Innovation in Education: from Data-Driven Learning to Automated Teaching	Akmal Mundi, Izzatul Munawwaroh, Hasan Baharun, and Wali Ja'far Shudiq (Universitas Nurul Jadid, Indonesia); Muhammad Irwan Hadi (Darul Yasin Al Sys Foundation, Indonesia); Ayatullah Maulidy (Universitas Islam Negeri Walisongo, Indonesia)

01:00 PM **Enhancing the Accuracy of Chili Plant Disease Classification Using Convolutional Neural Networks and Image Augmentation**

Authors: Ni Lokeswari Sasmita Puri and Dita Pramesti (Telkom University, Indonesia); Hanif Fakhrrurroja (Telkom University and National Research and Innovation Agency of Republic Indonesia, Indonesia)

Abstract: Chili (*Capsicum annuum*) is an essential agricultural commodity in Indonesia, but its production is threatened by various plant diseases that significantly reduce yield and quality. Traditional methods of disease identification rely on manual inspection, which is time-consuming and susceptible to human error. This study proposes a deep learning-based classification model utilizing Convolutional Neural Networks (CNN) for chili plant disease detection to address these limitations. The research integrates data augmentation techniques to enhance model generalization and prevent overfitting, thus improving classification accuracy. The dataset comprises images of chili plant leaves categorized into three classes: Healthy, Mosaic Curl, and Geminivirus. The research follows the Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology to ensure a systematic approach to data handling and model development. The proposed CNN model is

optimized using various augmentation strategies, including flipping, rotation, zooming, and brightness adjustments. Experimental results demonstrate that augmentation increases model accuracy from 92.13% to 95.89%, confirming its effectiveness in improving deep learning-based disease classification.

01:15 PM **Artificial Intelligence as a Tool to Improve the Quality of Job-Ready Graduate Skills in Higher Education**

Authors: Zamroni (Islamic University Samarinda, Indonesia); Rhini Fatmasari (Faculty of Teacher Training and Education (FKIP) UT, Indonesia); Rasyidi (Institute of Islamic Religion Tafaquh Fiddin (IAITF) Dumai, Indonesia); Hasan Baharun and Dinda Febrianti Putri (Nurul Jadid University, Indonesia); and Tustiyana Windiyani (Pakuan University, Indonesia)

Abstract: In the era of digital transformation, AI as a tool to improve the quality of job-ready graduate skills in higher education is a major factor in bridging the gap between education and industry needs. AI enables personalized learning, increases the effectiveness of data-based training, and helps students hone skills that are relevant to the demands of the modern workplace. However, the implementation of AI still faces challenges, such as unequal access to technology, institutional readiness to adopt AI-based systems, and the need for more inclusive education policies. This study uses qualitative methods with interviews, observations, and document analysis at various higher education institutions. The results show that AI can accelerate students' readiness to enter the workforce through the AI-Powered Career Echo System, Intelligent Employability Simulator, and Smart Skill Mapping. This study provides insight into how AI can be a strategic solution in improving the quality of graduate skills and emphasizes the need for education policies that support the development of AI-based skills sustainably.

01:30 PM **AI-Based Multi-Sensor Fusion for High-Precision Obstructive Sleep Apnea Diagnosis Using Sleep Center PSG3 Secondary Data**

Authors: Frisa Yugi Hermawan, Aries Subiantoro, and Abdul Halim (Universitas Indonesia, Indonesia); S. Syafie (King AbdulAziz University, Saudi Arabia)

Abstract: Obstructive sleep apnoea (OSA) is a sleep disorder affecting more than 3 billion people by 2023 and impacts everything. Although polysomnography (PSG) Type III is used for OSA screening at home, its accuracy and reliability are still the subject of ongoing evaluation. Integrating machine learning with multi-sensor physiological data provides a promising solution to improve the diagnosis and prediction of OSA severity. This study aims to develop an OSA severity classification model using machine learning-based PSG3 signals. This study focuses on the multi-sensor analysis of three different sleeping positions against OSA severity in AHI. Using a dataset of 532 patients undergoing sleep testing, PSG3 was analyzed using six key physiological sensors: Plethysmography, Thorax Movement, Nasal Airflow (PFlow), Blood Oxygen Saturation (SpO₂), Heart Rate (BPM), and Snoring Sounds through in-depth Exploratory Data Analysis (EDA). Machine learning models, including Random Forest, Decision Tree, K-Nearest Neighbors, Gradient Boosting, Support Vector Machine, and Logistic Regression, were compared to determine the optimal classification approach. The highest accuracy of 98.56% was achieved by Random Forest, surpassing previous studies that reported accuracies of up to 91% using a multi-sensor approach. A stability analysis of the results was demonstrated through K-fold cross-validation. This study highlights the effectiveness of integrating machine learning with multi-sensor PSG3 data for OSA prediction. The findings suggest that AI-driven sleep diagnostics can significantly improve home-based screening, personalized treatment strategies, and early intervention efforts. Future research should explore additional physiological markers, sensor selection optimization, and the use of larger data sets to improve model performance.

01:45 PM **Analyzing User Experience in Indonesian Investment Platforms: a Hybrid Approach Using Sentiment Analysis and BERTopic Modeling**

Authors: Andi Rifan Ghaffar Herdany and Tanty Oktavia (Bina Nusantara University, Indonesia)

Abstract: The Indonesian capital market has experienced significant growth, this was indicated from the increasing number of Single Investor Identifications (SIDs). This study examines the sentiment

experiences of users for five popular investing applications that have more than 1 Million downloads-Ajaib, StockBit, IPOT, Bareksa, and Bibit-within the digital investment landscape. Using a rigorous approach, the research conducted sentiment analysis on user reviews through manual labeling with multiple annotators and employed machine learning models, including Random Forest, Support Vector Machine (SVM), and Naive Bayes for sentiment prediction. BERTopic with IndoBERT was implemented for in-depth topic modelling which enables an exploration of user sentiments. The research revealed a dominant in negative sentiment, with 808 negative reviews and 352 positive reviews. Topic modelling also unfolds critical insights: positive sentiment focused on application ease of use, and investment accessibility, conversely, negative sentiments primarily centered on authentication difficulties, withdrawal process challenges, and accessibility issues. Both SVM and Naive Bayes models achieved an impressive 91% accuracy with Naive Bayes as the chosen model as it is able to reach the highest F1-Score for each negative and positive sentiment. This study contributes valuable insights into the user experience of digital investment platforms in Indonesia, providing actionable recommendations for app developers to enhance platform reliability, user satisfaction, and market accessibility. By addressing the existing research gap, our analysis offers a comprehensive understanding of sentiment in the popular Indonesian digital investment applications.

02:00 PM **Analysis of Network-Wide Ad Blocker Using Mikrotik RouterBoard and Raspberry Pi for Enhancing Network QoS**

Authors: Abdurrasyid Malvin Nugraha, R. Muhammad Rizqi Erlangga, Fellica Clara Cindy, Nyoman Karna, and Arif Indra Irawan (Telkom University, Indonesia)

Abstract: The rapid increase in online advertisements has significantly impacted network performance, leading to higher bandwidth consumption, increased latency, and a degraded browsing experience. This study shows how to use a Raspberry Pi 4, a MikroTik RouterBOARD, and DNS filtering to create a proactive network-wide ad-blocking system that works well to fix these problems and boost network Quality of Service (QoS). The proposed solution prevents unnecessary data requests by filtering ad-serving domains at the network level, therefore reducing congestion and optimizing traffic flow. Experimental findings reveal notable enhancements, including reduced latency, increased throughput, and minimized jitter, all of which contribute to a more responsive and efficient internet experience. The findings highlight the advantages of network-wide ad-blocking as a scalable, cost-effective approach to improving overall network performance while ensuring seamless browsing for users.

02:15 PM **Analyzing Employee Sentiment of Companies via Social Media and Job Sites for Informed Job Hunting**

Authors: Clifford Allen Ebaya, Clint Earl Ebayan, Mark Jover R. Dela Cruz, Marinelle C. Manaligod, and Annjeannette Alain D. Galang (Mariano Marcos State University, Philippines)

Abstract: This study addresses the challenges job seekers face in efficiently assessing companies through online employee reviews. The traditional method of relying on personal connections for company insights has evolved, leading to information overload. The complexity of processing and interpreting the extensive array of employee-generated content across various online platforms not only poses a challenge in offering meaningful insights for job seekers but also contributes to the time-intensive decision-making process. To address this process, the study proposes a sentiment analysis model employing logistic regression. By categorizing sentiments (positive, negative, neutral) in employee reviews, the model aims to provide job seekers with a quick overview, facilitating informed decision-making based on the emotional tone conveyed in reviews. The use of machine learning enhances the accuracy of sentiment analysis, contributing to a clearer understanding of the overall company environment.

02:30 PM **AR-BEiT: Adaptive Regression BEiT for Predicting Roasted Coffee Beans Agtron Score**

Authors: Aubrey Theodore Godeliva Sitepu, Bryan Chandra, Hans Jonathan Zebua, and Hidayaturrahman (Bina Nusantara University, Indonesia)

Abstract: As one of the biggest coffee producers globally, Indonesia faces challenges in maintaining consistent quality. Implementation of Agtron measurement technology has already been done by

certain coffee producers and has helped improve the consistency of produced coffee. However, the technology is still deemed too expensive thus limiting the implementation in Indonesia. This research proposes implementing a Neural Network (NN) model to replicate the task of an Agtron measurement by accepting input from a coffee image taken by a smartphone camera. To achieve this, a Bidirectional Encoder representation from Image Transformers (BEiT) with a custom regression-specific head was introduced. The research explored the experimentation of model configurations to identify the optimal results, including experiments with different optimizers, schedulers, and advanced learning techniques such as progressive freezing and residual blocks. Furthermore, Model-Agnostic Meta-Learning (MAML) was implemented as a solution for adaptability problems related to domain shifts in the dataset.

02:45 PM **Artificial Intelligence (AI) Innovation in Education: from Data-Driven Learning to Automated Teaching**

Authors: Akmal Mundiri, Izzatul Munawwaroh, Hasan Baharun, and Wali Ja'far Shudiq (Universitas Nurul Jadid, Indonesia); Muhammad Irwan Hadi (Darul Yasin Al Sys Foundation, Indonesia); Ayatullah Maulidy (Universitas Islam Negeri Walisongo, Indonesia)

Abstract: This research explores Artificial Intelligence (AI) innovation in madrasa education, especially in applying data-driven learning and automated teaching. This research aims to understand how AI can improve the teaching and learning process through in-depth analysis of student data and adaptive automated teaching. Using a qualitative method with a case study type, data was collected through in-depth interviews and participant observation at Madrasah, which has implemented AI technology. The research results show that data-driven learning allows teachers to design more personalized and effective learning based on comprehensive data analysis. Meanwhile, automated teaching through AI provides real-time guidance and feedback, accelerating students' understanding of lesson material. These findings indicate that the integration of AI in madrasa education strengthens the quality of learning and creates a more inclusive and adaptive learning environment.

Papers Presentation 3 - Onsite

Paper	Authors
Low Overhead Wi-Fi Fingerprinting-Based Indoor Positioning for Evacuation Support System During Disaster in Smart Campus	Made Harta Dwijaksana, Immanuel Brilan Solvanto Darmawan, Melisa Ayu Angelina, Samuel Raja Partogi, Luthfi Arfiansyah, and Ari Wibisono (University of Indonesia, Indonesia)
Design and Implementation of Low Resource Consumption Low Pass Filter Based on Parallel CIC	Zhiyu Zheng, Kuojun Yang, Wuhuang Huang, Ruiyuan Ming, Huanchao Liu, Pengfei Zhang, Jingjing Luo, and Yuanhang Wang (University of Electronic Science and Technology of China, China)
A Fuzzy-Based Grouping Mechanism for Reliable Cooperative Automated Driving in Decentralized C-V2X Networks	Tse-Jui Chang, Chuan-Wei Cho, and Meng-Shiuan Pan (National Taipei University of Technology, Taiwan)
Wi-NetX: Next Generation Wi-Fi 7 Based Train Wireless Networks	Juseong Moon and Ronny Yongho Kim (Korea National University of Transportation, Republic of Korea)
A Frequency Estimation Method Based on Swarm Intelligence and Digital Frequency Mixing	Chuan Huang, Shunlin Tian, Qinchuan Zhang, Peng Ye, Kuojun Yang, and Hongzhi Xu (University of Electronic Science and Technology of China, China)

03:20 PM **Low Overhead Wi-Fi Fingerprinting-Based Indoor Positioning for Evacuation Support System During Disaster in Smart Campus**

Authors: Made Harta Dwijaksana, Immanuel Brilan Solvanto Darmawan, Melisa Ayu Angelina, Samuel Raja Partogi, Luthfi Arfiansyah, and Ari Wibisono (University of Indonesia, Indonesia)

Abstract: Disaster has usually claimed many casualties, and it is very difficult to avoid. Specifically in Indonesia, where disaster (natural disasters) occurs frequently, great losses have been experienced. Related parties have worked to reduce the losses during a disaster by planning the evacuation procedure. One of the important objectives is to save lives. Therefore, the capability to identify the victim's location during a disaster becomes crucial, particularly when it happens indoors. Wi-Fi fingerprinting-based indoor positioning system (IPS) has become a widely used technique to predict the location of users indoors. The reason is that the Wi-Fi infrastructure is widely deployed in indoor environments. Thus, we can deploy Wi-Fi-based IPS instantly at a very low cost. However, the Wi-Fi fingerprinting-based IPS usually introduces high overhead due to the requirement for collecting and labeling fingerprint data manually. The commonly taken approach is grid-based fingerprint collection. The building is divided into several grids, and fingerprints are taken from each grid one by one. Hence, the overhead increases with the size of the buildings. To reduce this overhead, we propose automatic fingerprint collection and labeling by leveraging the information readily available in a smart campus environment, such as students' information, course information, building map data, etc. By exploiting this information, we can run seamless service on students' or employees' devices to collect fingerprint data and label the data according to the course schedule or room occupancy. We have implemented the proposed IPS and made the source code available publicly. The performance evaluation shows that the proposed IPS has an accuracy as high as that of the IPS with manual fingerprint collection and labeling. The benefit of the proposed IPS comes from its capability in eliminating labor work for collecting and labeling fingerprint data.

03:40 PM **Design and Implementation of Low Resource Consumption Low Pass Filter Based on Parallel CIC**

Authors: Zhiyu Zheng, Kuojun Yang, Wuhuang Huang, Ruiyuan Ming, Huanchao Liu, Pengfei Zhang, Jingjing Luo, and Yuanhang Wang (University of Electronic Science and Technology of China, China)

Abstract: Modern signal testing instruments are continuously evolving towards higher bandwidths and sampling rates to meet the diverse demands across various fields. However, in most application

scenarios, the effective components of the test signal do not require such high bandwidths. When the instrument captures signals across the entire bandwidth range, additional noise is inevitably introduced, which affects the accuracy of the measurements. Therefore, the bandwidth-limiting function of the instrument becomes crucial. This paper proposes a method to achieve digital bandwidth-limiting low-pass filtering using a parallel CIC filter: by adjusting the delay of the CIC filter for filtering and designing a parallel CIC structure. This parallel CIC structure can realize 20 MHz low-pass filtering at a 10 GSPS sampling rate without consuming multipliers, using only a small amount of LUT resources. This method can achieve high-performance low-pass filtering with tight resource constraints.

04:00 PM **A Fuzzy-Based Grouping Mechanism for Reliable Cooperative Automated Driving in Decentralized C-V2X Networks**

Authors: Tse-Jui Chang, Chuan-Wei Cho, and Meng-Shiuan Pan (National Taipei University of Technology, Taiwan)

Abstract: Cooperative Automated Driving (CAD) enables vehicles to exchange information for mitigating blind spots and preventing potential accidents. To support the reliable inter-vehicles communication, the Third Generation Partnership Project (3GPP) standardized Cellular Vehicle-to-Everything (C-V2X). However, decentralized C-V2X lacks trustworthy infrastructure to verify the message authenticity, that provides an opportunity for malicious vehicles to manipulate the disseminating messages. In this work, we propose a grouping strategy that leverages fuzzy logic to select a trustworthy leader and establish the communication group, thereby enabling the implementation of consensus-based information authentication. Simulation results demonstrate that the proposed scheme enhances the group's communication quality and stability while mitigating the impact of malicious vehicles.

04:20 PM **Wi-NetX: Next Generation Wi-Fi 7 Based Train Wireless Networks**

Authors: Juseong Moon and Ronny Yongho Kim (Korea National University of Transportation, Republic of Korea)

Abstract: The ongoing development of IEEE 802.11be introduces a plethora of advanced features, encompassing wider bandwidth, multi-link operation (MLO), and latency-sensitive operation. In light of this progress, this paper proposes Wi-NetX, an innovative train all-wireless network leveraging the capabilities of the next-generation wireless LAN. Designed to adeptly support mission-critical transmissions in intra-train communication scenarios, Wi-NetX incorporates priority-based link allocation, flexible service period time extension, delay-guaranteed slotted service period operation, and expedited priority-based channel contention. The efficacy and remarkable performance of Wi-NetX are meticulously validated through both numerical analysis and simulation.

04:40 PM **A Frequency Estimation Method Based on Swarm Intelligence and Digital Frequency Mixing**

Authors: Chuan Huang, Shunlin Tian, Qinchuan Zhang, Peng Ye, Kuojun Yang, and Hongzhi Xu (University of Electronic Science and Technology of China, China)

Abstract: The estimation of signal frequency has been a hot research area in the test instrument industry. In this paper, an estimation algorithm based on swarm intelligence algorithm and digital frequency mixing technology is proposed: firstly, an energy estimation algorithm of frequency mixing is proposed as the objective function, and the problem is converted into an optimization solving problem, and then the objective function is optimally solved based on three swarm intelligence algorithms (particle swarm algorithm, simulated annealing algorithm, tuna algorithm). Experimental results show that the frequency solving method based on swarm intelligence algorithm is correct, the computational accuracy is far more than the traditional method, and can be further improved by optimizing the parameters.

Papers Presentation 3 – Online Breakout Room 1

Paper	Authors
A Technique to Improve Performance of ResNet-18 in Classifying Multi-Class Corrosion	Akhmad Sarif and Dadang Gunawan (Universitas Indonesia, Indonesia); Mahfudz Al Huda (National Research and Innovation Agency, Indonesia)
Automated Summarization of E-Commerce Application Reviews for Generating Application Descriptions to Enhance Customer Insights	Jessica Berliani, Alicia Jocelyn Siahaya, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia)
Beyond the Naked Eye: AI-Driven Sugarcane Quality Assessment Using Deep Learning	Muhammad Juanda, Nur Ichsan Utama, and Sinung Suakanto (Telkom University, Indonesia)
An Extensive Experiment on Emotion Classification in Social Media Utilizing Multiple Text Representation Techniques and Deep Recurrent Neural Networks	Steve Marcello Liem, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia)
Bridging the Competency Gap: Aligning Digital Competency Framework 2.2 for Citizens with Public Sector Digital Competencies for Industry 4.0	Riandoko Riko (Bandung Institute of Technology and PKN STAN, Indonesia); Siswanto Joko and Sari Hasrini (Bandung Institute of Technology, Indonesia)
Bridging the Physical and Virtual: Digital Twin Solutions with Arduino and FlexSim	Camilo Ignacio Acosta-Acosta, Roberto Omar Andrade-Paredes, and Sonia Valeria Avilés-Sacoto (Universidad San Francisco de Quito USFQ, Ecuador)

03:20 PM **A Technique to Improve Performance of ResNet-18 in Classifying Multi-Class Corrosion**
Authors: Akhmad Sarif and Dadang Gunawan (Universitas Indonesia, Indonesia); Mahfudz Al Huda (National Research and Innovation Agency, Indonesia)

Abstract: Metal is used in almost every sector of human life, ranging from household appliances and transportation equipment to high skyscrapers. One of the main problems that occur with metal is corrosion. Corrosion degrades metal's quality. It decreases the strength of the metal structure and changes the color of the metal's appearance. Early corrosion detection in metals is essential to ensure appropriate treatment against corrosion. Certified experts usually do corrosion classification. Limited resources of experts are one of the problems of corrosion detection. For this reason, it is necessary to have a method that does not depend on experts for corrosion detection and classification which uses artificial intelligence (AI). One of the main parameters to measure image classification performance is accuracy. However, accuracy in Convolutional Neural Networks (CNN) is a challenging problem if there is a limited dataset in number with slight differences between each class. This research aims to improve the performance of CNN for the classification of corrosion images, including increasing accuracy. ResNet-18, as a pre-trained network, is used in this research. Some strategies were done, such as pre-processing and augmentation dataset, transfer learning, fine-tuning and modifying ResNet-18 network architecture and tuning the hyperparameter of ResNet-18. We use the corrosion dataset, which has multiple classes. It has 600 different images that are divided into five different classes. This research reveals that the proposed method increases accuracy from 72,22% to 93.89%, precision score of 0.94, recall of 0.94, and F1-score of 0.94.

