ICORIS2025
The 7th International Conference on Cybernetics and Intelligent System

IEEE Indonesia Section

Host

UNIVERSITAS BUMIGORA
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ICORIS 2025 | HYBRID CONFERENCE

7TH INTERNATIONAL CONFERENCE ON CYBERNETICS AND INTELLIGENT SYSTEMS

~ Cybernetic technology and intelligent systems in achieving sustainable development ~

12-13th September 2025

Bumigora University,
Mataram - West Nusa Tenggara,
Indonesia

Co-Host

ICORIS2025

The 7th International Conference on Cybernetics and Intelligent System

PROGRAM BOOK
ICORIS 2025

The 7th International Conference
on Cybernetics and Intelligent Systems

IEEE Indonesia Section

BUMIGORA UNIVERSITY
2025

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PREFACE

It is with great honor and privilege that we welcome you to The 7th International Conference on Cybernetics and Intelligent Systems (ICORIS 2025), convened on 12th – 13th September 2025 at Universitas Bumigora, West Nusa Tenggara, Indonesia.

This year's theme, "Cybernetic Technology and Intelligent Systems in Achieving Sustainable Development," underscores the importance of advancing research and innovation to address both global and national challenges. ICORIS 2025 serves as a distinguished platform for scholars, researchers, practitioners, and industry leaders to exchange knowledge, present new discoveries, and foster collaborative partnerships across disciplines in the fields of cybernetics, artificial intelligence, robotics, neural networks, intelligent control systems, and cyber-physical systems.

For ICORIS 2025,a total of 485 papers were submitted from 5 countries, and following a rigorous peer-review process, 150 papers have been accepted for presentation These papers are scheduled across several regular sessions, both onsite and virtually, and will be published in the official conference proceedings. All accepted papers are submitted to IEEE Xplore (IEEE Conference Number: #63540).

On behalf of the organizing committee, we extend our deepest gratitude to all authors for their scholarly contributions, to the reviewers for their commitment to ensuring academic quality, and to our keynote speakers and sponsors whose expertise and support have greatly enriched the conference. We also acknowledge with appreciation the dedication of Universitas Bumigora and all parties whose direct and indirect contributions have been instrumental to the success of this event.

It is our sincere hope that ICORIS 2025 will inspire fruitful discussions, stimulate innovation, and strengthen international collaborations, thereby contributing to the advancement of cybernetic technology and intelligent systems in achieving sustainable development.

Evi Triandini (Organizing Chair)

OPENING SPEECH

Good morning, and a very warm welcome to Universitas Bumigora, here in the beautiful city of Mataram, on the island of Lombok, West Nusa Tenggara, Indonesia. It is both a privilege and a profound honour for us to host the **7th International Conference on Cybernetics and Intelligent Systems (ICORIS 2025).** On behalf of Universitas Bumigora, I would like to extend our heartfelt greetings and express our most profound gratitude for your presence at this prestigious gathering of scholars, researchers, and practitioners.

The theme of this year's conference, *"Cybernetic Technology and Intelligent Systems in Achieving Sustainable Development,"* addresses the challenges and opportunities of our time directly. Around the world, we are witnessing rapid transformations driven by technology, but we are also confronted with the urgent need for sustainability. In this era where responsibility for the future is shared by all, integrating cybernetics and intelligent systems into our research, policies, and innovations presents powerful avenues for creating innovative, adaptive, environmentally responsible, and socially inclusive solutions.

For Universitas Bumigora, hosting ICORIS 2025 is not only an academic milestone but also a reflection of our commitment to contributing actively to global conversations on technology and sustainability. We are deeply grateful to our co-hosts and sponsors for their invaluable collaboration and for affirming our shared vision of advancing research and fostering innovation that transcends borders. Your partnership makes this conference possible and meaningful.

What makes ICORIS so special is the diversity of expertise and perspectives represented here. Over the next two days, we will engage in keynote lectures, panel discussions, technical sessions, and collaborative exchanges. These interactions will not only generate new insights but also inspire creative pathways for collaboration across disciplines and across nations. Together, let us strengthen academic and professional bonds, share transformative ideas, and develop impactful solutions that benefit not only the advancement of technology but also the well-being of society and the sustainability of our planet.

As we begin, I encourage all of us to take full advantage of this unique opportunity to listen, to learn, and to contribute. May ICORIS 2025 serve as a platform for innovation, inspiration, and lasting partnerships that continue well beyond this conference.

Once again, on behalf of Universitas Bumigora, welcome to ICORIS 2025. May this conference be an inspiring, productive, and unforgettable experience for each of you.

Thank you and let us work together to make ICORIS 2025 a resounding success.

Rector
Anthony Anggrawan
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COMMITTEES

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- Co-chair: Hairani, S.Kom., M.Eng
- Co-chair: Dewi Khairani, UIN Syarif Hidatullah Jakarta, Indonesia

Treasurer

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- Co-chair: Lalu Ganda Rady Putra, S.Kom., M.Eng, Universitas Bumigora , Indonesia

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- Siti Soraya, S.Si., M.Si
- Kurniadin Abd. Latif, M.Kom
- Khairan Marzuki, S.T., M.Kom

PROGRAM STRUCTURE

Saturday, 13th September 2025

Venue: Bumigora University

Conference Opening:

07:00 - 07:30	Event Preparation
07:30 - 07:45	Participant Registration
08:00 - 09:30	Opening:
	Singing the National Anthem "Indonesia Raya"
	Singing the "Bumigora University" Mars
	Opening Dance
	Prayer
	Speech by the Head of the Committee
	Speech by the Chair of Coris
	Speech by the Rector of Bumigora University (officially opening the event)
	Group Photo Session
	Closing of the Opening Session
09:30-10:00	Coffee Break

Keynote Session:

10:00 -10:45	Keynote Speaker 1 Prof. Ir. Zainal Arifin Hasibuan, MLS.,Ph.D (Indonesia Computer University)
10:45 - 11:30	Keynote Speaker 2 Prof. Dr. (Andy) Liew Teik Kooi (HELP University)
11:45 - 12:15	Q&A
12:15 - 13:00	Ishoma (Rest, Pray, and Lunch)