03:35 PM **Automated Summarization of E-Commerce Application Reviews for Generating Application Descriptions to Enhance Customer Insights**
Authors: Jessica Berliani, Alicia Jocelyn Siahaya, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (*Bina Nusantara University, Indonesia*)

Abstract: In the digital commerce era, online reviews are crucial in shaping consumer decisions and perceptions, particularly on e-commerce platforms like Tokopedia and Shopee in Indonesia. However, the large volume of user reviews can be overwhelming, making it challenging for consumers to identify relevant insights efficiently. This research addresses this issue by focusing on abstractive text summarization of user reviews, specifically using T5-small and DistilBART

CNN 12-6 models. The methodology includes data collection from the Google Play Store, followed by preprocessing, manual summarization, and model training. The models are evaluated based on ROUGE metrics (ROUGE-1, ROUGE-2, and ROUGE-L) to assess their performance in creating coherent, human-like summaries. The findings provide a foundation for developing summarization techniques that enhance the accessibility of user feedback, helping consumers make informed decisions while supporting application improvements.

- 03:50 PM** **Beyond the Naked Eye: AI-Driven Sugarcane Quality Assessment Using Deep Learning**
Authors: Muhammad Juanda, Nur Ichsan Utama, and Sinung Suakanto (Telkom University, Indonesia)
Abstract: In the digital era, the demand for automated systems that enhance industrial efficiency and accuracy has become increasingly critical, particularly in the assessment of raw materials such as sugarcane. Sugar factories face challenges in manually evaluating sugarcane quality, which often lacks consistency due to human subjectivity and affects overall productivity. This study proposes a deep learning based approach using Convolutional Neural Networks (CNN), specifically the YOLOv10 architecture, to automate sugarcane quality prediction through CCTV based monitoring. The system enables real time quality assessment via IoT-connected cameras, linked directly to the trained deep learning model. The proposed model achieves an accuracy of 81%, significantly improving reliability compared to manual evaluation, while also streamlining the assessment process by reducing reliance on manual inspection, which can be inefficient and prone to misclassification due to human subjectivity. The development was carried out using an Iterative Incremental methodology in two phases to ensure adaptability to operational requirements in the field. The results demonstrate that the proposed YOLOv10 based system enhances the accuracy of sugarcane quality assessment, optimizes decision making.
- 04:05 PM** **An Extensive Experiment on Emotion Classification in Social Media Utilizing Multiple Text Representation Techniques and Deep Recurrent Neural Networks**
Authors: Steve Marcello Liem, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia)
Abstract: Emotion classification in text is essential for applications such as sentiment analysis and mental health monitoring, particularly in social media, where users frequently share opinions and emotions. This study evaluates three text representation techniques, namely Term Frequency-Inverse Document Frequency (TF-IDF), Word to Vector (Word2Vec), and Global Vectors for Word Representation (GloVe), combined with four deep recurrent neural networks, including Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), Bidirectional GRU (Bi-GRU), and Bidirectional LSTM (Bi-LSTM). Using a dataset of 393,822 samples categorized into six emotions, sadness, joy, love, anger, fear, and surprise, the data underwent preprocessing, including noise removal, spelling correction, and lemmatization. Exploratory Data Analysis (EDA) examined label distribution and linguistic patterns to inform model development. A two-step evaluation process selected models based on validation loss and F1-Score. Word2Vec with Bi-LSTM achieved the highest F1-Score of 0.9248, outperforming other configurations. Pre-trained embeddings like Word2Vec and GloVe demonstrated greater effectiveness than statistical approaches such as TF-IDF when paired with recurrent models
- 04:20 PM** **Bridging the Competency Gap: Aligning Digital Competency Framework 2.2 for Citizens with Public Sector Digital Competencies for Industry 4.0**
Authors: Riandoko Riko (Bandung Institute of Technology and PKN STAN, Indonesia); Siswanto Joko and Sari Hasrini (Bandung Institute of Technology, Indonesia)
Abstract: The systematic literature review examines public sector digital competencies in Industry 4.0 and the European Digital Competency Framework for Citizens (DigComp 2.2). As Industry 4.0 advances technology across sectors, public administration must improve digital competencies. Digital competency frameworks like DigComp 2.2 inform policy and education, but their use in public service is unclear and not Industry 4.0-ready. SPIDER and PRISMA were used to review 59 articles, and 11 met the final eligibility criteria. ROBIS identified 7 low-risk bias articles. In public sector literature, only 60 of DigComp 2.2's 327 sub-competencies (18.34%) were identified, highlighting a gap between citizen-oriented frameworks and the advanced digital competencies

needed for modern public service under Industry 4.0. The most common competency was information and data literacy (24), followed by communication and collaboration (20) and problem-solving (19). Digital content creation was mentioned only eight times, indicating a skills gap that could impede public service digital transformation. This study emphasizes the need to add Industry 4.0 skills like data analytics, cybersecurity, digital infrastructure management, and AI literacy to competency frameworks.

04:35 PM

Bridging the Physical and Virtual: Digital Twin Solutions with Arduino and FlexSim

Authors:

Camilo Ignacio Acosta-Acosta, Roberto Omar Andrade-Paredes, and Sonia Valeria Avilés-Sacoto (Universidad San Francisco de Quito USFQ, Ecuador)

Abstract:

Process simulations are used in modern industries, enabling the optimization of operations, reduction of costs and risks, enhancement of decision-making, and promotion of innovation. By experimenting with scenarios, adjusting variables, and predicting outcomes without requiring costly or risky physical tests, simulations provide valuable insights into complex phenomena, supporting behavior prediction and informed decisions. Digital twins take simulation a step further by creating dynamic, real-time virtual representations of physical systems or processes, facilitating a deeper understanding of their performance. These digital twins not only improve the efficiency and sustainability of products and processes but also enhance competitiveness in an increasingly digitalized world. This study emphasizes the importance of simulations and digital twins by presenting a practical approach using FlexSim software and Arduino technology. FlexSim's robust simulation capabilities, combined with Arduino's accessibility, provide a cost-effective and scalable solution for experimenting with interconnected physical and digital systems. This approach highlights essential principles of control, monitoring, optimization, and automation, offering a practical pathway to Industry 4.0 and advancing the digital transformation of modern industries.

Papers Presentation 3 – Online Breakout Room 2

Paper	Authors
Broadband Complex Impedance Transformers Realized Using Multi-Sectional Microstrip Lines	Nuwan Atthanayake (Sri Lanka Technology Campus, Sri Lanka); Disala Uduwawala (University of Peradeniya, Sri Lanka)
Central Bank Digital Currencies: a Technical Exploration of Infrastructure, Access, and Cross-Border Models	Rosa Indira, Andry Alamsyah, and Irni Yunita (Telkom University, Indonesia)
Cloud Computing Adoption in the Education Sector	Muhammad Stiven Pratama, Joseph Marcelino Susanto, Banu Salman, Maulana Agung Hidayat, Reynard Hans Prayoga, and Adele B L Mailangkay (Bina Nusantara University, Indonesia)
CPU Usage Forecasting for Load Balancing in Kubernetes Using LSTM: a Synthetic Traffic Simulation Approach	Amirullah (Politeknik Negeri Lhokseumawe, Indonesia); Ahmad Saikhu (Sepuluh Nopember Institute of Technology, Indonesia)
Contextual Tourism Access Through Geographic Information System with Recommendation System: the Case of Greater Bandung	Amanda Amelia, Taufik Nur Adi, Sinung Suakanto, and Safara Cathasa Riverinda Rijadi (Telkom University, Indonesia)
Contextual Spelling Corrector for Indonesian Text Preprocessing: a Comparative Analysis of Large Language Models	Matthew Lefrandt, Elvina Benedicta Santoso, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia)

03:20 PM **Broadband Complex Impedance Transformers Realized Using Multi-Sectional Microstrip Lines**

Authors: Nuwan Atthanayake (Sri Lanka Technology Campus, Sri Lanka); Disala Uduwawala (University of Peradeniya, Sri Lanka)

Abstract: A multi-sectional complex impedance transformer (CIT) is proposed for broadband microwave applications. It combines two single-section CITs with a Chebyshev transformer to achieve increased bandwidth for complex-to-complex impedance transformation. The multi-sectional Chebyshev transformers are broadband but limited to real impedance transformations. The single line sections can transform complex impedances but with a limited bandwidth. In this paper, we combine the two types to obtain a broadband CIT. The proposed multi-sectional CIT is simulated for different load and source impedances to cover various regions in the Smith chart. The simulations show that a bandwidth increment of around 130-350% could be achieved as compared to single-section or double-section CITs. Three multi-sectional CITs are fabricated, each demonstrating a nearly identical increase in bandwidth compared to the simulations. Although there are minor reductions, and these are likely caused by imperfections in the fabrication process. In addition, a new approach is suggested to synthesize and design a Double-section CIT with an intermediate real impedance, which can be optimally selected to minimize the electrical length and hence maximize the bandwidth.

03:35 PM **Central Bank Digital Currencies: a Technical Exploration of Infrastructure, Access, and Cross-Border Models**

Authors: Rosa Indira, Andry Alamsyah, and Irni Yunita (Telkom University, Indonesia)

Abstract: Central Bank Digital Currencies (CBDCs) represent a critical innovation in the era of Industry 4.0, combining the technological advancements of digital currencies with the regulatory oversight of central banks. Despite increasing interest, gaps remain in understanding how technical design choices influence CBDC integration into financial systems. This study addresses this gap by examining key technical characteristics of CBDCs across three critical dimensions through a systematic literature review: Infrastructure and Functionality, Access and Transfer Mechanisms, and Cross-Border Payments. The Infrastructure and Functionality dimension examines architectural models (one-tier vs. two-tier), and the integration of blockchain and Distributed Ledger Technology (DLT), non-DLT, and hybrid systems, with a focus on how these frameworks

impact CBDC performance. The Access and Transfer Mechanisms dimension focuses on access models (token-based vs. account-based) and transfer methods (online vs. offline). The Cross-Border Payments dimension explores interoperability through three potential models: Compatible CBDC Systems, Linking Multiple CBDC Systems, and Single Multi-Currency Systems. By synthesizing insights from ongoing global CBDC projects such as Project Garuda, Project Jura, and e-CNY, this research develops a refined taxonomy that categorizes and maps technical design elements of CBDCs. The findings provide a comprehensive transformative mapping of CBDC's technical aspects, supporting policymakers, regulators, and developers to navigate implementation challenges and achieve the goals of Industry 4.0. Future studies could further investigate specific use cases to optimize CBDC frameworks.

03:50 PM

Cloud Computing Adoption in the Education Sector

Authors:

Muhammad Stiven Pratama, Joseph Marcelino Susanto, Banu Salman, Maulana Agung Hidayat, Reynard Hans Prayoga, and Adele B L Mailangkay (Bina Nusantara University, Indonesia)

Abstract:

The rapid advancement of technology has made the use of cloud computing increasingly popular in various sectors, especially in education. This study uses the Technology Acceptance Model (TAM) to examine the factors that influence the adoption of cloud computing technology in the education sector. This research uses a quantitative approach by distributing online questionnaires to 100 students aged 16 to 22 years in the Jakarta, Tangerang, Depok and Bekasi areas. The main variables studied in this study include perceived usefulness, perceived ease of use, perceived risk, user satisfaction, and intention to use. The collected data were analyzed using PLS-SEM method with SmartPLS. The results showed that perceived usefulness and perceived ease of use have a positive effect on user satisfaction and intention to use cloud computing services, while perceived risk has no significant effect directly. This study provides insights for educational institutions and cloud computing service providers in designing effective implementation strategies to support digital learning in the future

04:05 PM

CPU Usage Forecasting for Load Balancing in Kubernetes Using LSTM: a Synthetic Traffic Simulation Approach

Authors:

Amirullah (Politeknik Negeri Lhokseumawe, Indonesia); Ahmad Saikhu (Sepuluh Nopember Institute of Technology, Indonesia)

Abstract:

Kubernetes offers automatic scaling; however, the accuracy of predicting resource requirements remains a challenge in dynamic workload environments. This research proposes LSTM to predict CPU usage in real-time on Kubernetes. The dataset was obtained from e-commerce server logs, and a distribution that identified the beta distribution as the best choice (AIC & BIC). Synthetic data based on the Beta distribution is then simulated using k6, resulting in a time series of CPU usages. The results show that LSTM outperforms ARIMA and GRU with the lowest MSE (0.00001053) and RMSE (0.00324451). The proposed approach can enhance resource allocation efficiency and application stability, as well as provide opportunities to develop real-time workload predictions for more adaptive auto-scaling on Kubernetes

04:20 PM

Contextual Tourism Access Through Geographic Information System with Recommendation System: the Case of Greater Bandung

Authors:

Amanda Amelia, Taufik Nur Adi, Sinung Suakanto, and Safara Cathasa Riverinda Rijadi (Telkom University, Indonesia)

Abstract:

The rapid growth of tourism requires service providers to deliver complete, accurate, relevant, and easily accessible information, as current tourism data is widely distributed and complex. Numerous travel platforms provide only generic destination information, overlooking tourists' contextual needs and real-time conditions. Consequently, this often leads to confusion and less personalized decision-making among tourists, reducing the overall quality of their tourism experience. To address these challenges, this research aims to develop a web-based Geographic Information System (GIS) that manages tourism information and offers contextually relevant information tailored to tourists' needs and conditions. The GIS was developed using Next.js by implementing the Design Science Research method. The case study focuses on Greater Bandung, a major tourist destination in Indonesia, facing challenges in managing and delivering accessible

tourism information. Key features of the system include category-based recommendations of popular destinations using Bayesian weighted rating, a location-based search within a specified radius, weather-informed suggestions, and comprehensive information on tourist attractions and nearby supporting facilities. Black-box testing of the destination management feature confirms the system's proper functioning. Usability testing from the tourists' side resulted in an average SUS score of 91, reflecting a high level of system usability and user-friendliness.

04:35 PM **Contextual Spelling Corrector for Indonesian Text Preprocessing: a Comparative Analysis of Large Language Models**

Authors: Matthew Lefrandt, Elvina Benedicta Santoso, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia)

Abstract: Spelling errors are a major problem in Natural Language Processing (NLP), particularly when it comes to Indonesian text, since they might reduce the performance of subsequent NLP models. To guarantee cleaner data and improve model performance in applications such as information retrieval, machine translation, and sentiment analysis, it is imperative to rectify such problems during text preprocessing. The purpose of this study is to evaluate and compare the efficacy of current transformer-based models for Indonesian spelling correction and optimize the top-performing model. To meet the demand for efficient spelling correction in Indonesian, the Spell Error Corpus for Indonesian Language (SPECIL) dataset was used. A pre-trained transformer, i.e. BART and T5 were experimented. To choose the best model for fine-tuning, the models were assessed based on BLEU score, edit distance, and character correctness. The T5 Base model achieved the best performance with a BLEU score of 0.9380, an edit distance of 0.2533, an exact match of 0.8656, and a character accuracy of 0.9638. This study highlights the importance of transfer learning in tackling language-specific NLP difficulties by showing how transformer models may be refined to produce an efficient spelling correction tool for Indonesian.

Technical Paper

Papers Presentation Session Day 2: July 4, 2025

Papers Presentation 4 - Onsite

Paper	Authors
Scalarization Machine Learning Module for Counterpoising Interpretability, Deep Learning, and Construct Validity Amidst Uncertainty	Steve Chan (Harvard University, USA).
Machine Learning-Empowered Mode Selection for QoS Improvement in D2D-Assisted Communication Networks	Nuha Adiba Binti Mohd Ridzuan (ACRI, Malaysia), Hafiz Muhammad Fahad Noman, Effariza Hanafi, Kamarul Ariffin Noordin, and Kaharudin Dimiyati (University of Malaya, Malaysia).
Future Trends of Energy Consumption in Indonesia Through CNN-Based Modeling	Lindiasari Martha Yustika, Rifki Rahman Nur Ikhsan, Jangkung Raharjo, Areta Adelia Callista, and Muhammad Albaihaq Abdiary. YL (Telkom University, Indonesia).
Fuzzy Logic-Based Energy Potential Assessment for Hydropower in the Davao Region Using GIS	Carlson B. Casenas (Ateneo de Manila University, Philippines) and King Harold A Recto (Ateneo de Manila University, Philippines)
Malware Classification Using Deep Learning on National Cyber and Crypto Agency Honeynet Data	Daffa Hari Lesmana (Cyber and Crypto Polytechnic, Indonesia) and Nurul Qomariasih (Poltek Siber Dan Sandi Negara, Indonesia)

08:00 AM **Scalarization Machine Learning Module for Counterpoising Interpretability, Deep Learning, and Construct Validity Amidst Uncertainty**

Authors: Steve Chan (Harvard University, USA)

Abstract: A bespoke Artificial Intelligence System (AIS) linchpin Machine Learning (ML) module focused upon Multi-Objective Optimization Problem (MOOP) scalarization is investigated for the purposes of enhancing the construct validity for a "Domain Knowledge Communication" (DKC) paradigm of an ML model's inferential process. The Multi-Objective Decision-Making (MODM)-related MOOP scalarization is constrained to the progression from attributes to certain inferred latent variables of the interim notions of the predicted class/concept(s) being alluded to. The experimental testbed utilized to operationalize the aforementioned leveraged some specific presets, among others: (1) a Lower Ambiguity Higher Uncertainty (LAHU) module (given a sufficiently robust repertoire of experience, the tolerance for uncertainty is higher), which served as a proxy to the "domain knowledge" itself (e.g., via isomorphic apriori experience), (2) a Higher-Order Network (HON) discernment module (to ascertain if certain Influence Dominating Sets or IDS are at play), and (3) a Dynamic Assessment and Weighting System (DAWS) (to ascertain the most apropos weights to be utilized). The conjoining of these three key presets with MOOP scalarization for construct validity enhancement - related to the DKC facet - exhibits promise, and further work is planned.

08:20 AM **Machine Learning-Empowered Mode Selection for QoS Improvement in D2D-Assisted Communication Networks**

Authors: Nuha Adiba Binti Mohd Ridzuan (ACRI, Malaysia), Hafiz Muhammad Fahad Noman, Effariza Hanafi, Kamarul Ariffin Noordin, and Kaharudin Dimiyati (University of Malaya, Malaysia).

Abstract: Device-to-device (D2D) communication has the potential to enhance network efficiency in upcoming sixth-generation (6G) wireless networks by enabling direct communication between users. However, in ultra-dense network environments, severe interference can degrade D2D performance, potentially leading to suboptimal Quality of Service (QoS) for some users. To address this challenge, we propose a machine learning-based approach for dynamic mode selection between device-to-device (D2D) and cellular communication, aiming to improve network efficiency and ensure optimal user satisfaction. The proposed framework leverages clustering algorithms including k-means and k-medoids to segregate users based on channel gain, Signal-to-Interference-plus-Noise Ratio (SINR), and path loss. Furthermore, we employ binary classification models including k-Nearest Neighbor (k-NN), Naive Bayes, and Support Vector Machine (SVM), to predict the optimal communication mode, using achievable data rate as the performance metric. Simulation results demonstrate that k-medoids clustering coupled with a cubic SVM classifier achieves the highest accuracy of 98.36%, leading to significant performance improvements. Moreover, k-medoids-based mode selection results in a 19.66% throughput increase, and a 20.37% reduction in energy consumption, outperforming k-means-based approaches for enhancing the QoS in D2D-assisted communication.