Parallel Sessions for Paper Presentation

13:00 - 13:05	Breakout Room Preparation
13:05 - 14:50	Paper Presentations by Authors (Session 1)
12:15 - 13:00	Coffee Break
15:00 - 16:40	Paper Presentations by Authors (Session 2)

Conference Closing:

16:40 - 16:45	Event Preparation
16:45 - 17:00	Closing Ceremony - Announcement of Best Paper Award - Announcement of HOST ICORIS 2026 - Closing Ceremony by the Program Committee Chair

PARAREL PRESENTATION SCHEDULE

DATE	`TIME	ONSITE		VIRTUAL															
		Track1		Track2		Track3		Track4		Track5		Track6		Track7		Track8		Track9	
		Topics	#	Topics	#	Topics	#	Topics	#	Topics	#	Topics	#	Topics	#	Topics	#	Topics	#
September 13, 2025 Saturday Session 1	13:10 - 13:25	CP	90	CNSB	15	RC	19	SPA	8	SPA	142	CP	1	CP	91	CP	175	CP	323
	13:25 - 13:40	CP	188	CNSB	92	RC	32	SPA	17	SPA	264	CP	7	CP	95	CP	192	CP	328
	13:40 - 13:55	SPA	314	CNSB	373	RC	39	SPA	35	SPA	265	CP	24	CP	96	CP	199	CP	332
	13:55 - 14:10	RC	395	SE	2	RC	87	SPA	64	SPA	268	CP	25	CP	101	CP	203	CP	336
	14:10 - 14:25	CP	433	SE	3	RC	98	SPA	89	SPA	271	CP	31	CP	105	CP	207	CP	340
	14:25 - 14:40	SPA	452	SE	26	RC	111	SPA	108	SPA	280	CP	52	CP	112	CP	221	CP	344
	14:40 - 14:55	CP	479	SE	27	RC	122	SPA	109	SPA	281	CP	88	CP	120	CP	222	CP	359
	14:55 - 15:10	CP	482	SE	54	RC	132	SPA	133	SPA	311	CP	57	CP	123	CP	224	CP	385
Session 2	15:25 - 15:40	CP	487	SE	97	RC	134	SPA	137	SPA	366	CP	61	CP	138	CP	240	CP	389
	15:40 - 15:55	SPA	483	SE	110	RC	170	SPA	146	SPA	396	CP	62	CP	141	CP	257	CP	419
	15:55 - 16:10	SPA	486	SE	451	RC	187	SPA	148	SPA	404	CP	68	CP	160	CP	261	CP	446
	16:10 - 16:25			SE	495	RC	250	SPA	163	SPA	405	CP	70	CP	161	CP	272	CP	480
	16:25 - 16:40			SE	496	RC	295	SPA	197	SPA	438	CP	79	CP	165	CP	291	CP	491
	16:40 - 16:55			CNSB	200	RC	339	SPA	252	SPA	484	CP	84	CP	168	CP	302	CP	493
	16:55 - 17:10			CNSB	237	RC	497	SPA	260			CP	53	CP	174	CP	303	CP	292

TECHNICAL SESSION SCHEDULE

Day/Date : Saturday, 13th September 2025
Time : 13.10-17:10
Zoom ID : 999 6180 6276
Passcode : 142583

https://zoom.us/j/99961806276?pwd=sedYvDj1Eln8EoDsgq9lVjA2twW7V0.1

Track 1 : ONSITE Session Chair: Dr. Sandy Kosasi, MM., M.Kom. Session co-chair: Habibi Yusuf Saputra, Adi Saputra			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	90	Titik Ceriyani Miswaty, Fahry, Bambang Krismono Triwijoyo, Elyakim Nova Supriyedi Patty	Mitigating Language Variation Bias in AI-Based Text-to-Speech Systems: A Sociolinguistic Study In Natural Language Processing
13:25 - 13:40 WITA / UTC+8	188	Tri Kuntoro Priyambodo	Machine Learning Algorithms for Attack Detection on Encryption Systems Based on Activity Logs
13:40 - 13:55 WITA / UTC+8	314	Indriyani, Paula Dewanti	Simulation of Anti-Aging Skincare Effects on Facial Images Using Pix2Pix and Generative Adversarial Networks
13:55 - 14:10 WITA / UTC+8	395	Laily Asna Safira, Evi Triandini, Djoko Kuswanto, Faizal Rezky Dhafin	Development of an Affordable Bionic Prosthetic Arm with Mechanical Sensors for Amputee Patients : Preliminary Study
14:10 - 14:25 WITA / UTC+8	433	Fika Hastarita Rachman, Ika Oktavia Suzanti, Imamah, Firdaus Solihin, Salmatul Farida, Nenden Siti Fatonah	The Impact of Rule-Based Opinion Extraction on Sentiment Classification Using Support Vector Machine (SVM)

14:25 - 14:40 WITA / UTC+8	452	Evi Triandini, Putu Adi Guna Permana, Ricky Aureliuz Nurtanto Diaz, Agus Yarcana, Djoko Kuswanto, Yuri Pamungkas, Komang Yuli Santika	A Hybrid Rule-Based and Natural Language Processing Framework for Real-Time TAF Verification at Tropical Airports
14:40 - 14:55 WITA / UTC+8	479	I Nyoman Yoga Sumadewa, Anthony Anggrawan, Hairani Hairani, I Putu Hariyadi, Christofer Satria, Dian Syafitri Chani Saputri	Emotion Classification on Customer Reviews of Drinking Water Services Using IndoBERT and Machine Learning Algorithms
14:55 - 15:10 WITA / UTC+8	482	Dian Syafitri Chani Saputri, Anthony Anggrawan, Hairani Hairani, Elyakim Nova Supriyedi Patty, Christofer Satria, Victoria Cynthia Rebecca	Comparison Analysis of Machine Learning Algorithm Performance in Detecting Diabetes Disease
15:25 - 15:40 WITA / UTC+8	487	Helna Wardhana, Hartono Wijaya, Husain, Kartarina, Suriyati, Rini Anggriani	Ontology Model for Lombok Tourism Knowledge System Using Apache Jena Fuseki
15:40 - 15:55 WITA / UTC+8	483	Bambang Krismono Triwijoyo, Dian Syafitri, Anthony Anggrawan, Husain, Agus Pribadi, Nurul Indriani	Detection of Hazardous Materials in Skin Care Products Based on Product Packaging Label Images Using a CNN Model
15:55 - 16:10 WITA / UTC+8	486	Dian Syafitri Chani Saputri , Dyah Susilowati, Ahmat Adil, Bambang Krismono, Kartarina, Lalu Roni Arianto	Markerless-based Augmented Reality for Learning Sasak Language

Track 2 : VIRTUAL Session Chair: Dr. Ir. Bambang Krismono Triwijoyo, M.Kom. Session co-chair : M Rizqullah, Olivia Sonata Rizki			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	15	Ivan Alexander, Marcel Saputra, Matthew Filbert Tander	Laser Vision: Haptic Navigation System for The Blind
13:25 - 13:40 WITA / UTC+8	92	Kevin Joseph Handoyo, Brhanselino Satrio Edipurtta, Nico Wijaya Hariyanto, Bakti Amirul Jabar, Jurike V. Moniaga	Utilizing AI-Powered Anomaly Detection to Counter DDoS Attacks: A Comparative Study of Random Forest and XGBoost Algorithm in Network Protection
13:40 - 13:55 WITA / UTC+8	373	Danang Haryo Sulaksono, Citra Nurina Prabiantissa, Rinci Kembang Hapsari, Latiful Sirri, Djuniharto, Dwi Yulian R.L	Implementation of Load Balancing on a Quiz Web Application Using the Least Connection Algorithm with Reverse Proxy Technique
13:55 - 14:10 WITA / UTC+8	2	Indrajani Sutedja, Masagus Padadingsiang Luzcyrill, Luthfi Khan Alfaridzzi	Effectiveness of Scrum in Software Development a Bibliometric Analysis
14:10 - 14:25 WITA / UTC+8	3	Gat; Irawan Wingdes; Tri Widayanti; Tony Wijaya; Kusrini	The Role of Content Delivery Networks (CDN) in Improving Django Web Application Performance (Case Study: PPID Sintang)
14:25 - 14:40 WITA / UTC+8	26	Anas Fikri Hanif; Ema Utami	Multimodal Approach for Depression Detection on Social Media: A Systematic Literature Review
14:40 - 14:55 WITA / UTC+8	27	Arif Nur Rohman, Ema Utami, Kusrini Kusrini, Alva Hendi Muhammad	Exploring Extractive and Abstractive Summarization Methods in Indonesian Text: A Systematic Survey
14:55 - 15:10 WITA / UTC+8	54	Yunita Primasanti, Farid Fitriyadi, Evelyne Henny Lukitasari, Erna Indriastiningsih, Bekti Nugrahadi	Implementation of the Internet of Things (IoT) in the Trans Jateng Bus Rapid Transit (BRT) System: Toward Smart and Sustainable Public Transportation
15:25 - 15:40 WITA / UTC+8	97	Sulistyo Heripracoyo, Sharon Levina Saputra, Jane Safirin Yusri, Angelina Fredlin	Exploring the Utilization of Perplexity AI for Academic Information Retrieval with Valid References Sourcing: A Study on Bina Nusantara Students

15:40 - 15:55 WITA / UTC+8	110	Muhammad Fahman Yusuf, Widyanida Amalia Pramesti, Pebry Putri Pratiwi, Sunardi	Analysis of User Experience in the Blood Donor Information System Using the User Experience Questionnaire Plus (UEQ+) and Usability Testing: A Case Study at RSUD Dr. Moewardi
15:55 - 16:10 WITA / UTC+8	451	Akbar Zaidan Rohman, Hasyid Fitra Hasaini, Reina Setiawan, Reinert Yosua Rumagit	Predictive Framework for Adaptive Learning: Integrating Clickstream Analytics and Assessment Outcomes in LMS
16:10 - 16:25 WITA / UTC+8	495	Khairul Imtihan, Muhamad Rodi, Mardi	Optimizing Academic Information Systems: Linking Interface Design with User Loyalty and Institutional Performance
16:25 - 16:40 WITA / UTC+8	496	Khairul Imtihan, Muhamad Rodi, Mardi, Wire Bagye, Mohammad Taufan Asri Zaen.	Optimizing Higher Education Data Governance In The Digital Era: Leveraging Cobit 2019 For Strategic It Alignment And Effectiveness.
16:40 - 16:55 WITA / UTC+8	200	Mehdi Houichi, Faouzi Jaidi, Adel Bouhoula	Privacy-Preserving Threat Intelligence Sharing in Smart Cities Using Homomorphic Encryption and Federated Analytics
16:55 - 17:10 WITA / UTC+8	237	Adrian Jaleco Forca, Desiree Gallarda Morales, Dan Christian Gallo Gellada, James Ryan Balictar Ga	Driving Sustainable Development Through Data: A Looker Studio Dashboard for Philippine HEIs