08:40 AM **Future Trends of Energy Consumption in Indonesia Through CNN-Based Modeling**

Authors: Lindiasari Martha Yustika, Rifki Rahman Nur Ikhsan, Jangkung Raharjo, Areta Adelia Callista, and Muhammad Albaihaq Abdiary. YL (Telkom University, Indonesia).

Abstract: Accurate electricity load forecasting is essential for balancing supply and demand, optimizing energy distribution, and improving cost efficiency. This study presents a CNN-based model for long-term electricity load forecasting in Indonesia, leveraging 1D Convolutional Layers (Conv1D) to extract patterns from historical consumption data (1989-2020) across multiple sectors. Using a sliding window approach, the model captures temporal dependencies and performs multi-step forecasting up to 30 years ahead. Evaluation against GRU and ARIMA shows CNN's superior accuracy, achieving a MAPE of 4.30% and R^2 of 0.87, outperforming GRU (MAPE 6.24%) and ARIMA (MAPE 8.60%). CNN's ability to capture seasonal patterns and long-term trends without recurrent architectures makes it a promising tool for national energy planning. Its flexibility and scalability allow adaptation to various future scenarios, supporting sustainable electricity supply and informed policymaking.

09:00 AM **Fuzzy Logic-Based Energy Potential Assessment for Hydropower in the Davao Region Using GIS**

Authors: Carlson B. Casenas (Ateneo de Manila University, Philippines) and King Harold A Recto (Ateneo de Manila University, Philippines)

Abstract: This work integrates fuzzy logic modeling with a Geographic Information System (GIS) based technique to assess the energy potential of hydropower in the Davao Region, Philippines. Multiple geographic datasets-including Digital Elevation Models (DEM), river networks, road proximity, and slope analysis)-are analyzed using QGIS to find ideal sites for hydropower production. By establishing membership functions for important criteria including slope, river proximity, and infrastructure accessibility, the paper uses fuzzy logic to handle uncertainty in site selection. By allowing a disciplined and flexible evaluation system, these fuzzy sets help to reduce data variability and improve decision-making correctness. Matching Industry 4.0 developments in intelligent decision support systems, the resultant hydropower potential map offers insights for sustainable energy planning. Beyond Mindanao and the Philippines, this method offers a scalable framework for regional hydropower development and is especially helpful for surrounding ASEAN countries with comparable natural resources.

09:20 AM **Malware Classification Using Deep Learning on National Cyber and Crypto Agency
Honeynet Data**

Authors: Daffa Hari Lesmana (Cyber and Crypto Polytechnic, Indonesia) and Nurul Qomariasih (Poltek Siber Dan Sandi Negara, Indonesia)

Abstract: The rapid growth of malware poses a serious threat to cybersecurity, prompting experts to look for more sophisticated classification methods. In a recent study, a team of researchers utilized the power of deep learning to identify malware using real data from the National Cyber and Crypto Agency (NCCA) honeynet. By converting the malware files into grayscale images, three well-known CNN algorithms-VGG19, ResNet50, and EfficientNetV2B0-were tested to recognize the destructive patterns. The results showed that EfficientNetV2B0 beat both competitors with near-perfect accuracy (98%). Uniquely, conventional approaches such as data augmentation - such as rotating the image or changing the contrast - in this study led to a reduction in the model's performance. This is because visual modifications might cause the distinctive features of the malware to be altered, making it difficult to identify. The best model will be implemented in a Streamlit-based web application that allows users to upload files and instantly view classification results. This brought the academic findings into the practical realm, making it easier for cybersecurity analysts in their daily work. This research not only enriches the development of adaptive malware detection techniques, but also provides valuable lessons on the challenges of AI model optimization in the digital security field.

Papers Presentation 4 - Online Breakout Room 1

Paper	Authors
Detecting Fake Boarding House Listings Using Multimodal Deep Learning	Fahmi Agus Sulistio, Sinung Suakanto, Nia Ambarsari, and Safara Cathasa Riverinda Rijadi (Telkom University, Indonesia)
Development of Robotic-Based Early Fire Detection and Warning System for Supermarket	Tinh Tran Van (Hanoi University of Science and Technology, Vietnam), Phong Bui Thanh (Hanoi University of Science and Technology, Vietnam), Khanh Le Nguyen Nam (British Vietnamese International School, Vietnam), Thanh Le Thi Hai (Hanoi University of Science and Technology, Vietnam), Tan Nghia Duong (Hanoi University of Science and Technology, Vietnam)
Dual-Branch Feature Extraction via Discrepancy-Aware Fusion with Evidential Deep Learning for Sarcasm Detection	Takato Ueno (Shiga University, Japan), and Keito Inoshita (Kansai University & Shiga University, Japan)
Decentralized Autonomous Organization Framework for Business Operations	Desiree E. Esguerra, Jhon Paul B. Galing, Erika Mae R. Dionisio, Christian Joshua Dadia, Annjeannette Alain Dimaya Galang, and James Patrick A. Acang (Mariano Marcos State University, Philippines).
Deep Learning Approaches for Lower-Grade Gliomas Segmentation in MRI Images Leveraging U-Net and DeepLabV3+ Architectures	Thomas Gozalie, and Alexander Agung Santoso Gunawan (Bina Nusantara University, Indonesia)
Developing Filipino and Cebuano ASR Systems with Children's Speech Corpora on Healthcare Monitoring	Ronald Pascual, Gretel V. Mendoza, Alessandro Miguel Zapanta, and Kyle Angelo Lino (De La Salle University, Philippines).
Determinant Factors of Social Environment Characteristic in Social Commerce Using s-O-R Methodology	Gladys Patricia, Raffael Wiratna, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).
Digital Innovation Readiness: a Qualitative Analysis of Challenges and Opportunities Among Micro, Small, and Medium Enterprise	Jaypy Tenerife, Alonica R Villanueva, Ma. Elena Estebal, Menchie Rosales, and Rafael Veloso (Technological Institute of the Philippines - Quezon City, Philippines).

08:00 AM **Detecting Fake Boarding House Listings Using Multimodal Deep Learning**

Authors: Fahmi Agus Sulistio, Sinung Suakanto, Nia Ambarsari, and Safara Cathasa Riverinda Rijadi (Telkom University, Indonesia)

Abstract: The increasing popularity of online boarding house rental platforms is unfortunately accompanied by a rise in fraud cases in the form of fake listings. These fake listings often display misleading text descriptions and manipulated boarding house images. Manual fraud detection by platform administrators has proven unable to keep up with the large volume of data and the variety of complex fraud modes. As a solution, this study proposes a multimodal deep learning model that integrates textual features extracted from IndoBERT with visual representations obtained from a lightweight CNN to classify rental listings as either real or fake. The dataset comprises 1,632 authentic listings and 1,000 synthetically generated fake entries. The proposed model achieves a classification accuracy of 97.91%, outperforming unimodal approaches that rely solely on text or image inputs. To improve the interpretability of the model, we employ Grad-CAM and t-SNE visualization. The experimental results demonstrate that the multimodal strategy is effectively in identifies manipulative patterns

within rental listings, highlighting its potential for deployment as an automated moderation tool in online boarding house platforms.

08:15 AM **Development of Robotic-Based Early Fire Detection and Warning System for Supermarket**

Authors: Tinh Tran Van (Hanoi University of Science and Technology, Vietnam), Phong Bui Thanh (Hanoi University of Science and Technology, Vietnam), Khanh Le Nguyen Nam (British Vietnamese International School, Vietnam), Thanh Le Thi Hai (Hanoi University of Science and Technology, Vietnam), Tan Nghia Duong (Hanoi University of Science and Technology, Vietnam).

Abstract: This paper presents designing and implementing an early fire warning system using robotics for supermarket environments. The proposed system leverages a YOLO-based object detection model to identify fire and smoke in real-time. The hardware architecture integrates Raspberry Pi 4, Arduino UNO, and various sensors for enhanced accuracy and responsiveness. The system was tested in controlled supermarket environments, demonstrating high reliability and efficiency. The YOLO-based detection model achieved a precision of 95% and a recall rate of 96%, ensuring accurate fire detection. The system's response time was recorded at an average of 2 seconds, significantly faster than conventional smoke-based detection systems. Furthermore, the robotic platform successfully navigated supermarket aisles and provided continuous monitoring with a coverage rate of 98%. These results highlight the effectiveness of integrating deep learning and robotics for early fire detection. Future enhancements will improve navigation algorithms and integrate cloud-based alert mechanisms for remote monitoring.

08:30 AM **Dual-Branch Feature Extraction via Discrepancy-Aware Fusion with Evidential Deep Learning for Sarcasm Detection**

Authors: Takato Ueno (Shiga University, Japan), and Keito Inoshita (Kansai University & Shiga University, Japan).

Abstract: Sarcasm detection has been considered a challenging task for large language models (LLMs) due to their inability to accurately capture the discrepancy between surface meaning and intended sentiment. While traditional deep learning approaches have been explored to enhance sarcasm detection, they often fail to effectively handle the ambiguity of sarcasm, making it difficult to distinguish surface-level features from underlying emotional expressions. In this study, we propose Dual-Branch Feature Extraction via Discrepancy-Aware Fusion with Evidential Deep Learning (DBDA-EDL), a deep learning-based approach that explicitly captures the semantic discrepancy characteristic of sarcasm and utilizes evidence-based learning. The proposed model consists of three key components: Dual-Branch Feature Extraction (DBFE), which independently extracts literal meaning and emotional aspects; Discrepancy-Aware Fusion (DAF), which emphasizes branch-wise differences using a bilinear gate to model semantic discrepancy; and Evidential Deep Learning (EDL), which assigns low confidence to ambiguous samples, thereby improving uncertainty estimation. Experimental results demonstrate that DBDA-EDL outperforms MF-CNN, BiLSTM, CNN+BiLSTM, and MHA-CovBi, achieving superior classification performance and learning efficiency compared to previous models. These findings validate DBDA-EDL as a highly accurate and reliable approach for sarcasm detection.

08:45 AM **Decentralized Autonomous Organization Framework for Business Operations**

Authors: Desiree E. Esguerra, Jhon Paul B. Galing, Erika Mae R. Dionisio, Christian Joshua Dadia, Annjeannette Alain Dimaya Galang, and James Patrick A. Acang (Mariano Marcos State University, Philippines).

Abstract: Small and Medium Enterprises face delays and inefficiencies due to centralized decision-making structures. This study proposes a blockchain-powered Decentralized Autonomous Organization framework to automate governance processes and enhance transparency, and empower stakeholders. Results from three SME trials show a forty percent reduction in

approval delays and an eighty percent improvement in resource allocation transparency, demonstrating the framework's potential to transform traditional business operations. The framework seeks to overcome some of the traditional business challenges, including decision-making inefficiency, transparency, and inflexible business processes. The study makes use of a mixed method research approach, where quantitative and qualitative data collection are combined with the effect of the Decentralized Autonomous Organization model on organizational performance. This study proves that the Decentralized Autonomous Organization model has the potential to significantly improve organizational agility and management excellence to improve organizational success in competitive business environments.

09:00 AM **Deep Learning Approaches for Lower-Grade Gliomas Segmentation in MRI Images Leveraging U-Net and DeepLabV3+ Architectures**

Authors: Thomas Gozalie, and Alexander Agung Santoso Gunawan (Bina Nusantara University, Indonesia)

Abstract: Lower-grade gliomas are brain tumors in their early stages, in which the tumors are still localized in certain parts of the brain. Early detection of brain tumors are important for improving a tumor patient's prognosis, as this can help the patient in getting treatment before the tumor spreads to distant parts of the body through metastasis. The proposed method for brain tumor detection is through image segmentation, by which two popular deep learning image segmentation models, U-Net and DeepLabV3+, are trained and tested on the Lower-Grade Gliomas Segmentation dataset, with the goal of producing an accurate and precise segmentation mask as a prediction of where the tumor may or may not be. Due to the imbalance in the dataset where there are a lot of samples with blank mask labels, the non-blank samples in the training set is oversampled. After training with the oversampled training set, faster convergence is observed, as well as better results compared to training without oversampling. U-Net and DeepLabV3+ achieved Dice Scores of 0.9325 and 0.9468 respectively in the test split after training with a 3:1 ratio between samples with masks greater than or equal to 20x20 in area, and samples with masks smaller than 20x20. This is a significant increase from the models' performance without oversampling, where U-Net and DeepLabV3+ achieved 0.8802 and 0.9154 Dice Score respectively.

09:15 AM **Developing Filipino and Cebuano ASR Systems with Children's Speech Corpora on Healthcare Monitoring**

Authors: Ronald Pascual, Gretel V. Mendoza, Alessandro Miguel Zapanta, and Kyle Angelo Lino (De La Salle University, Philippines).

Abstract: Automatic Speech Recognition (ASR) systems play a crucial role in converting spoken language from audio recordings into text, facilitating the extraction of linguistic data, and the creation of transcriptions. These can be applied in healthcare where audio serves as an alternative input to applications like a chatbot. Creating ASR systems for these purposes presents obstacles, particularly for low-resource languages such as Filipino and Cebuano in the Philippines. Although a previous study has effectively trained ASR models for Filipino and Cebuano using healthcare-oriented datasets with adult speakers, the difficulty persists in using these systems to decode children's speech. This study aims to bridge this gap by developing baseline Filipino and Cebuano ASR systems trained on children's speech and tailored for healthcare monitoring. Additional children's speech data were collected and processed while existing base corpora from a healthcare chatbot project were reviewed. Various versions of the dataset and configurations were also used to experiment with lowering the word error rate (WER). The best-performing iteration of the Filipino ASR model had a word error rate of 25.59%, while the Cebuano ASR performed significantly better with a 16.80% word error rate. These performed reasonably well when compared to Google ASR. Future work involves increasing the data, using more thorough and complex pre-processing techniques, and adjusting the ASR system to better cater to specific healthcare uses.

09:30 AM **Determinant Factors of Social Environment Characteristic in Social Commerce Using s-O-R Methodology**

Authors: Gladys Patricia, Raffhael Wiratna, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).

Abstract: This study explores how the unique dynamics of social commerce environments influence customer interaction, perceived value, and engagement, ultimately enhance purchase intentions. Using the Stimulus-Organism-Response (S-O-R) framework, it investigates the role of community, personalization, social aspects, and interactivity in shaping customer-to-customer interactions, such as product and interpersonal exchanges. These interactions are further analyzed to understand their impact on functional, emotional, and social value dimensions, and how they contribute to customer engagement and purchase decisions. Employing Structural Equation Modeling (SEM), the research validates the intricate relationships between these variables, uncovering actionable insights for social commerce platforms. While community, social aspects, and interactivity emerged as pivotal drivers of trust, engagement, and loyalty, the findings reveal that personalization-often considered a cornerstone of customer experience-shows insignificant influence on engagement. This highlights the need for refined, context-aware personalization strategies. The study contributes to understanding the dynamics of social commerce environments by highlighting the significance of trust-building, interactivity, and meaningful customer interactions in shaping user experience and loyalty. These insights are pivotal for social commerce platforms aiming to enhance customer satisfaction, optimize user experience, and maintain competitive advantages. This research underlines the need for tailored strategies that align with consumer priorities, fostering a balance between social and transactional elements to drive sustained engagement and purchase behaviors.

09:45 AM **Digital Innovation Readiness: a Qualitative Analysis of Challenges and Opportunities Among Micro, Small, and Medium Enterprise**

Authors: Jaypy Tenerife, Alonica R Villanueva, Ma. Elena Estebal, Menchie Rosales, and Rafael Veloso (Technological Institute of the Philippines - Quezon City, Philippines).

Abstract: The research assessed the readiness of Micro, Small, and Medium Enterprises (MSMEs) in the Philippines' National Capital Region (NCR) to adopt digital transformation technologies, focusing on the manufacturing sector. In-depth interviews (IDIs) and focus group discussions (FGDs) were conducted with key informants categorized as innovators, adopters, and resisters using a qualitative approach. The study explored factors influencing technology readiness and adoption, offering insights into how MSMEs integrate new technologies into their operations. A Digital Framework was developed based on these findings, addressing the unique challenges MSMEs face in developing countries like the Philippines. Thematic analysis identified key factors such as workforce adaptability, business processes, time, and cost. These insights highlighted workforce skills, hiring practices, technological integration, supply chain management, quality control, waste management, innovation, and collaboration. The study also discussed strategies to overcome barriers to digital transformation. It provides recommendations for MSMEs in NCR, covering innovation boosters, drivers of innovation, and cultural resistance to change. The findings can serve as a model for other regions in the Philippines and Southeast Asia, advancing the understanding of digital transformation in the manufacturing sector.

Papers Presentation 4 - Online Breakout Room 2

Paper	Authors
Cryptography Skill Trees: Key Topic Identification and Knowledge Graph Modelling in the Field of Cryptography Within a Cyber Security Context	Bill Elim (Bina Nusantara University & Seclab Indonesia, Indonesia), Teresa Anjori, Yohan Muliono, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).
Dimensionality Reduction Using Variational Autoencoder to Reconstruct Artistic Arabic Calligraphy Characters	Siraj Reda Allaf, Sultan S. Zagzooq, Zaid A. Alqudsi, Muhammad Bilal, and Mohammed J Abdulaal (King Abdulaziz University, Saudi Arabia)
Developing a Data-Driven Dashboard for Monitoring and Evaluating Research and Community Service in Higher Education	Andi Amalia Rizqi Nursyams, Tien Fabrianti Kusumasari, and Sinung Suakanto (Telkom University, Indonesia).
Cyberbullying Detection on Twitter: a Comparison of One-Step vs. Two-Step Classification Approaches	Davin Edbert Santoso Halim, Felicia Andrea Tandoko, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).
Disgusting AI-Generated Images: Causes and Detection	Xu Zhou, Chibuike Onuoha, Shihao Luo, and Truong Cong Thang (The University of Aizu, Japan).
Disrupting Test Development with AI Assistants	Vijay Joshi, and Iver Band (Concora Credit Inc, USA)
Data Security Challenges in Financial Service and Insurance Industry: an Analysis of Data Protection, IoT and IT Infrastructure Factors	Dicky Hida Syahchari, and Miguel Pinesela (Bina Nusantara University, Indonesia).
SHAP Explainability: an Ensemble Learning Approach for Student Performance Prediction	Ghalia Nassreddine, Loubna Saleh, Mohamad Al Majzoub, and Amal El Arid (Rafik Hariri University, Lebanon).

08:00 AM Cryptography Skill Trees: Key Topic Identification and Knowledge Graph Modelling in the Field of Cryptography Within a Cyber Security Context

Authors: Bill Elim (Bina Nusantara University & Seclab Indonesia, Indonesia), Teresa Anjori, Yohan Muliono, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).

Abstract: Cybersecurity is a rapidly growing field and is now an inseparable part of modern organizations. To fulfill the rise in demand for skilled cybersecurity practitioners, cybersecurity education and training have become essential. This paper proposes the creation of a cybersecurity-related knowledge graph for the purpose of cybersecurity education. Due to limitations in time and resources, the knowledge graph created will cover the field of cryptography, a subfield of cybersecurity. Sources pertaining to cryptography are scraped from the web, pre-processed, and separated into documents based on topic. A label is decided for each document, using a combination of keyword extraction via KeyBERT and Gemini Pro. The cosine similarity between the documents are calculated and normalized to create a similarity matrix. Each keyword in the similarity matrix is grouped into clusters based on a certain threshold. The keyword clusters are then represented in the form of a knowledge graph. The resulting graph is well within our expectation, with keywords within the same cluster being close together and with general topics populating a central position. Ultimately, with enough time and resources, this research aims to cover the entirety of the cybersecurity field and contribute to the creation of an adaptive learning system for cyber security.