Track 3 : VIRTUAL Session Chair: Dr. Galih Hendro Martono, M.Eng. Session co-chair: Dhiya 'Ulhaq Ramdhani Malik, Saili Rizki Zahara			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	19	Seftico Frig Injek B, I Ketut Dharma Wijaya Kusuma, Hansen Oktario, Alexander Agung Santoso Gunawan	Optimizing Public Transport Demand in Motorcycle-Dominated Urban Areas: An Origin-Destination Analysis of Jakarta's Bus Rapid Transit
13:25 - 13:40 WITA / UTC+8	32	Aiko Nur Hendry Yansyah	A Literature Review on Integrating Hybrid Intrusion Detection Systems
13:40 - 13:55 WITA / UTC+8	39	Evi Dewi Sri Mulyani, Shinta Siti Sundari, Teuku Mufizar, Cepi Rahmat Hidayat, Dede Syahrul Anwar, Rosi Maelani	Classification of Biodegradable and Non-Biodegradable Waste using Convolutional Neural Network Method with ResNet152V2 Architecture
13:55 - 14:10 WITA / UTC+8	87	Rolly Junius Lontaan, Jacquline M. S. Waworundeng, Gregorius Vincent Adam, Jordy Alfa Elroy Waturandang, Wilsen Grivin Mokodaser	IoT-Based Automatic Plant Watering System With Sensor, Microcontroller and Solar Cell
14:10 - 14:25 WITA / UTC+8	98	Evan Santosa, Henry Wunarsa, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana	Ensemble Stacking For Cardboard Box Defect Detection Using ResNet-50 and Inception V3
14:25 - 14:40 WITA / UTC+8	111	Rifqi Sigwan Nugraha, Aji Gautama Putrada, Ryan Lingga Wicaksono	Monte Carlo Synthetic Data Generation for Durian Cultivation Based on Smart Farming IoT
14:40 - 14:55 WITA / UTC+8	122	Jeremy Axel Suryamiharja, Leony Agustin, Talitha Zasizki Gunara, Mochammad Haldi Widianto	Development of an IoT-Based Smart Waste System with RTC Time Logging for Cleaning Assistance
14:55 - 15:10 WITA / UTC+8	132	Muhamad Zefa Heryana, Zery Gallanta, Mochammad Haldi widianto	Design of pH Monitoring Device in IoT-Based Eco Enzyme Fermentation Process
15:25 - 15:40 WITA / UTC+8	134	Annie Rachmawati Musslifah, Hardika Khusnuliawati, Faqih Purnomosidi, Dhian Riskiana,	Can Robots Prescribe Happiness? A Control-Theoretic Approach to AI-Driven Emotional Enhancement

		Rusnandari Retno Cahyani, Evelyne Henny Lukitasari	
15:40 - 15:55 WITA / UTC+8	170	Rafael Dillon Hasan; Vincent Gavrila Aprilliano; Edmund Abraham Setiady; Maulin Nasari; Alfi Yusrotis Zakiyyah	Development of an Automatic Trash Sorting System Using Vision Transformer (ViT) Model
15:55 - 16:10 WITA / UTC+8	187	Rueben Gabriel Ismail, Nazzar Hibatullah Benediktus, Evandy Unamo, Annisa Istiqomah Arrahmah	IoT-Based Smart Indoor Plant Care System with Automatic Irrigation and UV Light Control
16:10 - 16:25 WITA / UTC+8	250	Dharma Vija Putra Sugianto, Gabrielle Jeconiah Christiando, Wijaya Pratama Suteja, Mochammad Haldi Widianto	Smart Warehouse Monitoring System with License Plate Recognition for Vehicle and Goods Movement
16:25 - 16:40 WITA / UTC+8	295	Isminarti, Alang Sunding, Irvawansyah, Riska Veronika, Muhammad Ali Chandra, Nur Azhary Iriawan Eka Putra	Enhancing Operational Efficiency and Profitability in Poultry Farming Through IoT-Based Innovations
16:40 - 16:55 WITA / UTC+8	339	Christopher Michael Lauw, Dadang Priyanto, Husain, I Made Yadi Dharma, Muhamad Wisnu Alfiansyah	IoT-Based Air Quality Monitoring System Using Tsukamoto Fuzzy Logic
16:55 - 17:10 WITA / UTC+8	497	Ploypailin Rakthum, Dechrit Maneetham, Evi Triandini	IoT-Enabled Continuous Passive Motion Device for Knee Rehabilitation

Track 4 : VIRTUAL Session Chair: Dr. Ir. Paula Dewanti, M.Kom., IPP Session co-chair : Nabila Wahyu Khairunnisa, Bayani Adam Sasaki			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	8	Shafira Ivana Eka Putri, Andi Pramono, Noor Anisa Nabila, Michelle Angelique and Riefky Prabowo	Artificial Intelligence Technology in Rendering Design for Perfume Startup Booths
13:25 - 13:40 WITA / UTC+8	17	Nur Yahya Iman Nuansa, Made Irma Lestari, Stella Tio Caroline	Do environmental transparency and deception practices affect firm value of energy sector in Indonesia?
13:40 - 13:55 WITA / UTC+8	35	Neny Sulistianingsih, Galih Hendro Martono	Coral Reefs Health Detection Using Pretrained Deep Learning Models and Feature Importance Visualization on Underwater Images
13:55 - 14:10 WITA / UTC+8	64	Gabriel Asael Tarigan, Gregorius Natanael Elwirehardja, Kuncahyo Setyo Nugroho, Bens Pardamean	Computer Vision-Based Pose Estimation for Student Engagement Detection: Trends and Challenges
14:10 - 14:25 WITA / UTC+8	89	Mahmud Isnan; Rudi Nirwantono	YOLOv9 for Food Recognition Benchmark Dataset
14:25 - 14:40 WITA / UTC+8	108	Istabraq H. Jassim, Zakariya A. Oraibi, Entesar B. Talal	Brain Tumor Prediction based on a Robust Hybrid CNN Model
14:40 - 14:55 WITA / UTC+8	109	Rinci Kembang Hapsari, Ahmad Naufal Lubabsyah, Tsania Mahja Waldani, Devina Christabel, Purbandini, Abdullah Harits Salim	Water Quality Classification Using the Naive Bayes Algorithm
14:55 - 15:10 WITA / UTC+8	133	Andrea Stevens Karnyoto, Mahmud Isnan, Gregorius Natanael Elwirehardja, Fitya Syarifa Mozar, Bens Pardamean	Sentence Similarity Task Performance with Data Augmentation and Pre-trained Transformers
15:25 - 15:40 WITA / UTC+8	137	Muhammad Muhaimin Nur, Andi Hutami Endang, Furqan Zakiyabarsi	Convolutional Neural Networks for Robust Arabic Handwritten Character Recognition: A Positional Variant-Aware Approach

15:40 - 15:55 WITA / UTC+8	146	Elissa Patricia, Erika Roselyn Husen, Sharon Hermawan, Moh. Erdda Habiby	Automatic Pill Dispenser to Improve Medication Adherence in Elderly and Chronic Disease Patients
15:55 - 16:10 WITA / UTC+8	148	Kurniawan Eka Permana; Iwan Santosa ; Abdullah Basuki Rahmat; Nurhaliza	Application of GoogLeNet Architecture (Inception-V3) for Rice Seed Image Classification
16:10 - 16:25 WITA / UTC+8	163	Ayu Desi Darmawati, I Made Agus Wirawan, I Made Gede Sunarya	Determination of Optimal Frequency Band Features in Electroencephalogram Signal Using Bandpass Filter for Emotion Recognition
16:25 - 16:40 WITA / UTC+8	197	Kelson Vincien, Albert Tandy Harison, Augusto Jonathan Chandra, Meiliana, Mohammad Faisal Riftiarrasyid	Evaluating Geometric Transformations, FA-GAN Augmentation, and CutMix to Improve Facial Expression Recognition
16:40 - 16:55 WITA / UTC+8	252	Aeri Rachmad, Fifin Ayu Mufarroha, Yuli Panca Asmara, Husni, Eka Mala Sari Rochman, Yoga Dwitya Pramudita	ResNet 50: A Convolutional Neural Network Technology for Corn Leaf Disease Recognition
16:55 - 17:10 WITA / UTC+8	260	Miftakhurrokhmat, Robi W. Abdullah, Tinuk Agustin, Ina S. Widiati, Febrianta S. Nugraha, Shofiyati N. Karimah	Detecting Image Manipulation Using a ResNet50–SVM Hybrid Model

Track 5 : VIRTUAL Session Chair: Dr. Dian Puspita Hapsari., S.Kom., M.Kom. Session co-chair: Sri Sulastri, Hammam Abdur Rahman			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	142	Rima Tri Wahyuningrum, Nurul Faizah, Indah Agustien Sirajuddin, Irmalia Suryani Faradisa	Betel Leaf Disease Classification Using EfficientNet-B7 Architecture With Triplet Attention
13:25 - 13:40 WITA / UTC+8	264	Mulaab, Abdullah Basuki Rahmat, Mohammad Syarief, Firdaus Solihin, Dwi Kuswanto	A Hybrid LSTM and Savitzky–Golay Approach for NDVI Forecasting in Protected Rice Field
13:40 - 13:55 WITA / UTC+8	265	Aurelia Tera Puspita, Scholastica Celine Wahyudi, Andien Dwi Novika, Azani Cempaka Sari	Improving Edible and Toxic Plant Recognition with CLIP and Zero-DCE in Low-Light Conditions
13:55 - 14:10 WITA / UTC+8	268	Tohru Djunaedi Sato, Yoel Kharis Wijaya Wong, Theona Arlinton, Bakti Amirul Jabar, Jurike V. Moniaga	Artificial Intelligence Synthetic Image Detection Using Ensemble Convolutional Neural Network Model
14:10 - 14:25 WITA / UTC+8	271	Fendy Wijaya, Wilbert Yang, Ivan Setiawan, Tjeng Wawan Cenggoro	Image Oversampling Enhancement Method Using Kolmogorov-Arnold Networks
14:25 - 14:40 WITA / UTC+8	280	Abdul Haris Rangkuti, Candra Hidayattuloh , Rio Ferdinand, Stanley Christian Darmawan	Comparative Analysis of YOLOv8, YOLOv10, and YOLOv12 for Multi-Class Defect Detection in Cans and Plastic Bottles
14:40 - 14:55 WITA / UTC+8	281	Felicia Audrey Tanujaya, Audrey Theodora Phang, Kelly Natalia, Dave Christian Thio, Dave Christian Thio, Gregorius Natanael Elwirehardja, Bens Pardamean	Enhanced Cervical Cancer Cell Detection Using CNN Transfer Learning with Strategic Layer Freezing
14:55 - 15:10 WITA / UTC+8	311	Ni Putu Linda Santiari, I Putu Ramayasa, N.Dinda Maharani	Evaluating User Satisfaction in Online Balinese Script Handwritten Recognition Using EUCS and IPA Methods
15:25 - 15:40 WITA / UTC+8	366	Joseph A. Escuro II, Kyla Nicole G. Cruz, Charmaine C. Paglinawan	Automated Scrap Metal Sorting System Using Magnetic, Resistive, and Visual Features

15:40 - 15:55 WITA / UTC+8	396	Limbran Sampebatu, Andani Achmad, Intan Sari Areni	Hamming Distance Optimization for 16-QAM Symbol Labeling Using GA and SA Algorithms
15:55 - 16:10 WITA / UTC+8	404	Jazzlyn Amelia Lim, Cindy Noveiren, Meiliana Meiliana, Mohammad Faisal Riftiarrasyid	CNN-BoostForest: A Synergistic Approach for Pneumonia Detection
16:10 - 16:25 WITA / UTC+8	405	Marsellus Oton Kadang, Indrabayu, Syafruddin Syarif	Coffee Bean Quality Classification Using the Variational Autoencoder and Support Vector Machine Algorithms
16:25 - 16:40 WITA / UTC+8	438	Kevin Benedict Lolong, Puti Andam Suri	PNEUMONIA CLASSIFICATION AND DETECTION FROM CHEST X-RAY IMAGES USING TRANSFER LEARNING
16:40 - 16:55 WITA / UTC+8	484	Khasnur Hidjah, Ria Rismayati, Bambang Krismono Triwijoyo, Ni Gusti Ayu Dasriani, Karina Anindita, Dicksa Ananda Christian Tue	The Effect of Hyperparameter Tuning Techniques on the Accuracy of Automated Thyroid Diagnosis
16:55 - 17:10 WITA / UTC+8		#N/A	#N/A