08:15 AM Dimensionality Reduction Using Variational Autoencoder to Reconstruct Artistic Arabic Calligraphy Characters

Authors: Siraj Reda Allaf, Sultan S. Zagzooq, Zaid A. Alqudsi, Muhammad Bilal, and Mohammed J Abdulaal (King Abdulaziz University, Saudi Arabia)

Abstract: In this paper, we introduce a Variational Autoencoder (VAE) model designed to reconstruct images of artistic Arabic calligraphy characters. One of the major challenges in this field is the limited availability of datasets containing artistic Arabic calligraphy that are written with calligraphy pens and adhere to traditional artistic rules, making it difficult to develop models that accurately capture the unique visual and structural intricacies of the script. To address this issue, we propose a method to compress the vector representation from 28x28 pixel images in the input layer to a 26-dimensional latent space while leveraging two newly developed artistic Arabic calligraphy datasets. Various VAE configuration parameters were tested to enhance reconstruction efficiency. The training phase utilized the publicly available Arabic Handwritten Character Dataset (AHCD) and the two new datasets in the Naskh and Reqaa styles, created using specialized calligraphy pens. During testing, these datasets were evaluated individually and in combination, with the mean squared error (MSE) for each reconstruction experiment recorded. The average reconstruction MSE values were 0.0532, 0.0405, and 0.0289 for the Naskh, Reqaa, and combined datasets, respectively. Our results demonstrate the significance of dataset type in the quality of reconstructed artistic calligraphy and suggest future improvements through larger, more diverse datasets.

08:30 AM **Developing a Data-Driven Dashboard for Monitoring and Evaluating Research and Community Service in Higher Education**

Authors: Andi Amalia Rizqi Nursyams, Tien Fabrianti Kusumasari, and Sinung Suakanto (Telkom University, Indonesia).

Abstract: Universities have the duty to conduct research and community service in addition to teaching. Both must be done responsibly to improve the performance of higher education. However, some universities have not conducted research and community service effectively and not in accordance with the objectives of the university because the monitoring and evaluating process has not been thorough. Thus, a data-driven dashboard is needed for monitoring and evaluating research and community service that can harmonize the provision of data with university goals. The development of a suitable data-driven dashboard can use the Visual Information Seeking Mantra (VISM) 3.0 method which can help users find information from the dashboard for monitoring and evaluating purposes. Dashboard development uses the Design Science Research (DSR) method with the process of understanding the problem, developing the VISM 3.0 method to the implementation of data-driven dashboard development. Based on the test results using PSSUQ, the level of stakeholder satisfaction is very high with a score of 1.90 for System Usefulness (SysUse), a score of 2.07 for Information Quality (InfoQual), a score of 2.20 for Interface Quality (IntQual), and a score of 2.62 for Overall on the data-driven dashboard using VISM 3.0. Thus, VISM 3.0 can assist developers in developing data-driven dashboards that help in the process of monitoring and evaluating research and community service.

08:45 AM **Cyberbullying Detection on Twitter: a Comparison of One-Step vs. Two-Step Classification Approaches**

Authors: Davin Edbert Santoso Halim, Felicia Andrea Tandoko, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).

Abstract: Cyberbullying detection on social media platforms, especially on Twitter, is crucial for ensuring online safety and addressing harmful online behaviors. As cyberbullying becomes more common, automatic detection systems are essential for identifying abusive content and protecting users. This study compares two classification approaches: a one-step approach and a two-step approach, for detecting and categorizing cyberbullying content. The one-step approach classifies tweets into various categories of cyberbullying, while the two-step approach first determines whether a tweet contains cyberbullying or not, and then classifies it into specific categories if it does. We evaluate the performance of both models using three machine learning algorithms: Random Forest, XGBoost, and SVM, all optimized through hyperparameter tuning. The results show that the two-step approach outperforms the one-step approach, achieving an overall accuracy of 91% compared to 84% for the one-step approach.

XGBoost performs the best for binary classification, while SVM performs best in multiclass categorization. These results highlight the potential of the two-step approach in providing a more detailed understanding of cyberbullying and its types.

09:00 AM **Disgusting AI-Generated Images: Causes and Detection**

Authors: Xu Zhou, Chibuike Onuoha, Shihao Luo, and Truong Cong Thang (The University of Aizu, Japan).

Abstract: AI-generated images (AIGIs) can be created by prompts with unlimited creativity. However, like deep-fake videos, generated contents could result in social problems. In this paper, we focus on disgusting AIGIs, which could be very emotionally negative to viewers. We show that disgusting images can be easily created, both intentionally and accidentally. We also analyze both types of disgusting images by measuring the DisgustRate, which is defined as the percentage of disgusting images over the total number of generated images. Our findings show that the Disgust Rate of intentionally disgusting images is higher than accidentally disgusting images. In addition, we built a dataset of disgusting images and investigated the potentials of AI models to detect this kind of AI-generated images. We found that CLIP performs exceptionally well in disgusting image classification, achieving an average validation accuracy of up to 86.76%.

09:15 AM **Disrupting Test Development with AI Assistants**

Authors: Vijay Joshi, and Iver Band (Concora Credit Inc, USA)

Abstract: Recent advancements in large language models, including GPT-4 and its variants, and Generative AI-assisted coding tools like GitHub Copilot, ChatGPT, and Tabnine, have significantly transformed software development. This paper analyzes how these innovations impact productivity and software test development metrics. These tools enable developers to generate complete software programs with minimal human intervention before deployment. However, thorough review and testing by developers are still crucial. Utilizing the Test Pyramid concept, which categorizes tests into unit, integration, and end-to-end tests, we evaluate three popular AI coding assistants by generating and comparing unit tests for open-source modules. Our findings show that AI-generated tests are of equivalent quality to original tests, highlighting differences in usage and results among the tools. This research enhances the understanding and capabilities of AI-assistant tools in automated testing.

09:30 AM **Data Security Challenges in Financial Service and Insurance Industry: an Analysis of Data Protection, IoT and IT Infrastructure Factors**

Authors: Dicky Hida Syahchari, and Miguel Pinesela (Bina Nusantara University, Indonesia).

Abstract: In the era of digital transformation, data security is a critical concern for the Financial Services and Insurance (FSI) industry, where sensitive customer and operational data are constantly at risk from cyber threats. This study explores the key challenges related to data security in the FSI industry, focusing on three core areas: data protection, the Internet of Things (IoT), and IT infrastructure. Drawing from primary data collected through surveys of 150 industry professionals and secondary data from relevant literature, this research identifies vulnerabilities in data management, IoT integration, and IT systems. The findings indicate that while regulatory frameworks and encryption technologies enhance data security, weaknesses in IoT devices and fragmented IT infrastructure remain significant concerns. The study emphasizes the importance of adopting robust security measures, such as advanced encryption, real-time monitoring, and adaptive IT frameworks, to mitigate risks. This research provides actionable insights and a strategic framework to strengthen data security practices in Indonesia's FSI industry, ensuring compliance, resilience, and trust in an increasingly interconnected digital ecosystem.

09:45 AM **SHAP Explainability: an Ensemble Learning Approach for Student Performance Prediction**

Authors: Ghalia Nassreddine, Loubna Saleh, Mohamad Al Majzoub, and Amal El Arid (Rafik Hariri University, Lebanon).

Abstract: Student academic performance is a crucial metric of educational advancement, influenced by factors such as gender, age, instructional staff, and learning environments. Forecasting and evaluating student performance are essential for enabling educators to identify deficiencies and facilitate grade enhancement. A comprehensive understanding of feature contributions is essential for enhancing model interpretability and enabling informed decision-making in academic institutions. Explainable AI (XAI) is a set of techniques and strategies that aim to provide transparent and comprehensible justifications for the decisions made by artificial intelligence and machine learning models. This paper proposed an XGBoost ensemble learning model with the ADASYN technique to tackle the problem of the imbalanced dataset. A hyperparameter tuning phase was conducted subsequent to stratified k-fold cross-validation to enhance XGBoost performance. The efficacy of the suggested method was measured by accuracy, precision, and recall in identifying various performance levels. The results of applying this approach to a dataset collected from Kaggle demonstrate its effectiveness and robustness. Next, the significance of features was evaluated using the SHAP methodology, calculating each feature's contribution to the model's predictions. The findings highlight the importance of student attendance, as increased absences negatively impact performance. Furthermore, extracurricular involvement may adversely impact student grades. Furthermore, the duration of study has a beneficial effect on academic success.

Papers Presentation 4 - Online Breakout Room 3

Paper	Authors
Determinant Factors of Online Advertisements on Video Streaming Platforms' Effect on Purchase Intention Across Different Generations in Indonesia	Gratia Honestha Patiung, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).
Enhancing Domain-Specific Retrieval-Augmented Generation: Synthetic Data Generation and Evaluation Using Reasoning Models	Aryan Jadon, Avinash Patil (Juniper Networks, USA), and Shashank Kumar (University of Florida, USA).
Enhancing E-Commerce Fashion Fitting with Low-Cost Augmented and Virtual Reality	Irfan Armawan, and Hadziq Fabroyir (Institut Teknologi Sepuluh Nopember, Indonesia).
Evaluating User Satisfaction of Automated Border Control in Smart Airports: Case Studies from Indonesia	Bilal Prasetya Pinarung, and Elisa Indriasari (Bina Nusantara University, Indonesia).
Enhancing Mission Planner with Real-Time Cloud Integration for Semi-Autonomous Drone-Based Logistics	Nabil Afkar (Telkom University & Individual, Indonesia), Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia), and Dita Pramesti (Telkom University, Indonesia)
Bowtie Antenna with Modification to Reduce Radiation Arm Area and Use of Parabolic Reflector to Increase Power Dissipation in Antenna Coupled Microbolometer	Andrano Mario Hitipeuw (Universitas Indonesia, Indonesia), Aditya Inzani (Universitas Indonesia & National Research and Innovation Agency, Indonesia), and Catur Apriono (Universitas Indonesia, Indonesia).
Ensemble Learning Approach in Tackling Smishing Messages	Joan Febryan, Darren Leonard, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).
Evaluating YOLO Variants for Real-Time Multi-Object Detection of Strawberry Quality and Ripeness	Rifki Rosada, Zidane Muhammad Hussein, and Ledy Novamizanti (Telkom University, Indonesia).

08:00 AM **Determinant Factors of Online Advertisements on Video Streaming Platforms' Effect on Purchase Intention Across Different Generations in Indonesia**

Authors: Gratia Honestha Patiung, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).

Abstract: In this digital age, video streaming platforms have become the main entertainment platform, influencing media consumption by providing on-demand access to various content. Out of our 415 survey respondents, 88.4% used video streaming sites, with varying usage patterns and subscription preferences, indicating wide exposure to advertisements. This research used the Structural Equation Model (SEM) and SmartPLS as statistical tools, with purposive sampling for data collection. Data were gathered via an online questionnaire conducted in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Greater Jakarta) from 22 April 2024 until 10 May 2024. The model for this study has 7 variables: Entertainment, Informativeness, Relevance, Advertising Value, Attitude, Brand Awareness, and Purchase Intention. This research has 7 hypotheses that are true for all the hypotheses. Entertainment, informativeness, and relevance of the advertisement influence a dependent variable, advertising value. Advertising value then impacts both attitude and brand awareness, which eventually influences people's purchase intention. These results are the same for both groups: Generation Z and the combined group of Generation X and Generation Y.

08:15 AM **Enhancing Domain-Specific Retrieval-Augmented Generation: Synthetic Data Generation and Evaluation Using Reasoning Models**

Authors: Aryan Jadon, Avinash Patil (Juniper Networks, USA), and Shashank Kumar (University of Florida, USA).

Abstract: Retrieval-Augmented Generation (RAG) systems face significant performance gaps when applied to technical domains requiring precise information extraction from complex documents. Current evaluation methodologies relying on document-level metrics inadequately capture token-resolution retrieval accuracy that is critical for domain-related documents. We propose a framework combining granular evaluation metrics with synthetic data generation to optimize domain-specific RAG performance. First, we introduce token-aware metrics Precision Ω and Intersection-over-Union (IoU) that quantify context preservation versus information density trade offs inherent in technical texts. Second, we develop a reasoning model driven pipeline using instruction-tuned LLMs (DeepSeek-R1, DeepSeek-R1 distilled variants and Phi-4) to generate context-anchored QA pairs with discontinuous reference spans across three specialized corpora: SEC 10-K filings (finance), biomedical abstracts (PubMed), and APT threat reports (cybersecurity). Our empirical analysis reveals critical insights: smaller chunks (less than 10 tokens) improve precision by 31-42% (IoU=0.071 vs. baseline 0.053) at recall costs (-18%), while domain-specific embedding strategies yield 22% variance in optimal chunk sizing (5-20 tokens). The DeepSeek-R1-Distill-Qwen-32B model demonstrates superior concept alignment (+14% mean IoU over alternatives), though no configuration universally dominates financial texts favor larger chunks for risk factor coverage (Recall=0.81@size=20), whereas cybersecurity content benefits from atomic segmentation (Precision Ω =0.28@size=5). We open-source this toolkit enabling reproducible optimization of chunking strategies through automated synthetic dataset generation and multi-metric analysis pipelines. This work bridges critical gaps between generic RAG architectures and enterprise requirements for precision-sensitive domains. Our code is available on GitHub.

08:30 AM **Enhancing E-Commerce Fashion Fitting with Low-Cost Augmented and Virtual Reality**

Authors: Irfan Armawan, and Hadziq Fabroyir (Institut Teknologi Sepuluh Nopember, Indonesia).

Abstract: Augmented Reality (AR) and Virtual Reality (VR) have significant potential to transform the E-commerce fashion industry by addressing the limitations of traditional product visualization methods, which often rely on static images or insufficient descriptions. This study explores the feasibility of a low-cost AR/VR solution using Google Cardboard to enhance user engagement and satisfaction in online fashion shopping. We evaluate whether immersive technologies can bridge the gap between customer expectations and delivered products by enabling realistic virtual try-ons in an accessible and affordable manner. A mixed-methods approach was employed, combining qualitative feedback with quantitative metrics, including the NASA Task Load Index (NASA TLX), to assess user experience and cognitive load. Twelve participants (aged 20-40) compared their shopping experiences using Google Cardboard-based AR/VR against conventional E-commerce methods. Results demonstrate that AR/VR significantly improves user engagement and satisfaction while maintaining low cognitive effort, validating its potential as a scalable solution for digital retail. This study contributes empirical evidence on the effectiveness of low-cost immersive technologies in E-commerce and proposes directions for future optimization, emphasizing affordability and user-centric design.

08:45 AM **Evaluating User Satisfaction of Automated Border Control in Smart Airports: Case Studies from Indonesia**

Authors: Bilal Prasetya Pinaring, and Elisa Indriasari (Bina Nusantara University, Indonesia).

Abstract: The digital transformation of airports has enhanced operational efficiency and elevated the customer experience. Soekarno-Hatta International Airport (CGK) has already seen a transition with the introduction of the Automated Border Control (ABC) system, referred to locally as Autogates. The ABC systems improve efficiency and security in immigration processes, But data privacy and user readiness emerge as concerns during implementation, especially

following a significant data breach incident in mid-2024 that disrupted immigration services. This research used a survey-based quantitative approach to analyze user perception of ABC at CGK with variables adapted from the Technology Acceptance Model (TAM) and the DeLone and McLean Information Systems Success Model. The findings of this study revealed that perceived ease of use, system quality, and service quality positively impact user satisfaction. In contrast, information quality has a negative effect on user satisfaction.

09:00 AM **Enhancing Mission Planner with Real-Time Cloud Integration for Semi-Autonomous Drone-Based Logistics**

Authors: Nabil Afkar (Telkom University & Individual, Indonesia), Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia), and Dita Pramesti (Telkom University, Indonesia)

Abstract: The increasing demand for autonomous delivery solutions has driven the integration of drone technology into modern logistics systems. However, standard implementations of Mission Planner lack native support for real-time cloud communication, limiting dynamic decision-making during missions. This study presents the development of an enhanced Mission Planner system that supports real-time telemetry upload and cloud-based command execution, enabling functions such as unlocking a delivery box upon user verification. The system integrates MAVProxy over a 4G LTE network using a Raspberry Pi companion computer, facilitating bidirectional communication with Firebase Realtime Database. Functional testing confirms the drone's ability to autonomously take off, navigate through waypoints, loiter, land, and execute remote commands with 100% success across all test cases. Latency performance evaluation shows an average delay of 571.08 ms for MAVProxy to Mission Planner communication and 248.12 ms for Mission Planner to Firebase, with all values remaining within operational thresholds. These results demonstrate that the proposed system is viable for real-world autonomous logistics scenarios requiring low-latency, cloud-integrated control.

09:15 AM **Bowtie Antenna with Modification to Reduce Radiation Arm Area and Use of Parabolic Reflector to Increase Power Dissipation in Antenna Coupled Microbolometer**

Authors: Andrano Mario Hitipeuw (Universitas Indonesia, Indonesia), Aditya Inzani (Universitas Indonesia & National Research and Innovation Agency, Indonesia), and Catur Apriono (Universitas Indonesia, Indonesia).

Abstract: Terahertz (THz) waves, ranging from 0.1 to 10 THz, possess unique properties like penetrating non-conductive materials, making them ideal for non-destructive applications such as medical imaging and security detection. Antenna-coupled microbolometers enhance THz detection, with bowtie antennas offering a simple and wideband design. This study proposes a modified bowtie antenna with centralized electric field distribution and a parabolic reflector to improve gain and power dissipation in the bolometer. Simulations using CST Microwave Studio 2024 show the modified antenna achieved a gain of 15.998 dBi, and, when combined with a microbolometer, a maximum power dissipation of $4.13 \cdot 10^{-10}$ W at $8.1 \cdot 10^{-4}$ Ω m resistivity. The enhanced configuration offers improved performance over standard designs, enabling practical applications in THz imaging and detection without cryogenic cooling.

09:30 AM **Ensemble Learning Approach in Tackling Smishing Messages**

Authors: Joan Febryan, Darren Leonard, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).

Abstract: In the digital age, the existence of smishing (SMS phishing) poses significant cybersecurity threats. This research aims to develop an effective smishing detection system using an ensemble learning approach. By integrating four machine learning models: Random Forest Classifier, Support Vector Machine, XGBoost Classifier, and Logistic Regression as base models, and Artificial Neural Network (ANN) as a meta-model, the proposed system improves detection accuracy. The study utilizes a dataset from Kaggle and personal SMS messages, achieving a high accuracy rate of 95.9% with Logistic Regression. The findings suggest that ensemble learning can significantly improve smishing detection, providing a robust solution to mitigate the risks associated with SMS-based phishing attacks.

09:30 AM **Evaluating YOLO Variants for Real-Time Multi-Object Detection of Strawberry Quality and Ripeness**

Authors: Rifki Rosada, Zidane Muhammad Hussein, and Ledy Novamizanti (Telkom University, Indonesia).

Abstract: Automated fruit grading plays a pivotal role in modern agriculture by enabling timely harvesting and maintaining quality standards, especially for high-value crops such as strawberries. This paper presents an end-to-end approach for the real-time detection and classification of strawberry ripeness using state-of-the-art YOLO-based models: YOLOv7, YOLOv8, and YOLOv11. A comprehensive dataset of 3,055 strawberry images is compiled from three distinct sources. Each image is meticulously annotated into five classes-Unripe (UNR), Fully Ripe Grade A (AFR), Fully Ripe Grade B (BFR), Half Ripe Grade A (AHR), and Half Ripe Grade B (BHR)-with additional complexity introduced by images containing multiple strawberries per frame. Data preprocessing and augmentation are performed using Roboflow, and model training is executed on Google Colab with a uniform protocol to ensure a fair comparison among the YOLO variants. Experimental results reveal a steady performance improvement from YOLOv7 to YOLOv11, with YOLOv11 achieving the highest detection accuracy (precision: 0.874, recall: 0.855, mAP@50: 0.942, and mAP@50-95: 0.820). The superior performance of YOLOv11 is attributed to its incorporation of dynamic attention modules and self-adaptive layer-wise fusion, which significantly enhance the detection of subtle ripeness variations and mitigate occlusion challenges. These findings underscore the potential of advanced YOLO architectures for deployment in real-time agricultural applications and automated harvesting systems.

Papers Presentation 5 - Onsite

Paper	Authors
Extreme Gradient Boosting with XAI Feature Importance for Energy Prediction	Aldi Cahya Muhammad, and Riri Fitri Sari (University of Indonesia, Indonesia).
Comparison of Four Metaheuristics for Cost-Effective Virtual Learning Resource Optimisation	Nurul Aisyah Aris (Universiti Teknikal Malaysia Melaka, Malaysia), Raja Rina Raja Ikram (Universiti Teknikal Malaysia Melaka, Malaysia), and Kamal Z Zamli (Universiti Malaysia Pahang, Malaysia).
Edge-Sparsing and Two-Level Tapering to Reduce Sidelobe Level in Small Square Antenna Arrays	Elsyea Adia Tunggadewi, Gamantyo Hendranto (Institut Teknologi Sepuluh Nopember, Indonesia), and Fannush Shofi Akbar (Telkom University & The University Center of Excellence for Intelligent Sensing-IoT, Indonesia).
Parameter Estimation Based Automatic Modulation Recognition for Radio Frequency Signal	Shuo Wang, Kuojun Yang, Zelin Ji, Qinchuan Zhang, and Huiqing Pan (University of Electronic Science and Technology of China, China).
Adaptive Resource Allocation in Edge Computing for IoT Networks Using Neural Networks	Amar Almaini (Deggendorf Institute of Technology, Germany), Jakob Folz (University of West Bohemia, Czech Republic & Deggendorf Institute of Technology, Germany), Ahmed Y Al-Dubai (Edinburgh Napier University, United Kingdom (Great Britain)), Martin Schramm (Deggendorf Institute of Technology, Germany), Michael Heigl (Deggendorf Institute of Technology, Germany), and Baraq Ghaleb (Edinburgh Napier University, United Kingdom (Great Britain)).

10:00 AM **Extreme Gradient Boosting with XAI Feature Importance for Energy Prediction**

Authors: Aldi Cahya Muhammad, and Riri Fitri Sari (University of Indonesia, Indonesia).

Abstract: Energy performance forecast is significant in optimizing energy allocation and integrating renewable energy sources. In this study, the authors employ XGBOOST machine learning with eXplainable AI (XAI) feature importance for energy prediction, which works with high accuracy. The boosting technique was selected because it is efficient in processing voluminous data and can model intricate non-linear relationships. The model was tested on open-source data. The scalability and speed of XGBOOST is well suited for large data processing. This study uses XAI techniques, such as feature importance, which explains how feature factors affect predictions. These techniques are used to increase the transparency of the model. By revealing the key drivers of electricity production trends, this transparency increases stakeholder confidence. The model shows changes in power generation by highlighting the influence of external factors such as policy changes and technological advances. Eliminating fossil fuels and worsening renewable energy adoption is essential to lowering emissions and reaching net-zero carbon. Machine learning, specifically XGBOOST, can reduce the operational costs of energy projects using trained data to predict energy output. Our research is to provide more interpretable and actionable insights into energy output prediction, which will help people make better energy management decisions. To enhance the efficiency and clarity of forecasts in energy system production, XGBOOST combined with XAI feature importance will serve as a foundation of future research.

10:20 AM **Comparison of Four Metaheuristics for Cost-Effective Virtual Learning Resource Optimisation**

Authors: Nurul Aisyah Aris (Universiti Teknikal Malaysia Melaka, Malaysia), Raja Rina Raja Ikram (Universiti Teknikal Malaysia Melaka, Malaysia), and Kamal Z Zamli (Universiti Malaysia Pahang, Malaysia).

Abstract: This paper compares the performance of four metaheuristic algorithms, Zebra Optimization Algorithm (ZOA), Sooty-Tern Optimization Algorithm (STOA), Jaya Algorithm (JA), and Owl Search Algorithm (OSA) for optimal team formation, focusing on minimizing team size and costs. The algorithms are evaluated based on their ability to balance exploration and exploitation while ensuring skill diversity and task compatibility. Computational experiments are conducted using a dataset of 500 healthcare professionals and their skill profiles. The results highlight that the most suitable algorithm for healthcare team formation is the one that achieves the minimal team size and costs while maintaining task efficiency. This comparative analysis offers valuable insights into the effectiveness of metaheuristic approaches for addressing team optimization challenges in the healthcare sector.

10:40 AM **Edge-Sparsing and Two-Level Tapering to Reduce Sidelobe Level in Small Square Antenna Arrays**

Authors: Elysea Adia Tunggadewi, Gamantyo Hendranto (Institut Teknologi Sepuluh Nopember, Indonesia), and Fannush Shofi Akbar (Telkom University & The University Center of Excellence for Intelligent Sensing-IoT, Indonesia).

Abstract: This paper described a method for synthesizing a small square antenna array with a low sidelobe level (SLL). The process is based on a small square antenna array of 12 elements x 12 elements with a size of $6\lambda \times 6\lambda$ and 8 elements x 8 elements with a size of $4\lambda \times 4\lambda$. Then, the square aperiodic is roughly half-filled with approximately in-fill thinning of 55.55% and 50.00% in the planar element arrangement of 12 elements x 12 elements and 8 elements x 8 elements. In the uniform amplitude the value $I=1$, however in the two-level tapering of the small square antenna array 12 elements x 12 elements using a polynomial equation of degree two so the values $I_1 < 1 < I_2$. Meanwhile, the 2-level tapering of the 8 elements x 8 element small square antenna array uses the I value obtained from the Hanning Window method. Moreover, an interesting feature about two-level tapering approach in small square antenna array is proposed in this paper. With this design, sidelobe levels is lower than -21 dB in the $\Phi = 0^\circ$ direction and lower than -17 dB in the $\Phi = 45^\circ$ direction can be achieved.

11:00 AM **Parameter Estimation Based Automatic Modulation Recognition for Radio Frequency Signal**

Authors: Shuo Wang, Kuojun Yang, Zelin Ji, Qinchuan Zhang, and Huiqing Pan (University of Electronic Science and Technology of China, China).

Abstract: Automatic modulation recognition (AMR) critically contributes to spectrum sensing, dynamic spectrum access, and intelligent communications in cognitive radio systems. The introduction of deep learning has greatly improved the accuracy of AMR. However, current automatic identification methods require the input of key parameters such as the carrier frequency, which is necessary to convert the radio frequency (RF) to a base-band signal before it can be used for identification. In addition, the high complexity of deep learning models leads to high computational effort and long recognition times of existing methods, which are difficult to implement in demodulation system deployments. To address the above issues, in this paper, we first use power spectrum analysis to estimate the carrier frequency and signal bandwidth, which realizes the effective conversion from RF signals to base-band signals. This paper chooses the long shortterm memory (LSTM) network as the model for automatic identification, which has low implementation complexity while maintaining high accuracy. Finally, by training the LSTM with actual sampling data combined with parameter estimation (PE), the method proposed in this paper can guarantee more than 90% format recognition accuracy.

11:20 AM **Adaptive Resource Allocation in Edge Computing for IoT Networks Using Neural Networks**

Authors: Amar Almaini (Deggendorf Institute of Technology, Germany), Jakob Folz (University of West Bohemia, Czech Republic & Deggendorf Institute of Technology, Germany), Ahmed Y Al-Dubai (Edinburgh Napier University, United Kingdom (Great Britain)), Martin Schramm (Deggendorf Institute of Technology, Germany), Michael Heigl (Deggendorf Institute of Technology, Germany), and Baraq Ghaleb (Edinburgh Napier University, United Kingdom (Great Britain)).

Abstract: This study presents a novel approach to resource allocation in edge-driven IoT networks using a regression-based neural network. IoT devices face significant constraints due to limited resources and increasing user demands. While edge computing offers a promising solution by processing data closer to the source, it introduces challenges such as dynamic network conditions and infrastructure limitations. To address these issues, we developed a framework leveraging a regression-based neural network to dynamically assess and score individual resources, enabling intelligent task allocation that minimizes service delays and optimizes resource utilization. The regression model, implemented using TensorFlow, evaluates resource performance independently, ensuring robustness in fluctuating environments. Experimental results demonstrate that the proposed model achieves an 87.5% task completion rate within priority constraints in a dynamic testing environment. These findings highlight the potential of neural networks for efficient and adaptive resource management in edge computing, improving task scheduling and system stability.

Papers Presentation 5 - Online Breakout Room 1

Paper	Authors
Exploring the Impact of Gamification on User Engagement in Mobile Shopping Apps	Adele B L Mailangkay, and Yogi Pratama Hutagalung (Bina Nusantara University, Indonesia).
Evaluation of the Automated Labeling Method for Taxonomic Nomenclature Through Prompt-Optimized Large Language Model	Keito Inoshita (Kansai University & Shiga University, Japan), Kota Nojiri (The University of Tokyo, Japan), Haruto Sugeno (Fukushima University, Japan), and Takumi Taga (Nagoya University, Japan).
Exploring Customer Satisfaction Towards Omnichannel Ordering Implementation at Tech-Led Retail Coffee Shops in Great Bandung, Indonesia	Muhammad Reza Imaduddin, Muharman Lubis (Telkom University, Indonesia), and Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia).
Forecasting of Potential Fishing Zones in the Arabian Sea Using Satellite Imagery	Sai Janani C, Samantha Susan John, Saranga A Kulkarni (PES University, India), M.Farida Begam (PES University EC Campus, India), and Ankit Hiremath (Pes University & Metamor Technologies, India).
Factors Influencing Purchase Intention in Social Commerce Using SOR Approach	Jesselynn Natasha, Raihan Bilal Bagaswara, Najwa Marshanda Pratama, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).
Four Channels WDM Radio over Fiber for Millimeter-Wave Fronthaul with Optical Amplifier and DCF Optimization	Syafiq Maulana Al Faruq, Malvin Samuel Martino, Catur Apriono (Universitas Indonesia, Indonesia), and Yus Natali (Universitas Telkom, Indonesia).
Investigating the Effect of Different Augmentation Strategies on MobileNetV2 for Strawberry Disease Classification	Sazqia Aulia Palad, Haikal Febriano, Ledya Novamizanti, and Nyoman Karna (Telkom University, Indonesia).
Finding Vacant Seats in a Public Seating Area with Object Detection Using YOLOv10	Fredericky Jonery Yaury, Devi Fitriannah, and Jonathan Samuel Lumentut (Bina Nusantara University, Indonesia).

10:00 AM **Exploring the Impact of Gamification on User Engagement in Mobile Shopping Apps**

Authors: Adele B L Mailangkay, and Yogi Pratama Hutagalung (Bina Nusantara University, Indonesia).

Abstract: This research investigates the influence of gamification elements and self-efficacy on user acceptance of mobile shopping applications through an extended Technology Acceptance Model (TAM) framework. In the rapidly evolving mobile commerce landscape, retailers increasingly implement gamification strategies to enhance user engagement and drive customer retention. However, the theoretical understanding of how these elements affect user acceptance remains limited. This study extends the traditional TAM by incorporating gamification elements and self-efficacy as additional constructs to better understand their impact on user attitudes and behavioural intentions. The research employs a quantitative approach, utilizing survey data from 150 mobile shopping app users to examine how specific gamification features-including points systems, badges, leaderboards, and challenges-affect users' perceived ease of use and perceived usefulness. Additionally, the study explores the moderating role of self-efficacy in the relationship between gamification elements and user acceptance. The findings aim to contribute to both theoretical understanding of gamification in technology acceptance and practical implementation guidelines for mobile commerce platforms. This research addresses a significant gap in the literature by providing empirical evidence of the effectiveness of gamification strategies in mobile shopping applications while considering the crucial role of user self-efficacy in technology adoption.

10:15 AM **Evaluation of the Automated Labeling Method for Taxonomic Nomenclature Through Prompt-Optimized Large Language Model**

Authors: Keito Inoshita (Kansai University & Shiga University, Japan), Kota Nojiri (The University of Tokyo, Japan), Haruto Sugeno (Fukushima University, Japan), and Takumi Taga (Nagoya University, Japan).

Abstract: Scientific names of organisms consist of a genus name and a species epithet, with the latter often reflecting aspects such as morphology, ecology, distribution, and cultural background. Traditionally, researchers have manually labeled species names by carefully examining taxonomic descriptions, a process that demands substantial time and effort when dealing with large datasets. This study evaluates the feasibility of automatic species name labeling using large language model (LLM) by leveraging their text classification and semantic extraction capabilities. Using the spider name dataset compiled by Mammola et al., we compared LLM-based labeling results-enhanced through prompt engineering-with human annotations. The results indicate that LLM-based classification achieved high accuracy in Morphology, Geography, and People categories. However, classification accuracy was lower in Ecology & Behavior and Modern & Past Culture, revealing challenges in interpreting animal behavior and cultural contexts. Future research will focus on improving accuracy through optimized few-shot learning and retrieval-augmented generation techniques, while also expanding the applicability of LLM-based labeling to diverse biological taxa.

10:30 AM **Exploring Customer Satisfaction Towards Omnichannel Ordering Implementation at Tech-Led Retail Coffee Shops in Great Bandung, Indonesia**

Authors: Muhammad Reza Imaduddin, Muharman Lubis (Telkom University, Indonesia), and Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia).

Abstract: Nowadays, technology is increasingly developing. People often use technology for all their activities. This is also found when people order coffee at coffee shops. Coffee shops have finally developed until researchers call them Tech-Led Retail Coffee Shops because they are already technology-based. This study uses a purposive sampling method to see what factors make people satisfied with buying coffee at tech-led retail coffee shops. This study is based on the Technology Acceptance Model (TAM) with a grounded theory approach as part of the mixed- methods, the results of which will later be triangulated. The findings of this study, people tend to be satisfied using mobile applications because of the convenience, speed, discounts, and points (loyalty programs). Meanwhile, people are satisfied coming to the outlet because of the ease of access, comfortable atmosphere, many facilities, and its consistent services. Meanwhile, Food aggregators tend to be rarely chosen because of the fewer benefits felt by customers.

10:45 AM **Forecasting of Potential Fishing Zones in the Arabian Sea Using Satellite Imagery**

Authors: Sai Janani C, Samantha Susan John, Saranga A Kulkarni (PES University, India), M.Farida Begam (PES University EC Campus, India), and Ankit Hiremath (Pes University & Metamor Technologies, India).

Abstract: India is the 3rd largest fish-producing and 2nd largest aquaculture-producing nation globally. Potential Fishing Zones (PFZs) are areas of high pelagic fish concentration that aid fishermen in catching fish. This paper proposes a novel machine-learning (ML) architecture that uses a combination of a clustering model and a sequence of two ensemble models to predict PFZs. The proposed model uses satellite images of seven oceanographic parameters as input that are passed through the clustering model to acquire numerical parameter data. The output of the clustering model is then fed to the ensemble model for prediction. The final output is a visualisation of the PFZs as marked areas in the ocean. The methodology used and the corresponding results have been explained in this paper.

11:00 AM **Factors Influencing Purchase Intention in Social Commerce Using SOR Approach**

Authors: Jesselynn Natasha, Raihan Bilal Bagaswara, Najwa Marshanda Pratama, and Yakob Utama Chandra (Bina Nusantara University, Indonesia).

Abstract: Social commerce in Indonesia has experienced significant growth, especially since the pandemic, leading to an increase in online shopping frequency among consumers. This change caused consumers to actively seek information when deciding on the product they desire. This research aims to find out how UGC and eWOM influence purchase intentions in social commerce. The research population mostly consists of females in Java who actively use social commerce. This research utilizes a quantitative approach featuring 537 respondents, of which 489 are active users of social commerce, while the remaining 48 had never used social commerce. This research applies the Stimulus Organism Response (SOR) model to identify stimulus, organism, and response factors. Research question investigated within the current research is: what factors influence someone's purchase intention on social commerce? The results of this research show that UGC and eWOM greatly influence Purchase Intention, with the exception of mental imagery. For Social Commerce sellers, this study has practical implication. Sellers should ensure their UGC and should be transparent to their consumer by improving their UGC quality and truthfulness.

11:15 AM **Four Channels WDM Radio over Fiber for Millimeter-Wave Fronthaul with Optical Amplifier and DCF Optimization**

Authors: Syafiq Maulana Al Faruq, Malvin Samuel Martino, Catur Apriono (Universitas Indonesia, Indonesia), and Yus Natali (Universitas Telkom, Indonesia).

Abstract: The demand for high-speed and large-capacity communication networks is increasing due to the advancement of information and communication technology. This research focuses on the transmission performance of a 4-channel wave-length division multiplexing (WDM) radio over fiber (RoF) optical link design for fronthaul applications. The design is optimized with the use of an optical amplifier and dispersion compensating fiber (DCF) for radio millimeter-wave frequencies of 26 GHz. Both the upstream and downstream schemes, where every channel complied with both the Q factor and the BER standards, are higher than 6 and less than 10⁻⁹, respectively. The design successfully achieved an optical signal to noise Ratio (OSNR) within the range of 52 to 56 dB and a signal to noise ratio (SNR) between 32 and 38 in both transmission schemes. Eye height analysis revealed minimal variations, suggesting a consistent likelihood of error occurrence across all channels. The design and performance demonstrate its potential to improve the efficiency and capacity of future communication networks.

11:30 AM **Investigating the Effect of Different Augmentation Strategies on MobileNetV2 for Strawberry Disease Classification**

Authors: Sazqia Aulia Palad, Haikal Febriano, Ledy Novamizanti, and Nyoman Karna (Telkom University, Indonesia).

Abstract: Strawberries are a significant agricultural commodity, valued for their rich nutritional content, including high levels of potassium, vitamin C, phosphorus, calcium, and magnesium. However, strawberry cultivation faces challenges from various diseases, pests, and weeds, adversely affecting yield and fruit quality. This study evaluates the impact of different data augmentation strategies on the performance of MobileNetV2, a lightweight convolutional neural network, in classifying strawberry diseases. Utilizing a dataset of 1,200 images across six distinct disease classes, three augmentation strategies were employed: minimal, moderate, and aggressive. Results indicate that the moderate augmentation strategy achieved the highest performance, with an accuracy of 98%, a loss of 0.05, and perfect precision, recall, and F1-score of 1.00. In contrast, the aggressive augmentation strategy yielded a slightly lower accuracy of 97% and a higher loss of 0.27, suggesting potential data distortions. The minimal augmentation strategy also performed well, attaining 96% accuracy with a loss of 0.09. These findings underscore the importance of selecting appropriate augmentation techniques to enhance model generalization and reliability in real-world applications for strawberry disease detection, contributing to sustainable agricultural practices.

11:45 AM **Finding Vacant Seats in a Public Seating Area with Object Detection Using YOLOv10**

Authors: Fredericky Jonery Yaury, Devi Fitriana, and Jonathan Samuel Lumentut (Bina Nusantara University, Indonesia).

Abstract: This paper presents an approach to real-time detection of vacant seats in public seating areas using YOLOv10. In places where finding available seating can be slow and inefficient, this system offers a solution by utilizing YOLOv10 to find available seats by analyzing a live surveillance camera footage of the seating area. The system processes the video to pinpoint vacant seats and indicate their locations on a user interface using bounding boxes. Additionally, it counts the number of currently unoccupied seats, providing instant information on seating availability to the user. By automating the detection and monitoring of vacant seats, the system reduces the manual effort involved in this task and improves overall user experience in public spaces. The system is developed in Python, and it utilizes OpenCV to seamlessly connect with surveillance cameras. This approach not only has the potential to assist in crowd management but also demonstrates the practical application of computer vision techniques in real-world scenarios. By training YOLOv10 using a dataset containing 500 images of an audience seating area, the model has fulfilled its main purpose, which is to locate available seats, mark them, and count their amount. This model achieved a strong mAP50 score of 0.95, along with a precision, recall, and F1 score of 0.95, 0.92, and 0.94 respectively, indicating good overall accuracy.