Track 6 : VIRTUAL Session Chair: Dr.Eng. Wilem Musu, S.Kom.,MT. Session co-chair: Baiq Fadilatul Islamiah, Rinda Fitriana Azmi			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	1	Tamoor Aziz, Chalie Charoenlarpnopparut, Srijidtra Mahapakulchai	Data Augmentation for Deep Learning-based Diabetic Retinopathy Diagnosis in Fundus Images
13:25 - 13:40 WITA / UTC+8	7	Faisal Asadi, Poa, Felix Giovan Oktaviano, Mellisa Angelin, Hany Wijaya, Deverel Vieri, Andrew Alfonso Lie	Machine Learning Methods in Predicting Regulatory Elements in the Non-coding Genome
13:40 - 13:55 WITA / UTC+8	24	Andi Pramono, Bambang Kartono Kurniawan, Muchammad Farchan, Ira Audia Agustina, Baskoro Azis, Wahyu Waskito Putra	Implementation of a Cloud-Connected IoT System for Real-Time Indoor Air Quality Monitoring in Tropical Environments
13:55 - 14:10 WITA / UTC+8	25	Sandy Kosasi, Po Abas Sunarya, Susanti Margaretha Kuway, I Dewa Ayu Eka Yuliani, Utin Kasma, Febriana Giovani	Mediating Roles of AI-Driven Adoption in IT Agility Drivers on Digital Transformation
14:10 - 14:25 WITA / UTC+8	31	Titan Paramayoga, Nur Alamsyah, Acep Hendra, Imannudin Akbar, Budiman Budiman, Reni Nursyanti	t-SNE and KMeans-Based Dimensionality Reduction for Explainable Unsupervised Clustering in Mental Health Data Analysis
14:25 - 14:40 WITA / UTC+8	52	Adzin Zhalifunnas, Alexander Agung Santoso Gunawan, Andien Dwi Novika	Enhancing Know Your Customer (KYC) Efficiency in the Financial Sector Using Blockchain-Based Models
14:40 - 14:55 WITA / UTC+8	88	I Kadek Defa Danuarta, Dustin Manuel, Christian Jodi Wisnuwardana, Bakti Amirul Jabar, Jurike V. Moniaga	Application of Fuzzy Logic Mamdani to Optimize Traffic Light Timing at Intersections

14:55 - 15:10 WITA / UTC+8	57	Richelle Widyananda, Maylinda, Yulius Lie	Examining the Adoption of AI Chatbots in Higher Education for Academic Tasks: Perceived Security, Perceived Trust, and Information Quality
15:25 - 15:40 WITA / UTC+8	61	Abdul Haris Rangkuti , Rifdah Fajri Rosyadah	Utilizing Convolutional Neural Networks for Orange Fruit Identification
15:40 - 15:55 WITA / UTC+8	62	Advendio Desandros, Matthew Martianus Henry, Alyssa Imani, Muhammad Rezki Rasyak, Mahmud Isnan, Bens Pardamean	Sparse Machine Learning for Predicting Dry Matter Content in Food Hyperspectral Data
15:55 - 16:10 WITA / UTC+8	68	David, Gusti Syarifudin, Ponti Harianto, Nanja Alamin, Edy Victor Harianto S	Enhancing Classification Performance of k-NN and SVM with Firefly Algorithm
16:10 - 16:25 WITA / UTC+8	70	Vallerie Alexandra Putra, Evelyn Christine, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana	Fine-Tuning and Model Size Effects on NLLB-Based Minangkabau-Indonesian Translation: A Comparative Analysis
16:25 - 16:40 WITA / UTC+8	79	Abdul Haris Rangkuti, Johan Muliadi Kerta, Sian Lun Lau, Budi Juarto, Rasyad Muhammad Aridzal, Ahmad Syamil	Early Detection of Apple Plant Diseases : Deep Learning and Similarity Measurement
16:40 - 16:55 WITA / UTC+8	84	1.Kevin Yanuar, 2.Jason Lee, 3.Matthew Christian Hansel Budhiono, 4.Sulistyo Heripracoyo	Development of Artificial Intelligence for Sentiment Analysis on Social Media in Facing the Impact of Social Media on Education in Indonesia
16:55 - 17:10 WITA / UTC+8	53	Erfan Hasmin, Indrajani Sutedja, Oleh Soleh, Nurul Aini	Prediction for Stunting Prevention Intervention in Children Using Machine Learning Approach with Classification Method

Track 7 : VIRTUAL Session Chair: Fahry, S.Kom., M.Kom. Session co-chair: Hisbullah, Haura Febria Hidayah			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	91	Wilsen Grivin Mokodaser, Green Arther Sandag, Semmy Wellem Taju, Raissa Camilla Maringka, Rolly Junius Lontaan	A Comparative Study of Isolation Forest, LOF, OCSVM and Elliptic Envelope for Anomali Detection in Insurance dataset
13:25 - 13:40 WITA / UTC+8	95	Davita Khowati, Erik Sanjaya, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana	Explaining Gender Bias in Machine Learning Hiring Systems: An XAI-Based Impact Assessment
13:40 - 13:55 WITA / UTC+8	96	Abraham Arthur Fendy, Yosi Kristian, Lukman Zaman P. C. S. W.	Generative AI for Mobile App UI Mockups Using Stable Diffusion with the EveryDream2 Fine-Tuner and GLIGEN
13:55 - 14:10 WITA / UTC+8	101	Erwin Rommel, Michael Christopher Yuvi, Kenzie Timothy Ebenezer, Abdul Haris Rangkuti	Deep Learning to Recognize Book Titles: Leveraging the Front Image Feature
14:10 - 14:25 WITA / UTC+8	105	Lianna Wijaya, Kinmeng Cheng, Lourdes Lasian, Made Irma Lestari, Johannes Widjaja Wahono, Nova Nur Anisa	Trust and Quality in AI-Driven Tools: The Influence on Intention to Use ChatGPT Among University Students in Manila
14:25 - 14:40 WITA / UTC+8	112	Evangelo Wincent, Justin Jovito, Raven Derrick Bee, Evaristus Didik Madyatmadja	Harmonizing Public Sentiment Analysis on Indonesia's New Capital (IKN) on X Using Machine Learning
14:40 - 14:55 WITA / UTC+8	120	Revan Bagus Amrulloh, Afrizal Muhardianto, Yulius Denny Prabowo	BERT-Based Classification Model to Detect Answer Relevance in Online Academic Forum