Papers Presentation 5 - Online Breakout Room 2

Paper	Authors
Human Vs AI-Generated Text Detection Using IndoBERT Algorithm for Different Types of Text	Gracia Abadi, Ariana Noya Zaida Amelia, Yohan Muliono, Ika Dyah Agustia Rachmawati, Chrisando Ryan Pardomuan, and Aditya Kurniawan (Bina Nusantara University, Indonesia).
Implementation of Augmented Reality Technology for Cryptography Educational Media	Nathanael Berliano Novanka Putra (National Cyber and Crypto Agency, Indonesia), Nurul Qomariasih, Herman Kabetta, I Komang Buana (Poltek Siber dan Sandi Negara, Indonesia), and Isna Aldilla Syifa (Politeknik Industri Furnitur dan Pengolahan Kayu, Indonesia).
Improving Abstractive News Summarization Using Keyword Extraction for Human-like Summaries	Maria Linneke Adjie, Wilson Gregory Pribadi, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).
Indonesian Herbal Plant Identification System Based on Deep Learning	Naufalia Azzahra, Devi Maziaty, and Hilman Fauzi (Telkom University, Indonesia).
Exploring NLP for Mental Health Insights: Multi-Class Classification of Online Forum Texts	Jennifer Patricia, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia).
Investigating the Impact of Movie Poster Clustering on Box Office Prediction	Bryan Johanes Rengkung (President University, Indonesia), and Rila Mandala (Institut Teknologi Bandung, Indonesia).
IoT Implementation for Air Quality Monitoring System Using Low Cost Sensor	I Gusti Ayu Isnaini Fatha Ramadhani, Tiara Zakiyah Putri, Yulmaisi Dwi Asmarita, Sulfa Amania, Nandang Mufti, Muhammad Alfian Mizar, Hasan Ismail, and Harits Ar Rosyid (Universitas Negeri Malang, Indonesia).
IoT-Driven Hybrid Microgrid Simulation for Energy-Efficient Smart Industries	Carlo N. Romero (Polytechnic University of the Philippines-Sta.Rosa & Ateneo de Manila University, Philippines), and King Harold A Recto (Ateneo de Manila University, Philippines).

10:00 AM **Human Vs AI-Generated Text Detection Using IndoBERT Algorithm for Different Types of Text**

Authors: Gracia Abadi, Ariana Noya Zaida Amelia, Yohan Muliono, Ika Dyah Agustia Rachmawati, Chrisando Ryan Pardomuan, and Aditya Kurniawan (Bina Nusantara University, Indonesia).

Abstract: Along with the advancement of AI and LLMs that has enabled the creation of hyper-realistic, human-like content, it became difficult to tell if a content is created by humans or AI. This difficulty impacts not only how information is absorbed, but also how it is managed and regulated. This research aims to evaluate the effectiveness of IndoBERT-base-p2, a BERT model for the Indonesian language, in distinguishing between human-written and AI-generated texts and see the accuracy of the model for various informal writing styles and contexts. The type of dataset used in this research is short text i.e. Movie Reviews and Student Experience Surveys. The results show that IndoBERT-base-p2 is highly accurate and precise in distinguishing Human written and AI-generated text, as well as adapting with different type of datasets used in the experiments.

10:15 AM **Implementation of Augmented Reality Technology for Cryptography Educational Media**

Authors: Nathanael Berliano Novanka Putra (National Cyber and Crypto Agency, Indonesia), Nurul Qomariasih, Herman Kabetta, I Komang Buana (Poltek Siber dan Sandi Negara, Indonesia), and Isna Aldilla Syifa (Politeknik Industri Furnitur dan Pengolahan Kayu, Indonesia).

Abstract: Cryptography is often considered complex and difficult to learn due to its involvement of intricate and abstract mathematical concepts. The existing media and educational methods currently available do not fully meet the needs for effective and efficient learning in conveying this complex material. Conventional approaches are often insufficiently interactive and engaging for learners, potentially hindering the learning process. On the other hand, Augmented Reality (AR) technology has proven effective as an interactive and accessible learning medium, offering new ways to present complex material visually and dynamically. Therefore, this study aims to develop an Android application that integrates AR technology as an educational tool for cryptography and to evaluate its impact on the general public's understanding of cryptography. This research employs the ADDIE method, a systematic instructional design framework that includes five stages: Analysis, Design, Development, Implementation, and Evaluation. Additionally, the study integrates principles from the Software Development Life Cycle (SDLC) to ensure precise and structured development. The research findings indicate that AR can serve as an interactive medium for learning cryptography and significantly enhance users' understanding of cryptography. Moreover, the AR-based cryptography learning system was well-received by the public, with an acceptance rate of over 90% in every aspect tested.

10:30 AM **Improving Abstractive News Summarization Using Keyword Extraction for Human-like Summaries**

Authors: Maria Linneke Adjie, Wilson Gregory Pribadi, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).

Abstract: In today's world, people frequently find themselves reluctant to read lengthy news articles, making news summarization a crucial tool for efficient information consumption. This study investigates the use of Large Language Models (LLMs), specifically BART and DistilBART, to generate abstractive news summaries based on the CNN Daily Mail News dataset, which includes text and highlight data. To address the limitation of highlights that often only capture parts of sentences, keyword extraction techniques such as RAKE, YAKE, and KeyBERT were incorporated to guide the summarization method, improving the quality of the generated summaries. The results demonstrate that the BART and DistilBART models, when combined with keyword extraction methods, produce more balanced and coherent summaries compared to the gold summaries. The BART model combined with RAKE obtained the greatest ROUGE-1 rating of 0.3733, while the DistilBART model with KeyBERT(paraphrase-MiniLM-L6-v2) reached a ROUGE-1 score of 0.3722, showcasing the effectiveness of keyword extraction techniques in improving news summarization performance but with just the right tuned hyperparameters.

10:45 AM **Indonesian Herbal Plant Identification System Based on Deep Learning**

Authors: Naufalia Azzahra, Devi Maziaty, and Hilman Fauzi (Telkom University, Indonesia).

Abstract: Indonesia has a diverse range of herbal plants, including 3,000 species with potential applications in traditional medicine. However, the lack of public knowledge in identifying different types of herbal plants hinders their utilization. This study develops a herbal plant identification system based on leaf image processing using the YOLOv5 algorithm. The dataset consists of 15,826 leaf images from 20 types of herbal plants, annotated using Roboflow. The model was trained and evaluated using performance metrics, including accuracy, precision, recall, F1-score, and mean average precision (mAP50-95). The test results indicate that the model achieved an accuracy of 0.99, a precision of 0.98, a recall of 0.98, an F1-score of 0.98, and a mAP50-95 of 0.85. These results suggest that the YOLOv5-based system can effectively assist in educating the public about recognizing Indonesia's herbal plant species.

11:00 AM **Exploring NLP for Mental Health Insights: Multi-Class Classification of Online Forum Texts**

Authors: Jennifer Patricia, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia).

Abstract: With the increasing incidence of mental health issues, there is a real need for early detection, which is currently limited by stigma and ignorance. This study attempts to explore multi-class classification models to analyze mental health problems through social media text. The goal of the classification model is to categorize text to one of six categories of the mental health problems and thus to provide patterns of the language which might serve as an early indication of these problems. After data collection and labeling, the dataset was resampled to balance the dataset for model training. Some of the important steps for data preprocessing included tokenization, the removal of unnecessary characters and labels, and one-hot encoding. To further understand the language used in expressing the different conditions, word clouds and bigram analyses were conducted. The training utilized transformer models and machine learning approaches, including BERT + XGBoost, T5, and MentalBERT. The results revealed that T5 and MentalBERT achieved the highest accuracy of 83%, significantly outperforming BERT + XGBoost, which attained an accuracy of 60%.

11:15 AM **Investigating the Impact of Movie Poster Clustering on Box Office Prediction**

Authors: Bryan Johannes Rengkung (President University, Indonesia), and Rila Mandala (Institut Teknologi Bandung, Indonesia).

Abstract: Predicting box office revenues remains challenging due to various intrinsic and extrinsic factors. Most studies using traditional models did not consider visual marketing elements like movie posters, and those that included them showed moderate results. This study introduces novelty by simplifying the inclusion of poster visual features using K-means clustering and explores the implementation of nine machine learning regression techniques to improve box office prediction. A literature review is conducted to identify the most relevant methods and features. Using IMDb and Box Office Mojo dataset of 2,397 movies, the study develops a web scraping program, followed by visual feature extraction from the posters using VGG16 and clustering with k values ranging from 3 to 12. The clustering results, along with the other movie metadata, are applied to Random Forest, Sequential Neural Networks, Support Vector Machine, linear regression, XGBoost, Decision Trees, K-Nearest Neighbors, Light Gradient Boosting Machine, and Gradient Boosting Decision Trees. The results show that poster clustering achieves higher R^2 scores (0.9211 for training and 0.7415 for validation) and lower MSE compared to the direct use of visual features. The best-performing combination is LGBM with nine clusters, along with budget, genre, year, rating, runtime, user review count, critic review count, and IMDb vote count as additional features.

11:30 AM **IoT Implementation for Air Quality Monitoring System Using Low Cost Sensor**

Authors: I Gusti Ayu Isnaini Fatha Ramadhani, Tiara Zakiyah Putri, Yulmaisi Dwi Asmarita, Sulfa Amania, Nandang Mufti, Muhammad Alfian Mizar, Hasan Ismail, and Harits Ar Rosyid (Universitas Negeri Malang, Indonesia).

Abstract: This study developed an Internet of Things (IoT)-based gas concentration monitoring system capable of measuring and displaying eight environmental parameters in real-time, including temperature, humidity, and gas concentrations of O_3 , CO, CH_4 , CO_2 , SO_2 , and NO_2 . The system utilizes an ESP32 microcontroller to process data from sensors and transmit it to the ThingSpeak database via a Wi-Fi network. The monitoring results are displayed on a Nextion screen and an App Inventor-based application, allowing data access through smartphones. The system was tested using ambient air samples at Universitas Negeri Malang for two hours. The results indicate that the system operates stably and can accurately transmit and display data. Additionally, it maintains connectivity with the server even in the event of network disruptions. With this success, the developed system has the potential for continuous air quality monitoring and can be integrated with other IoT platforms for further data analysis.

11:45 AM **IoT-Driven Hybrid Microgrid Simulation for Energy-Efficient Smart Industries**

Authors: Carlo N. Romero (Polytechnic University of the Philippines-Sta.Rosa & Ateneo de Manila University, Philippines), and King Harold A Recto (Ateneo de Manila University, Philippines).

Abstract: This research explores the simulation of an IoT-driven hybrid microgrid designed to enhance energy efficiency and sustainability in smart industrial environments. Utilizing Cisco Packet Tracer within an Industry 4.0 framework, the microgrid integrates renewable energy sources—solar and wind—with battery storage systems to ensure a reliable and eco-friendly power supply for diverse industrial consumers. The simulation is organized into five interconnected sub-networks, focusing on power generation, energy storage, industrial operations, office functions, and IoT-based control, all managed through a central core router for seamless data flow and optimized energy distribution. Key Industry 4.0 technologies, including IoT-enabled sensors, smart actuators, and automation systems, are embedded within the microgrid to enable intelligent energy management. Renewable energy harvested from solar and wind sources is efficiently stored in batteries and allocated to industrial machinery, auxiliary equipment, and climate control systems. Secure network segmentation ensures protected access, while automated protocols, such as temperature-responsive air conditioning, optimize energy use and operational efficiency. The results highlight the potential of hybrid microgrids to significantly reduce industrial carbon footprints while enhancing energy resilience and operational performance. By integrating Industry 4.0 advancements with IoT-based automation, this research offers a forward-thinking model for sustainable industrial innovation, contributing to global efforts in environmental responsibility and smart energy management.

Papers Presentation 5 - Online Breakout Room 3

Paper	Authors
Leveraging Pre-Trained Models for Abstractive Summarization of Computer Science Research Papers	Patricia Pepita, Jovan Samuel Hendra, Lili Ayu Wulandhari, Ghinaa Zain Nabiilah, and Andien Dwi Novika (Bina Nusantara University, Indonesia).
MHcanvas: Interactive Visualization of Passive Behavioral Data for Mental Health Awareness	Taehwi Lee, Jihwan Kim, Joonsung Lee, and Chang-Gun Lee (Seoul National University, Korea (South)).
Modified U-Slot Dual-Band Microstrip Patch Antenna for Ku-Band Applications	Muhammad Danny Naufal Syach (Universitas Indonesia, Indonesia), Aditya Inzani (Universitas Indonesia & National Research and Innovation Agency, Indonesia), and Catur Apriono (Universitas Indonesia, Indonesia).
Object Detection Model for Student and Lecturer Classification Using YoloV8 and Optuna	I Gusti Agung Ayu Bitari Damar Ratih, and Dedy Rahman Wijaya (Telkom University, Indonesia).
Machine Learning-Based Prediction of Smart City Development Index in Indonesia	Putri Adistia Ramadhani, and Rojali Rojali (Bina Nusantara University, Indonesia).
OptRAAL: a Robust Machine Learning Classifier for Predicting Anomalies in Fusion Power Reactors	Mushfiqur Rashid Khan (Bangladesh University of Engineering and Technology, Bangladesh), Zahwa Ahmad Jasim (Universiti Teknologi MARA, Malaysia), Dzata Farahiyah (Institut Teknologi Bandung, Indonesia), and Raja Kafi Rahmatullah (Bangladesh University of Engineering and Technology, Bangladesh).
Outage Probability on HAPS System as IMT Base Station	Dwi Harinitha, Iskandar Iskandar, and Irma Zakia (Institute of Technology Bandung, Indonesia).
NLP-Based Automated Essay Scoring Using BERT and Random Forest Algorithm	Marbella, Moethia Shakira, Alfi Yusrotis, and Kelvin A Minor (Bina Nusantara University, Indonesia).

10:00 AM Leveraging Pre-Trained Models for Abstractive Summarization of Computer Science Research Papers

Authors: Patricia Pepita, Jovan Samuel Hendra, Lili Ayu Wulandhari, Ghinaa Zain Nabiilah, and Andien Dwi Novika (Bina Nusantara University, Indonesia).

Abstract: Rapid growth in the publication of academic articles, including computer science research, has created challenges for researchers in extracting and assimilating concise information. Abstractive text summarization algorithms offer a promising solution by generating summaries that capture the essence of source material in a coherent manner. This study evaluates the performance of three pre-trained abstractive summarization models-T5-Small, BERT, and GPT-2-on a dataset of computer science research papers from OpenReview. The objective is to identify the most effective model for summarizing academic texts based on ROUGE metrics under varying preprocessing conditions. Experimental results demonstrate that preprocessing techniques significantly influence model performance. BERT achieved the highest ROUGE scores when text cleansing was applied, indicating its sensitivity to noise and reliance on clean, structured input for optimal results. In contrast, T5-Small exhibited robust performance without text cleansing, achieving superior semantic coherence and contextual accuracy, making it highly adaptable for diverse input conditions. GPT-2 showed moderate performance, excelling in noisy data scenarios but lagging behind BERT and T5-Small overall. The study concludes that both T5-Small and BERT are highly effective models for abstractive summarization, with their suitability depending on the preprocessing approach. BERT is recommended for tasks requiring precision and clean input, while T5-Small's flexibility and robustness make it ideal for handling raw, unprocessed data. Future research should focus on fine-tuning these models

with domain-specific datasets, employing dynamic preprocessing strategies, and exploring ensemble approaches to enhance performance further. These findings contribute to advancing scholarly summarization techniques, offering valuable insights for academic and real-world applications in text summarization.

10:15 AM **MHcanvas: Interactive Visualization of Passive Behavioral Data for Mental Health Awareness**

Authors: Taehwi Lee, Jihwan Kim, Joonsung Lee, and Chang-Gun Lee (Seoul National University, Korea (South)).

Abstract: Mental health disorders are growing as a global concern, and while traditional diagnostic methods remain subjective and labor-intensive, recent advancements in digital phenotyping offer new opportunities for understanding mental health through behavioral data. This study introduces MHcanvas, providing an interactive visualization of passive behavior data for mental health awareness. MHcanvas enables users to explore passive behavioral data across two comparison modes and eight mental health assessments. It initially focuses on keyboard data, supported by a hierarchical feature selection interface and interactive visualization techniques. It also provides personalized context through scatterplots, statistical overlays, and dynamic histograms, allowing individuals to intuitively understand how their behaviors relate to broader mental health trends. In a pilot study with 40 participants, we evaluate that MHcanvas has the ability to increase self-awareness and make complicated mental health information easier for users to understand, with 77.5% of participants showing a positive reaction.

10:30 AM **Modified U-Slot Dual-Band Microstrip Patch Antenna for Ku-Band Applications**

Authors: Muhammad Danny Naufal Syach (Universitas Indonesia, Indonesia), Aditya Inzani (Universitas Indonesia & National Research and Innovation Agency, Indonesia), and Catur Apriono (Universitas Indonesia, Indonesia).

Abstract: This paper presents the design, simulation, and measurement of a dual-band U-slot microstrip patch antenna optimized for Ku-band satellite communication systems. The proposed antenna employs a U-slot technique and an aperture-coupled feed to achieve dual-band functionality. The simulation results demonstrate operational frequencies of 10.9-13 GHz and 13.9-14.72 GHz, with gains of 5.208 dBi and 3.014 dBi. The measurement results validate the simulated performance, showing the practical operation at 11.18 to 12.9 GHz and 13.97 to 14.29 GHz, with corresponding gains of 5.05 and 3.62 dBi. Although the antenna successfully achieved dual-band operation, minor frequency shifts and reduced bandwidth in the lower frequency band highlight challenges to fully meet the target specifications. These results indicate the potential of the proposed U-slot antenna for compact dual-band satellite communication applications, with future work required to address remaining discrepancies and improve performance consistency.

10:45 AM **Object Detection Model for Student and Lecturer Classification Using YoloV8 and Optuna**

Authors: I Gusti Agung Ayu Bitari Damar Ratih, and Dedy Rahman Wijaya (Telkom University, Indonesia).

Abstract: This study explores the application of YOLOv8 with Hyperparameter Optimization (HPO) using Optuna to classify students and lecturers in real-time for academic applications such as access control and attendance monitoring. A custom dataset was developed from campus scenarios, and the model's performance was evaluated through rigorous training and validation. Experiments revealed that HPO and extended training significantly improved performance, achieving a highest mAP50-95 score of 0.489, with notable precision 0.894 and recall 0.789 for lecturers, and high recall 0.9 for students. While the baseline model without HPO showed competitive results, it struggled to differentiate lecturers accurately. This research highlights the effectiveness of HPO in enhancing model performance for role-based classification,

recommending the optimized model for scenarios requiring precise detection and the baseline model for resource-limited environments.

11:00 AM **Machine Learning-Based Prediction of Smart City Development Index in Indonesia**

Authors: Putri Adistia Ramadhani, and Rojali Rojali (Bina Nusantara University, Indonesia).

Abstract: We employ a machine learning approach to forecast Smart City Development Index (SCDI) trends to overcome the constraints of static assessments. Our model generates a strong R^2 score of 0.9790 using a Random Forest Regressor trained on urban data from BPS-Statistics Indonesia (2019-2021). The findings imply that the development of a smart city depends mostly on urban infrastructure and connectivity as well as on urban economic resilience. Following a downturn in SCDI from 2020 to 2021 most likely resulting from COVID-19's effect on the economy and mobility, we see a comeback in 2022. This emphasizes how well cities might recover from crises. Our results provide legislators with insightful analysis to help allocate resources, promote sustainable development, and project future urban issues.

11:15 AM **OptRAAL: a Robust Machine Learning Classifier for Predicting Anomalies in Fusion Power Reactors**

Authors: Mushfiqur Rashid Khan (Bangladesh University of Engineering and Technology, Bangladesh), Zahwa Ahmad Jasim (Universiti Teknologi MARA, Malaysia), Dzata Farahiyah (Institut Teknologi Bandung, Indonesia), and Raja Kafi Rahmatullah (Bangladesh University of Engineering and Technology, Bangladesh).

Abstract: Fusion reactors offer clean energy but face challenges in anomaly detection for safety and performance. Hence, fusion power research needs advanced machine learning (ML) methods to enhance anomaly detection and predictive maintenance in nuclear fusion reactors. In this study, a novel ML framework, Optuna Randomized Adversarial Adaptive Learning (OptRAAL) is introduced, integrating Random Forest, AdaBoost, Bagging, and a meta-learner optimized through Optuna. By leveraging stacking and voting mechanisms, OptRAAL ensures improved accuracy, robustness, and adaptability in detecting critical anomalies such as plasma disruptions, superconducting quenching, and fuel contamination. The balanced dataset, containing 100,000 fusion experimental data, includes nineteen critical reactor parameters, with major magnetic confinement configurations (Tokamak, Reversed Field Pinch, and Stellarator). To enhance clustering accuracy, k-Means++ was employed for better centroid initialization. The OptRAAL framework combines ensemble techniques with fusion-specific feature engineering, an adaptive loss function, and dimensionality reduction to handle high-dimensional reactor sensor data efficiently. This ensures precise classification while mitigating noise and uncertainty. Comparative benchmarking against several regular ML models demonstrates its superior 99.667% accuracy, 0.9967 precision, and 0.9967 recall, with an average inference time of 0.041 milliseconds per sample. By significantly improving fault detection, predictive maintenance, and real-time adaptability, OptRAAL enhances fusion reactor safety and efficiency. Its scalability and robustness make it a promising solution for continuous monitoring, contributing to the long-term viability of fusion energy as a clean, carbon-free power source. The robustness, interpretability, real-time processing, efficacy, feature engineering, and deep learning integration can be enhanced for improved anomaly prediction in fusion reactors.

11:30 AM **Outage Probability on HAPS System as IMT Base Station**

Authors: Dwi Harinitha, Iskandar Iskandar, and Irma Zakia (Institute of Technology Bandung, Indonesia).

Abstract: Global communication services utilize terrestrial communication systems, which are applicable to urban, suburban, rural, and remote areas. However, terrestrial infrastructure in rural and remote areas often faces challenges, restricting access to telecommunication services. The presence of a high-altitude platform station (HAPS) is a new alternative solution that is able to answer the challenge of wide-area coverage while supporting operational cost efficiency. HAPS was then used as a base station for international mobile telecommunications (IMT) services known as HIBS (HAPS IMT Base Station). It operates on a 2 GHz cellular frequency and is 20 km in altitude. In this study, the system is designed to serve an area consisting of seven cells, where one cell is located directly under the HAPS as a reference cell, and six surrounding cells are outside cells that can cause interference. Channel capacity and outage probability for 5G services using different numerologies reveal the system's performance. Simulation results indicate that $\mu=0$ and $\mu=1$ numerology can maintain communication feasibility in the planned system.

11:45 AM **NLP-Based Automated Essay Scoring Using BERT and Random Forest Algorithm**

Authors: Marbella, Moethia Shakira, Alfi Yusrotis, and Kelvin A Minor (Bina Nusantara University, Indonesia).

Abstract: Automated Essay Scoring (AES) systems are used by teachers or lecturers to improve grading objectivity, efficiency, and scalability on large numbers of student essays. This research uses BERT for feature extraction and Random Forest for regression prediction. The dataset is from The Hewlett Foundation's AES. Data Preprocessing includes text cleaning, followed by feature extraction and model training with hyperparameter tuning. The Baseline and Normalization models give the best performance, like the value of the MSE score is 13.48 and the value of the R-squared score is 0.84. On the other hand, when comparing the models' prediction accuracy, the data normalization result showed no significant improvement and reduced model accuracy.

Papers Presentation 6 - Onsite

Paper	Authors
Optimisation of an Ash Fouling Model for Predicting Cleanliness Levels in Coal-Fired Power Plant	Nabil Achmad Nazeem, Maslina Mohd Ibrahim , Azura Che Soh, Asnor Juraiza Ishak, Raja Kamil, Nor Mohd Haziq Norsahperi, Mohd Amran Mohd Radzi (Universiti Putra Malaysia, Malaysia), and Amir Redzuan Mohd Ibrahim (TENAGA NASIONAL BERHAD, Malaysia)
LSTM Methods for Estimating Missing Data in Advanced Metering Infrastructure (AMI) in Indonesia	Guntur Supriyadi, Joko Hartono, Aji Alam, and Kensianesi Kensianesi (PLN Research Institute, Indonesia).
A Machine Learning Framework for Predicting Vehicle Specifications and Environmental Impact	Ajmal Khan (Communication and Information Research Center, Sultan Qaboos University, Oman), Muhammad Ilyas Khattak (Shandong University, China), and Mohammed Bait-Suwailam (Communication and Information Research Center, Sultan Qaboos University & Dept. of ECE, Sultan Qaboos University, Oman).
Self-Sovereign Identity in Indonesia: Opportunities, Challenges, and Implications for Public Services	Ferdinan Setyo Puji, Bety Hayat Susanti, and Rheva Anindya Wijayanti (Politeknik Siber dan Sandi Negara, Indonesia).
Comparison of Long-Term Energy Measurements of Elevator Systems with ISO 25745	Pirmin Held, Daniel Weißhaar, and Dirk Benyoucef (Furtwangen University, Germany).

01:00 PM Optimisation of an Ash Fouling Model for Predicting Cleanliness Levels in Coal-Fired Power Plant

Authors: Nabil Achmad Nazeem, Maslina Mohd Ibrahim , Azura Che Soh, Asnor Juraiza Ishak, Raja Kamil, Nor Mohd Haziq Norsahperi, Mohd Amran Mohd Radzi (Universiti Putra Malaysia, Malaysia), and Amir Redzuan Mohd Ibrahim (TENAGA NASIONAL BERHAD, Malaysia)

Abstract: This study develops an optimised ash fouling model for coal-fired power plants by integrating feature selection with an advanced regression model. The aim is to accurately predict cleanliness levels, providing a reliable indication for soot-blowing operations to maintain boiler performance. Comprehensive feature selection techniques are used to identify key variables influencing soot accumulation, while Gaussian Process Regression (GPR) predicts cleanliness levels. Three feature selection methods are implemented and compared to determine the most accurate approach for guiding soot-blowing operations. Using operational data from a power plant station in Malaysia, this study aims to enhance soot-blowing practices, improve efficiency, and reduce environmental impact. By optimising soot-blowing strategies, the research supports sustainable energy practices and contributes to improved power plant performance.

01:20 PM LSTM Methods for Estimating Missing Data in Advanced Metering Infrastructure (AMI) in Indonesia

Authors: Guntur Supriyadi, Joko Hartono, Aji Alam, and Kensianesi Kensianesi (PLN Research Institute, Indonesia).

Abstract: Advanced Metering Infrastructure (AMI) systems are designed to collect and transmit energy consumption data from smart meters to utilities and consumers. Missing data can occur due to various reasons such as communication errors or sensor malfunctions. The Meter Data Management System (MDMS) should have this estimation function. The purpose of data estimation is to make complete load profile data. Without complete load profile data, some AMI function, such as consumption trending, peak demand periods identifying, energy distribution optimization, and long-term planning can not be delivered accurately. During the AMI deployment process, Perusahaan Listrik Negara (PLN) Indonesia has installed more than 1.3

million AMI meters for customers and developed its own MDMS. The function for estimating lost data is currently under development. Several methods have been proposed to estimate missing data in AMI systems. However, the estimated data is accumulated usage, whereas the load profile data in AMI PLN Indonesia is current usage. Despite this, AMI PLN has energy accumulation data taken twice a day. This data can be used to improve the results of the estimation performed using the Long Short-Term Memory (LSTM) method. In this paper, the LSTM method with correction will be tried using data from sample of data of the AMI PLN customers and will be compared with the LSTM method without correction.

01:40 PM **A Machine Learning Framework for Predicting Vehicle Specifications and Environmental Impact**

Authors: Ajmal Khan (Communication and Information Research Center, Sultan Qaboos University, Oman), Muhammad Ilyas Khattak (Shandong University, China), and Mohammed Bait-Suwailam (Communication and Information Research Center, Sultan Qaboos University & Dept. of ECE, Sultan Qaboos University, Oman).

Abstract: The release of carbon dioxide (CO₂), plays a significant role in driving atmospheric and climatic changes. This has raised public awareness of environmental issues and requires accurate predictions by governments to formulate effective preventive measures. Therefore, in this paper, a combination of classification and regression models is used to estimate categorical characteristics (transmission and fuel type) and continuous features (CO₂ emissions, CO₂ rating, and smog rating). The Random Forest, Extra Trees, and Ridge Classifier showed better performance in classification tasks. In contrast, models of linear regression, extreme gradient boost, and extra trees showed better results in predicting CO₂ emissions, CO₂ ratings, and smog ratings, respectively. These models were assessed using key performance indicators. The data was split, with 70% allocated for model training and the remaining 30% for validation. The results demonstrated the ability of analytical models to accurately project vehicular attributes and CO₂ emissions. Consequently, the results of this research can be instrumental for policymakers in formulating and implementing effective environmental policies.

02:00 PM **Self-Sovereign Identity in Indonesia: Opportunities, Challenges, and Implications for Public Services**

Authors: Ferdinan Setyo Puji, Bety Hayat Susanti, and Rheva Anindya Wijayanti (Politeknik Siber dan Sandi Negara, Indonesia).

Abstract: This paper explores the Self-Sovereign Identity (SSI) concept and its potential implementation within Indonesia's Identitas Kependudukan Digital (IKD) system. As Indonesia transitions towards digitalization, the integration of SSI offers significant opportunities to enhance privacy, security, and efficiency in public services. SSI empowers individuals to have greater control over their personal data, offering a decentralized model that reduces reliance on central authorities and mitigates risks such as identity fraud and data breaches. However, the adoption of SSI in Indonesia faces several challenges, including technological infrastructure gaps, regulatory hurdles, and public awareness. The paper examines the opportunities for improving data privacy, reducing administrative costs, and enhancing access to public services, particularly for marginalized communities. It also addresses the potential challenges in implementing SSI, such as digital literacy disparities, the need for robust legal frameworks, and ensuring interoperability with existing systems like e-KTP. The implications of SSI for Indonesia's public services are discussed, emphasizing its potential to streamline processes, increase trust in government systems, and promote digital inclusion. Ultimately, this paper offers insights into how the implementation of SSI could transform Indonesia's identity management system, contributing to more secure, efficient, and equitable public service delivery.

02:20 PM **Comparison of Long-Term Energy Measurements of Elevator Systems with ISO 25745**

Authors: Pirmin Held, Daniel Weißhaar, and Dirk Benyoucef (Furtwangen University, Germany).

Abstract: This paper compares long-term measurements of elevator systems to determine energy consumption with the estimation method of the ISO25745-2 standard. Five elevator systems

with more than 240,000 elevator trips were measured and evaluated. In order to assess the deviations between the results of the ISO25745-2 estimation method and the long-term measurements, the main parameters of the estimation according to the standard are described. The study showed that for three elevator systems there was a small deviation between the estimates and the measurements, while for two systems there was a larger deviation. As a result, the energy consumption was estimated to be up to 100% higher than measured. The paper investigates the reasons for the discrepancy between the estimated and measured energy consumption according to ISO25745-2 and shows how to improve the estimation of energy consumption. The individual usage profile of the elevator system with the average travel distance and usage time per day is of particular importance. The study concludes that a calculation of energy consumption according to ISO25745-2 only provides reliable data if the individual usage profile is accurately taken into account. If this is not the case, the results can deviate significantly from reality. Suggestions are made to objectify the estimation method.

Papers Presentation 6 - Online Breakout Room 1

Paper	Authors
Performance Evaluation for Cost-Effective Retrieval Process for Multi-Document Retrieval-Augmented Generation on a Domain-Specific Dataset	Maggiore A. Kartiyanta, Eugenia Ancilla, and Kenny Jingga (Bina Nusantara University, Indonesia).
PadYi: Ensembled CNN-Transformer Attention Based Framework for Optimizing Paddy Cultivation Management and Yield Estimation	Arush Sachdeva (IIIT Hyderabad, India), Niharika Jain, NIVarthi Ananya (GGSIU, India), and Sunita Kumari (Delhi Skill & Entrepreneurship University, India).
Predicting Bitcoin Prices by Applying LSTM, ARIMA, SARIMA, GBRP, and GARCH Models	Egi Al Fansyah (Telkom University, Indonesia), and Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia).
TAM and IPA Model Approach in Analyzing the Augmented Reality (AR) Technology Implementation on E-Commerce: a Case Study of Shopee Beauty Cam	Jenifer Naomi Indah Tesalonika, and Viany Utami Tjhin (Bina Nusantara University, Indonesia).
Predicting Student Entrepreneurial Intentions: a Comparative Analysis of Machine Learning Models	Darrel Abuyabor Cardaña, Danie D. Baldesco, Renante M Avergonzado, Jenifer Marie M Gasatan, Mae P Bas, and Renan O Sale (Bohol Island State University, Philippines).
Spam Detection on YouTube Comment Section: Comparison Between Deep Learning and Machine Learning Methods	Jovian Yanto, Richie Darylson Tandiono, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).
Representation Learning on Out of Distribution in Tabular Data	Achmad Ginanjar (), Xue Li (The University of Queensland, Australia), Wen Hua (The Hong Kong Polytechnic University, Hong Kong), and Priyanka Singh (The University of Queensland, Australia).

01:00 PM Performance Evaluation for Cost-Effective Retrieval Process for Multi-Document Retrieval-Augmented Generation on a Domain-Specific Dataset

Authors: Maggiore A. Kartiyanta, Eugenia Ancilla, and Kenny Jingga (Bina Nusantara University, Indonesia).

Abstract: Retrieval-Augmented Generation (RAG) has emerged as a promising approach to enhance Large Language Models (LLMs) in domain-specific tasks without requiring expensive fine-tuning. While dense embedding models, such as OpenAI's text-embedding-3 are widely used in retrieval systems, their high cost raises concerns about whether free or traditional retrieval methods can offer comparable performance. This study evaluates the effectiveness of sparse and dense retrieval models within a RAG framework using the RAGEval DragonBall dataset, focusing on multi-document retrieval in the medical domain. The results demonstrate that BM25, a traditional keyword-based retrieval method, outperforms dense embeddings in exact match retrieval and overall LLM answer quality, particularly in structured datasets where precision is crucial. Furthermore, a hybrid approach combining BM25 with a dense embedding model achieves competitive results, demonstrating the possibility of combining both retrieval methods for improved performance. These results challenge the assumption that paid embeddings are always the better option and highlight the potential of cost-effective retrieval strategies for domain-specific applications.

01:15 PM **PadYi: Ensembled CNN-Transformer Attention Based Framework for Optimizing Paddy Cultivation Management and Yield Estimation**

Authors: Arush Sachdeva (IIIT Hyderabad, India), Niharika Jain, Nlvarthi Ananya (GGSIPU, India), and Sunita Kumari (Delhi Skill & Entrepreneurship University, India).

Abstract: Paddy Rice cultivation in paddy fields, encompassing approximately 167 million hectares globally, serves as a critical staple for over half of the world's population and plays a pivotal role in global food security. However, this agricultural practice faces significant challenges, including water scarcity, climate change impacts, and inefficient farming methods, which collectively jeopardize its sustainability and productivity. This research introduces a novel self-curated dataset, PadiFier, and presents a comprehensive multi-stage framework that leverages advanced machine learning techniques, including Convolutional Neural Networks and Transformers. The framework incorporates state-of-the-art architectures such as ResNet18, EfficientNet, SE ResNeXt, DeiT, and MobileNetV3 to enhance paddy cultivation management. Our multi-stage model exhibits state-of-the-art performance, achieving high aggregate accuracy across all stages, comparable to cutting-edge technologies in agricultural image analysis. By providing real-time, precise information on crop status, health, and potential yield, this innovative technology enables farmers to make data-driven decisions, optimize resource allocation, and implement precision agriculture techniques effectively.

01:30 PM **Predicting Bitcoin Prices by Applying LSTM, ARIMA, SARIMA, GBRP, and GARCH Models**

Authors: Egi Al Fanyah (Telkom University, Indonesia), and Hanif Fakhurroja (National Research and Innovation Agency & Telkom University, Indonesia).

Abstract: Bitcoin is a promising investment asset for the future, offering a viable option for long-term investors. This study seeks to evaluate and compare the effectiveness and performance of several models, including Long Short-Term Memory (LSTM), Autoregressive Integrated Moving Average (ARIMA), Seasonal Autoregressive Integrated Moving Average (SARIMA), Gradient Boosting Regression Process (GBRP), and Generalized Autoregressive Conditional Heteroskedasticity (GARCH), in predicting Bitcoin prices. The dataset spans Bitcoin price data from 2012 to 2024. The findings reveal that each model demonstrates a positive trend in forecasting Bitcoin price movements. Therefore, Bitcoin is a valuable asset for those willing to invest; however, it may not be suitable for novice investors due to its high volatility. This study advances the development of predictive models leveraging machine learning and statistical methodologies, offering critical insights into Bitcoin's price behavior for informed investment decision-making.

01:45 PM **TAM and IPA Model Approach in Analyzing the Augmented Reality (AR) Technology Implementation on E-Commerce: a Case Study of Shopee Beauty Cam**

Authors: Jenifer Naomi Indah Tesalonika, and Viany Utami Tjhin (Bina Nusantara University, Indonesia).

Abstract: This study examines Shopee Beauty Cam's AR feature using the TAM and IPA methods. Validity test and reliability tests confirm that all variables are valid and consistent reliable. Gap Analysis shows users are not fully satisfied with its usefulness and ease of use. IPA results highlight key areas for improvement, particularly variables 11 and 12, which have high importance but low performance. Meanwhile, variable 2 is a strength, while variables in quadrant 3 need improvement but are not a priority. Quadrant 4 variables perform well but have low importance. Overall, Shopee Beauty Cam needs enhancements.

02:00 PM **Predicting Student Entrepreneurial Intentions: a Comparative Analysis of Machine Learning Models**

Authors: Darrel Abuyabor Cardaña, Danie D. Baldesco, Renante M Avergonzado, Jenifer Marie M Gasatan, Mae P Bas, and Renan O Sale (Bohol Island State University, Philippines).

Abstract: Various demographic, psychological, and socio-economic factors influence entrepreneurial intentions among university students. This study examines the key factors influencing

Entrepreneurial Intentions (EI) using eight different machine learning algorithms, including Logistic Regression, Decision Trees, Random Forest, Support Vector Machine (SVM), Naïve Bayes, K-Nearest Neighbors (KNN), Gradient Boosting, and Artificial Neural Networks (ANNs). The study utilizes a quantitative type of research. The findings reveal that entrepreneurial skills and attitudes (ESA) and perceived risk and trust (PRT) significantly impact EI. Support Vector Machine (SVM) and Naïve Bayes achieved the highest accuracy (87.31%) in predicting EI. ANOVA results confirm that psychological and environmental factors significantly shape EI, with ESA ($F = 50.14-116.79$), PRT ($F = 44.55-92.29$), and Performance Expectancy (PE, $F = 26.87-36.01$) emerging as the most influential predictors. These findings highlight the importance of fostering entrepreneurial competencies, reducing perceived risks, and enhancing institutional support to cultivate entrepreneurial intent among students.

02:15 PM **Spam Detection on YouTube Comment Section: Comparison Between Deep Learning and Machine Learning Methods**

Authors: Jovian Yanto, Richie Darylson Tandiono, Lili Ayu Wulandhari, and Ghinaa Zain Nabiihah (Bina Nusantara University, Indonesia).

Abstract: The comment sections of YouTube are increasingly targeted by spam generated by automated bots, leading to harmful and misleading content. This study evaluates the performance of machine learning (ML) and deep learning (DL) models in detecting spam comments using a balanced dataset of 2,519 entries. Data preprocessing included tokenization, lemmatization, and stopword removal, followed by word embedding techniques such as TF-IDF and Word2Vec. Machine learning models, including Logistic Regression, Random Forest, Support Vector Machines, and FastText, were compared against deep learning models like Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU). Among these, FastText achieved the highest accuracy (96.00%) and ROC AUC (0.9597), outperforming all other models. The GRU model emerged as the best deep learning model, with an accuracy of 91.60% and a ROC AUC of 0.9151. The findings highlight that ML models, particularly FastText, demonstrate superior accuracy and efficiency for this task compared to DL models. Future work should investigate larger datasets, advanced architectures like Transformers, and hybrid approaches to further enhance spam detection in YouTube comment sections.