14:55 - 15:10 WITA / UTC+8	123	Siti Rihastuti, Afnan Rosyidi, Dyah Rosna Yustanti Toin and M. Nur Juniadi	Classification of JKN Mobile User Sentiment with Support Vector Machine, Naïve Bayes and Logistic Regression
15:25 - 15:40 WITA / UTC+8	138	Darren Christian, Ahmad Nurul Fajar	Sentiment Analysis of Electronic Voting System on Indonesia Election Using Machine Learning with Deep Learning Approach
15:40 - 15:55 WITA / UTC+8	141	Sabar Aritonang Rajagukguk; Longinus Tito Hertiandito; Yanto Setiawan	Search Engine Query Analysis for Indonesian Business Trend Prediction Using Google Trends Integration and LSTM Networks
15:55 - 16:10 WITA / UTC+8	160	Sri Huning Anwariningsih, Erwin Kartinawati, Destina Paningrum, Erna Indriastiningsih,Rusnandari Retno Cahyani, Faqih Purnomosidi	Sentiment and Stance Analysis on Jokowi's Credential Controversy Using IndoBERT and Rule-Based Heuristics
16:10 - 16:25 WITA / UTC+8	161	Bain Khusnul Khotimah, Winarni, Andharini Dwi Cahyani, Rika Yuntarini, Mohammad Unis Iswahyudi, Yeni Kustiyahningsih	Optimization of Fuzzy Tsukamoto Membership Functions Using Genetic Algorithm for Cattle Weight Prediction
16:25 - 16:40 WITA / UTC+8	165	James Lay, Muhammad Amien Ibrahim	Emotion Detection in Indonesian E-Commerce Product Review Using BERT
16:40 - 16:55 WITA / UTC+8	168	Rajnaparamitha Kusumastuti, Tommy Dwi Putra, Dewi Oktafiani, Hadis Turmudi	An Explainable AI Approach to Multimodel Sentiment Classification Using LIME
16:55 - 17:10 WITA / UTC+8	174	Bryan Anthony, Davon Perry Nugroho, Henry Lucky, Derwin Suhartono	Fake News Detection Utilizing Ensemble Learning and Explainable AI

Track 8: VIRTUAL Session Chair: Muhamad Wisnu Alfiansyah, S.Kom., M.Sc. Session co-chair: Vina Febrianti, Yosia Nevrisya Danuarta			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	175	Nicholas Ho, Anthony Davidson Salim, Geoffrey Gohtama	Machine Learning Algorithms for HIV/AIDS Prediction using Explainable AI
13:25 - 13:40 WITA / UTC+8	192	Robert Wiliam, Jessica Ryan, Alexander Ivan Gumilang, Derwin Suhartono	Large Language Models for Disease Diagnosis using Symptom-Based Dataset: Exploring Reasoning and Non-Reasoning
13:40 - 13:55 WITA / UTC+8	199	Tristan Nafi Agung Kurniawan, Rafi Satria Putra Sudrajat, Riccosan	Deciding the most suited algorithm for food recognition: A Comparative Study
13:55 - 14:10 WITA / UTC+8	203	Bq Nadila Nuzululnisa, Dadang Priyanto, Raisul Azhar, Suriyati, Muhamad Wisnu Alfiansyah, Mitranikasih Laia	Evaluation and Combination of XGBoost, Artificial Neural Network, and Fuzzy Models for Credit Card Payment Default Classification
14:10 - 14:25 WITA / UTC+8	207	Iwan Fitrianto Rahmad, Syahril Efendi, Poltak Sihombing, T. Henny Febriana Harumy	Big Brain in a Nano Tank: Deep Policy Learning for Micro-Ecosystem Control
14:25 - 14:40 WITA / UTC+8	221	Shane Ryu Cahya, Jonathan Hartanto, Bakti Amirul Jabar, Jurike V. Moniaga.	Heart Disease Prediction Using Random Forest In Machine Learning Using The Concepts Of Data Mining
14:40 - 14:55 WITA / UTC+8	222	Indrawan Ady Saputro, Moch. Hari Purwidiantoro, Widiyanto Hadi, Iwan Ady Prabowo, and Nurhidayanto	Comprehensive Evaluation of Traditional and AI-Based Steganography under Adversarial Attacks Using Explainable AI
14:55 - 15:10 WITA / UTC+8	224	Made Agastya Maheswara, I Made Agus Wirawan, I Gede Mahendra Darmawiguna	Implementation of Continuous Convolutional Neural Network for Pattern Recognition of Balinese Vowel Modifiers in EEG Signals

15:25 - 15:40 WITA / UTC+8	240	Ni Luh Gede Pivin Suwirmayanti, Ricky Aurelius Nurtanto Diaz, Putu Adi Guna Permana, Dian Pramana, I Gde Agus Satya Pratama, Adolf Christian Pardomuan Siregar	A Machine Learning Approach to Predict and Analyze Student Academic Performance Using Random Forest and SVM with SMOTE for Imbalanced Data Handling
15:40 - 15:55 WITA / UTC+8	257	Ika Oktavia Suzanti, Maulana Malik Ibrohim, Rika Yunitarini, Zahra Arwananing Tyas, Arif Muntasa, Hanifudin Sukri	Imbalanced Text Classification using Artificial Neural Networks
15:55 - 16:10 WITA / UTC+8	261	Sudipto Prabangkoro Adristo , Farrel Eleazar Gunawan, Maulin Nasari, Alfi Yusrotis Zakiyya	Achieving Balanced Learning Groups: An Application of K-MeansWith Predefined Cluster Cardinality
16:10 - 16:25 WITA / UTC+8	272	Husni, Fika Hastarita Rachman, Muhammad Syarief, Risky Sulistiyani, Yoga Dwitya Pramudita, Aeri Rachmad	Improvement of cosine similarity-based drug information retrieval system using part-of-speech tagging
16:25 - 16:40 WITA / UTC+8	291	Angdy Erna, Sitti Harlina, Khaerunnisa Hanapi, Indo Intan, Erni Marlina Kadang, Arham Arifin, Muhammad Sadik, Sutan Azwar	Student Career Preferences Segmentation Based on Personality, Interests, and Competencies
16:40 - 16:55 WITA / UTC+8	302	Aprillia Dwi Dayani, Christofer Satria, Victoria Cynthia Rebecca, Anthony Anggrawan, Peter Wijaya Sugijanto, Hasbullah	Comparative Study of TF-IDF and Word Embedding in the Classification of Hoax Political News
16:55 - 17:10 WITA / UTC+8	303	Christofer Satria, I Nyoman Yoga Sumadewa, Anthony Anggrawan, Baiq Elsa Virga Dewanti Destiana, Muhamad Azwar, Muhammad Maulana	Comparative Study of Machine Learning Algorithms for Sentiment Analysis on the Public Housing Savings Program