02:30 PM **Representation Learning on Out of Distribution in Tabular Data**

Authors: Achmad Ginanjar (), Xue Li (The University of Queensland, Australia), Wen Hua (The Hong Kong Polytechnic University, Hong Kong), and Priyanka Singh (The University of Queensland, Australia).

Abstract: The open world assumption in model development indicates that a model may not have enough information to effectively manage data that is completely different or out of distribution (OOD). When a model encounters OOD data, its performance can deteriorate significantly. To enhance a model's ability to handle OOD data, generalization techniques can be employed, such as adding noise, which is easily implemented using deep learning methods. However, many advanced machine learning models are resource-intensive and optimized for use with specialized hardware like GPUs, which may not always be accessible to users with limited hardware capabilities. To provide a deeper understanding and practical solutions for handling OOD data, this study explores detection, evaluation, and prediction tasks within the context of OOD on tabular datasets, specifically using common consumer hardware (CPUs). The study demonstrates how users can identify OOD data from available datasets and offers guidance on evaluating the selection of OOD data through straightforward experiments and visualizations. Additionally, this study introduces a technique called Tabular Contrast Learning (TCL), a representation learning technique which is specifically designed for tabular prediction tasks. TCL achieves better results compared to heavier models while being more efficient, even when trained on non-specialized hardware. This makes it particularly beneficial for general machine learning users who face computational constraints. The results show that TCL outperforms other contrastive learning methods and various deep learning models in classification tasks.

Papers Presentation 6 - Online Breakout Room 2

Paper	Authors
The Effect of Gamification on Shopee in Increasing Customer Loyalty and Purchase Intentions	Natasha Aurelia, Amanda Christy, I Putu Satrya Nugraha Manik Galih, and Dedy Syamsuar (Bina Nusantara University, Indonesia).
Spectral Discrimination of Emotion Signatures in Continuous Homophonic Audio Signals	John Mark C. Alvis, Jonathan Apostol, Leigh Aloha T. Badua, Earnest Andrei L. Orcino, and James Patrick A. Acang (Mariano Marcos State University, Philippines).
The Impact of AI Optimization Elements on E-Commerce Consumer Engagement in Indonesia	Larios Leonardo, Nelson Susanto, and Hanny Juwitasary (Bina Nusantara University, Indonesia).
The Role of Natural Language Processing in Developing Intelligent Knowledge Repositories	Tharun Anand Reddy Sure (ServiceNow, USA), Saigurudatta Pamulaparthivenkata (Village MD, USA), Sonu Kapoor (Citi Group, Canada), Siva Teja Reddy Kandula (SC DHHS, USA), Prithiv Dev Devendran (Satori Apps, USA), and Abhik Choudhury (IBM Corporation, USA)
Toward a One-Stop Knowledge Service for Dermatology: a Case Study of Wikidata	Fariz Darari (Universitas Indonesia, Indonesia), and Fitri Firdausiya (Permata Jonggol Hospital, Indonesia).
The Precision of Model to Detect AI-Generated Text: Comparison on AI Text Detectors and Impact of Paraphrasing	Andrew Nicholas Jansen, Jacky Suwandy, Yohan Muliono, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).

01:00 PM The Effect of Gamification on Shopee in Increasing Customer Loyalty and Purchase Intentions

Authors: Natasha Aurelia, Amanda Christy, I Putu Satrya Nugraha Manik Galih, and Dedy Syamsuar (Bina Nusantara University, Indonesia).

Abstract: This study investigates the influence of gamification on user loyalty and purchase intention within Indonesia's highly competitive e-commerce sector, focusing specifically on Shopee. It examines how gamified elements, such as rewards and interactive games, can enhance consumer loyalty and encourage repeat purchases, addressing challenges like low user engagement and high bounce rates faced by e-commerce platforms. The study adopts a quantitative methodology, integrating the Technology Acceptance Model (TAM) alongside key concepts of Gamification, Customer Loyalty, e-word-of-mouth, and Purchase Intention. Data was collected through surveys from 411 respondents in Jakarta and the surrounding area. The findings suggest that gamification and other variables significantly impact customer loyalty. However, gamification does not directly influence Purchase Intention.

01:15 PM Spectral Discrimination of Emotion Signatures in Continuous Homophonic Audio Signals

Authors: John Mark C. Alvis, Jonathan Apostol, Leigh Aloha T. Badua, Earnest Andrei L. Orcino, and James Patrick A. Acang (Mariano Marcos State University, Philippines).

Abstract: Music has a significant role and importance in human life since it can trigger or convey feelings. This connection between emotion and the abundance of musical data has led to the emergence of Music Emotion Recognition (MER), a research field that focuses on the algorithms and techniques to recognize and understand these emotions. Primarily, developments in this area are utilized in personalized music recommendation systems, music therapy, and affective computing fields. However, present methodologies in the literature have focused mainly on single-emotion approaches, as this is inherent to the current data limitations. This disregards other meaningful information in the signal that could create better computing

results if more emotion labels are utilized. In this research, we propose a scheme that recognizes temporal emotion signatures in a signal using a single-label emotion dataset. The dataset was acquired from the Center for Informatics and Systems at the University of Coimbra, consisting of 130 homophonic audio clips with 4 emotion classes. Dominant features were used to model the base emotion signatures, allowing temporal recognition to be performed in the signal. Our results show that our model was able to achieve an accuracy score of 92%, which confirms its capacity to recognize temporal emotion signatures, allowing more sophisticated computational analysis in homophonic audio signals.

01:30 PM **The Impact of AI Optimization Elements on E-Commerce Consumer Engagement in Indonesia**

Authors: Larios Leonardo, Nelson Susanto, and Hanny Juwitasary (Bina Nusantara University, Indonesia).

Abstract: Artificial intelligence (AI) has been shown to increase overall efficiency and customers' online shopping experience. This research investigates how consumer behavior and psychological engagement in the Indonesian e-commerce industry are associated with the effectiveness of chatbots, image search results, recommendation systems, and automated after-sales services. This study uses analysis based on the Stimulus-Organism-Response (SOR) theoretical paradigm to examine how AI components influence customer engagement. The results show that AI elements significantly influence consumer engagement, both behaviorally and psychologically, and social consumption comparison has a moderating impact on this relationship. These findings emphasize the importance of innovation and continued investment in AI technology to increase competitiveness and meet evolving customer expectations in the Indonesian e-commerce industry.

01:45 PM **The Role of Natural Language Processing in Developing Intelligent Knowledge Repositories**

Authors: Tharun Anand Reddy Sure (ServiceNow, USA), Saigurudatta Pamulaparthivenkata (Village MD, USA), Sonu Kapoor (Citi Group, Canada), Siva Teja Reddy Kandula (SC DHHS, USA), Prithiv Dev Devendran (Satori Apps, USA), and Abhik Choudhury (IBM Corporation, USA)

Abstract: Intelligent knowledge repositories store vast amounts of unstructured information and leverage AI to deliver relevant knowledge to users. Recent Natural Language Processing (NLP) advances have transformed static data archives into dynamic, intelligent systems. NLP-powered repositories enable semantic search, automated information extraction, and conversational query answering by understanding context and meaning rather than just keywords. This paper provides a deep technical discussion of the NLP algorithms, models, and architectures that underpin these capabilities. We review seminal techniques in information retrieval (e.g., TF-IDF, BM25), distributed representations (word embeddings), and transformer-based language models, highlighting their mathematical formulations. We discuss how these methods are applied and integrated into knowledge management systems, including pipeline architectures for retrieval-augmented generation (RAG) and enterprise search. Experimental results from recent research demonstrate significant improvements in retrieval accuracy and user productivity through NLP, with BERT-based models and semantic embeddings significantly outperforming classical approaches. We also outline challenges (such as scalability and ensuring factuality) and future directions for making knowledge repositories even more intelligent. The insights in this paper target academic researchers and industry professionals building the next generation of AI-driven knowledge bases.

02:00 PM **Toward a One-Stop Knowledge Service for Dermatology: a Case Study of Wikidata**

Authors: Fariz Darari (Universitas Indonesia, Indonesia), and Fitri Firdausiya (Permata Jonggol Hospital, Indonesia).

Abstract: Dermatological knowledge encompasses a wide range of evolving topics, including diagnosis, treatment, and research related to skin diseases. Given the growing need for seamless integration of such information, this study explores Wikidata as a one-stop, comprehensive

service for representing and interlinking dermatological knowledge. Specifically, we investigate how dermatological entities, such as diseases, their causes, treatments, and related medical procedures, are structured within Wikidata. The study adopts an exploratory research approach, comprising four stages: problem definition, data collection and observation, data analysis, and reporting findings. Our research results highlight both the opportunities and challenges of leveraging Wikidata as an open and structured knowledge repository for dermatology.

02:15 PM **The Precision of Model to Detect AI-Generated Text: Comparison on AI Text Detectors and Impact of Paraphrasing**

Authors: Andrew Nicholas Jansen, Jacky Suwandy, Yohan Muliono, Nadia Nadia, and Franz Adeta Junior (Bina Nusantara University, Indonesia).

Abstract: The swift advancement of generative technologies such as LLMs has resulted in a variety of new challenges, especially in detecting AI-generated text. This study will evaluate 10 different AI models in distinguishing Indonesian AI and human generated text and the impact of paraphrasing on model detection outcomes. Each model will be trained using a dataset consisting of 224 paragraphs, which are evenly divided between AI and human writing with each paragraph containing approximately 100-200 words. The models are validated using a validation dataset consisting of 224 paragraphs that were utilized in training but have been paraphrased by QuillBot. The evaluation results show that partially paraphrased human-generated text is continues to be detected as human writing, while paraphrased AI-generated text is still detected as AI text. 3 models - indobenchmark/indobert-base-p1, indobenchmark/indobert-base-p2, indobenchmark/indobert-large-p2 - have high accuracy in detecting the validation dataset. While all models can generally differentiate between Indonesian AI and human generated text, they still face challenges when dealing with paraphraser, especially paraphrased human-generated text.

Papers Presentation 6 - Online Breakout Room 3

Paper	Authors
Two Stage Framework of Spam Detection for TikTok Reviews on Google Play Store	Angela Hartono, Alleluia Rehuellah Alefika Ndolu, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).
Towards Human-like Dialogue: a Low-Latency, Transition-Aware Talking Avatar Generation Framework	Joonsung Lee, Beomchan You, Do Hyung Kim, Taehwi Lee, Soeun Baek, Soyeon Park, and Chang-Gun Lee (Seoul National University, Korea (South)).
Towards Practical Indoor Navigation with Multi-Perspective Image Descriptors	Christian Joseph Buduan, April A. Dagdagan, Shelzy Joy B. Bareng, Mike Jay S. Bagayas, and James Patrick A. Acang (Mariano Marcos State University, Philippines).
Towards Precision Public Health: Advancing Obesity Prediction with Machine Learning Algorithms	Riadul Islam Rabbi, Anik Sen (Multimedia University, Malaysia), Ekramul Haque Tusher (University Malaysia Pahang Al-Sultan Abdullah), Nafiz Fahad (Multimedia University, Malaysia & American International University-Bangladesh, Bangladesh), Tze Hui Liew (Multimedia University, Malaysia), Md Sharifuzzaman (Trine University, USA), Rifat Md Iftakhar Hasan (American International University-Bngladesh, Bangladesh), and Thirumalaimuthu Thirumalaiappan Ramanathan (Multimedia University, Malaysia).
Tuna Loin Quality Grading Using Image Processing and EfficientNetV2	Narendra M Agastya, Ledy Novamizanti, and Gelar Budiman (Telkom University, Indonesia).
Utilizing Machine Learning to Identify Mental Health Issues Based on Music Genre Preferences	Janice Ashley Kurniawan, Putri Fatiha Nuzul, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia).

01:00 PM Two Stage Framework of Spam Detection for TikTok Reviews on Google Play Store

Authors: Angela Hartono, Alleluia Rehuellah Alefika Ndolu, Lili Ayu Wulandhari, and Ghinaa Zain Nabiilah (Bina Nusantara University, Indonesia).

Abstract: This research addresses the challenge of spam reviews on platforms like the Google Play Store, focusing on TikTok. We propose a two-stage spam detection model utilizing both traditional machine learning and deep learning techniques. The first stage classifies reviews into spam and non-spam, while the second categorizes spam reviews as sensitive or insensitive. A total of 6 models are applied for each stage, consisting of 3 traditional machine learning models, which are Random Forest (RF), Support Vector Machine (SVM), Logistic Regression (LogReg) and 3 deep learning models, which are Convolutional Neural Networks (CNN), Long Short-Term Memory (LSTM), Multi-Layer Perceptron (MLP), using feature extraction techniques like Term Frequency - Inverse Document Frequency (TF-IDF) and Word2Vec. Experimental results show an accuracy of over 90% for both stages emphasizing the importance of combining text representation methods with classification and sensitivity categorization to enhance content reliability. Future work will extend this approach to other social media platforms and develop real-time detection capabilities.

01:15 PM **Towards Human-like Dialogue: a Low-Latency, Transition-Aware Talking Avatar Generation Framework**

Authors: Joonsung Lee, Beomchan You, Do Hyung Kim, Taehwi Lee, Soeun Baek, Soyeon Park, and Chang-Gun Lee (Seoul National University, Korea (South)).

Abstract: Conventional conversational AIs that rely only on text or voice lack the immersive, face-to-face interactivity of human dialogue. This paper proposes a talking avatar generation framework that addresses two critical challenges for human-like communication: response latency and visual continuity. First, the paper introduces a chunk-based streaming generation approach that breaks the avatar's response into 1-second video chunks delivered incrementally. This ensures the avatar begins responding after a nearly constant short delay (independent of the total response length), closely mimicking human response timing. Second, a transition-aware scheduling strategy is presented that seamlessly aligns the avatar's motion when switching from silent (idle) to speaking, eliminating the unnatural visual jump at the start of the response. Built on the state-of-the-art MuseTalk lip-sync model, the framework is optimized with TensorRT to meet timing constraints for human-like communication. Consequently, the avatar maintains a stable response latency regardless of speech length, compared to the linear increasing delays of conventional methods. In addition to that the avatar's transitions from silence to speech are smooth, preserving the natural flow of conversation.

01:30 PM **Towards Practical Indoor Navigation with Multi-Perspective Image Descriptors**

Authors: Christian Joseph Buduan, April A. Dagdagan, Shelzy Joy B. Bareng, Mike Jay S. Bagayas, and James Patrick A. Acang (Mariano Marcos State University, Philippines).

Abstract: Indoor navigation in dynamic environments poses significant challenges due to the limitations of both traditional sensor-based and image-based systems. Sensor-based methods, though effective, are often costly and vulnerable to interference, while image-based systems encounter high computational demands, frequent retraining needs, and a reliance on single-perspective image descriptors, which limit their flexibility in recognizing landmarks from varying viewpoints. In this research, we attempt to resolve these challenges by introducing the concept of Multi-Perspective Image Descriptors. Matching typical descriptors in several reference images is task intensive, hence, we propose an alternative that could work on several source images. We tested our proposed method using 24 reference images and 76 query images, which we manually gathered indoors. We exploited the Geometric and Region-Based features from these images to compose our Multi-Perspective Image Descriptors. Our experimental results show that our proposed scheme was able to achieve about 83.60% accuracy score on all test cases. This proves that our proposed Multi-Perspective Image Descriptors work well in indoor environments, allowing multi-perspective flexibility in the matching process without adding additional computational overhead, making it a viable alternative to traditional sensor-based systems.

01:45 PM **Towards Precision Public Health: Advancing Obesity Prediction with Machine Learning Algorithms**

Authors: Riadul Islam Rabbi, Anik Sen (Multimedia University, Malaysia), Ekramul Haque Tusher (University Malaysia Pahang Al-Sultan Abdullah), Nafiz Fahad (Multimedia University, Malaysia & American International University-Bangladesh, Bangladesh), Tze Hui Liew (Multimedia University, Malaysia), Md Sharifuzzaman (Trine University, USA), Rifat Md Iftakhar Hasan (American International University-Bngladesh, Bangladesh), and Thirumalaimuthu Thirumalaiappan Ramanathan (Multimedia University, Malaysia).

Abstract: Addressing the global epidemic of obesity requires innovative approaches that enhance predictive accuracy and provide actionable insights. This study introduces a groundbreaking application of machine learning (ML) algorithms, enriched with SHapley Additive exPlanations (SHAP), to predict obesity with unprecedented precision. By deploying a comprehensive suite of algorithms-CatBoost, Gradient Boosting, XGBoost, LightGBM, Random Forest, Bagging, and a novel Stacking Hybrid model-this research systematically quantifies and compares their predictive performances on a multifaceted dataset representing diverse demographic attributes.

The incorporation of SHAP values into these algorithms marks a significant novelty, facilitating a nuanced understanding of the factors influencing obesity predictions. This approach not only enhances model transparency but also contributes to the robustness of obesity prediction by revealing the impact of each feature on the model's output. Our findings indicate that the Stacking Hybrid model achieves the highest accuracy, with a balanced accuracy score significantly outperforming conventional models. This research advances the frontier of predictive analytics in public health by demonstrating the efficacy of ML algorithms augmented with explainability in tackling complex health challenges such as obesity. The superior accuracy and interpretative depth offered by our approach hold profound implications for policy-making and health interventions, paving the way for precision public health practices that are both scientifically sound and ethically responsible.

02:00 PM **Tuna Loin Quality Grading Using Image Processing and EfficientNetV2**

Authors: Narendra M Agastya, Ledy Novamizanti, and Gelar Budiman (Telkom University, Indonesia).

Abstract: The global tuna industry faces challenges in maintaining consistent quality standards due to the limitations of manual grading methods, which are often subjective and labor-intensive. This paper proposes an automated tuna loin quality grading system based on image preprocessing and the EfficientNetV2 architecture. The system classifies tuna loins into three quality grades (A, B, and C) using color and texture features extracted from images. To improve classification accuracy and generalization, various preprocessing techniques-Shades of Gray (SOG), Self-Adaptive Illumination Correction (SAIC), and Contrast Limited Adaptive Histogram Equalization (CLAHE)-are explored to mitigate lighting inconsistencies and enhance texture details. Additionally, the study evaluates different optimizers, including Adam, AdamW, and Stochastic Gradient Descent, and learning rate schedulers, including Cosine Annealing and Cyclic Learning Rate Scheduling to identify the optimal training configuration. Experimental results show that the SACM model, which combines SAIC and CLAHE preprocessing with EfficientNetV2M, the Adam optimizer, and Cyclic Learning Rate Scheduling, achieves a validation accuracy of 96.9% and a test accuracy of 96.0%. These findings demonstrate that the integration of advanced preprocessing techniques and adaptive learning strategies significantly enhances model robustness, making it well-suited for real-world tuna grading applications.

02:15 PM **Utilizing Machine Learning to Identify Mental Health Issues Based on Music Genre Preferences**

Authors: Janice Ashley Kurniawan, Putri Fatih Nuzul, Alexander Agung Santoso Gunawan, and Jeffrey Junior Tedjasulaksana (Bina Nusantara University, Indonesia).

Abstract: Mental health issues have been increasing worldwide, with a sharp rise in cases over the last 30 years. This shows the need for better ways to identify and address these problems. This study looks at how machine learning can help identify mental health conditions like anxiety, depression, insomnia, and OCD based on people's music preferences. Survey data on favorite music genres and self-reported mental health were analyzed using machine learning methods, including Logistic Regression, Decision Trees, and Gradient Boosting. Logistic Regression and Gradient Boosting worked the best, predicting anxiety with 32% accuracy after selecting key features. However, issues like unbalanced data and limited relevance of the information made it harder to improve the results. These findings highlight the correlation between the two, suggesting that while music and mental health might be connected, music preferences alone cannot accurately reflect a person's mental health condition, as causation does not work both ways.

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Also available e-Visa on Arrival (eVoA) at evisa.imigrasi.go.id

Also, have a look at this interesting map: en.wikipedia.org/wiki/Visa_policy_of_Indonesia