Track 9: VIRTUAL Session Chair: Ismarmiaty, S.T., MMSI Session co-chair: Ayu nursila, Endah komariyah lestari			
Time	**#**	**Author**	**Title**
13:10 - 13:25 WITA / UTC+8	323	Krisna Adiyarta M., Bambang Adiwinoto, Tri Sugihartono, Marini, Rahmat Sulaiman, Hidayat Febriansyah	XGBoost vs. LSTM: A Comparative Performance Analysis for Global Stock Market Prediction
13:25 - 13:40 WITA / UTC+8	328	Goenawan Brotosaputro, Rahmat Sulaiman, Tri Sugihartono, Bambang Adiwinoto, Agustina Mardeka Raya	Utilizing the C4.5 Algorithm to Evaluate Public Satisfaction for Village Administration System using Client-Server Based
13:40 - 13:55 WITA / UTC+8	332	Nello Aurelius, I Yajamana, Hafizh Shiddiqi, Sonya Manalu	Accuracy and Performance Evaluation of Machine Learning Algorithms for Used Car Price Prediction
13:55 - 14:10 WITA / UTC+8	336	Lilik Widyawati, Christofer Satria, Aprillia Dwi Dayani, Anthony Anggrawan, Heroe Santoso, Rini Anggriani	Comparison Between Support Vector Machine, Naïve Bayes, and Long Short-Term Memory Methods on Sentiment Analysis Performance
14:10 - 14:25 WITA / UTC+8	340	Goenawan Brotosaputro, Ellya Helmud, Rahmat Sulaiman	Comparative Accuracy of Prediction Classification Using Supervised Machine Learning
14:25 - 14:40 WITA / UTC+8	344	Darwin Tandi, Rashawn Yashadhana, Jason Loren, Azani Cempaka Sari	Hybrid Fuzzy-RL Framework for Intelligent Customer Targeting in E-Commerce
14:40 - 14:55 WITA / UTC+8	359	Jovian Hizkia, Marcellino Bonamutial, Abram Prabowo	Predicting Water Levels for Flood Early Warning in Jakarta Using LSTM and Transformer-Based Models
14:55 - 15:10 WITA / UTC+8	385	Robby Kurniawan Harahap, Antonius Irianto Sukowati, Dyah Nurainingsih, Widyastuti Widyastuti, Raden Ayu Sekar Ciptaning Anindya, Erfiana Wahyuningsih	Generative AI-Based Verilog Generation for Scalable ALU Architectures in FPGA Prototyping
15:25 - 15:40	389	James Alvin Dhanardi, Fredy Purnomo, Anang Prasetyo	Comparative analysis of transformer-based models for hate speech detection

WITA / UTC+8			
15:40 - 15:55 WITA / UTC+8	419	Ferlie Hernata, Matthew Ethan Laurent, Sonya Rapinta Manalu, Hafizh Ash Shiddiqi	AI vs. Rule-Based Approaches in Time-Series Anomaly Detection
15:55 - 16:10 WITA / UTC+8	446	Jehan Aprillia Rahma, Silvia Ratna, M. Muflih, Muhammad Amin, Desy Ika Puspitasari, Haldi Budiman	Time Series Prediction Of Martapura River Water Level Utilising Ensemble Stacked LSTM, BPNN, Random Forest And XGBoost
16:10 - 16:25 WITA / UTC+8	480	Christofer Satria, Lilik Widyawati. Anthony Anggrawan, Peter Wijaya Sugijanto, Aprillia Dwi Dayani, I Putu Hariyadi	Performance Testing of the Backpropagation Method in Predicting Carbon Dioxide Emissions Based on Root Mean Square Error and Mean Absolute Error Results
16:25 - 16:40 WITA / UTC+8	491	Lili Tanti, Budi Triandi, Safrizal, Yan Yang Thanri, Bob Subhan Riza dan Juli Iriani	Enhancing Mushroom Classification Using Feature Engineering and Naive Bayes Algorithm
16:40 - 16:55 WITA / UTC+8	493	Tangka, George Morris William and Watopa, James Jonah	An Integrated BWM–MARCOS Framework for Objective Assessment-Based Optimisation of Church Congregation Leader Selection
16:55 - 17:10 WITA / UTC+8	292	Andharini Dwi Cahyani, Ari Basuki, Bain Khusnul Khotimah, Muhammad Yusuf, Ika Suzan Oktavianti, Fifin Ayu Mufarroha	Advancing Automatic Essay Scoring using Synonym-Aware Rabin-Karp Algorithm

KEYNOTE SPEAKER AND INVITED SPEAKER PROFILE

KEYNOTE SPEAKER 1

Prof. Ir. Zainal Arifin Hasibuan, MLS., Ph.D., is a Professor of Computer Science currently serving as the Vice Rector for Information Systems and International Programs Universitas Komputer Indonesia. He has also served as the Chairman of the Association of Indonesian Higher Education in Computer Science (APTIKOM). His areas of expertise include e-learning, information retrieval, and information systems. As a prolific academic, Prof. Zainal has published over 273 scientific works since 1989, with more than 3,600 citations, demonstrating a significant impact on the scientific community. Prof. Zainal's contributions to education and research have been widely recognized, including his ranking at 70th place in the 'Indonesia Top 10,000 Scientists' for the Engineering & Technology category by the AD Scientific Index in 2023. His dedication to advancing the field of computer science has made him a central figure in Indonesia's academic community.

KEYNOTE SPEAKER 2

Prof Liew currently serves as the Vice Chancellor at HELP University. With a remarkable career spanning over 30 years in the academic realm, Prof Liew has held senior administrative positions in various conventional and open distance learning institutions in Malaysia.

Prof Liew's expertise encompasses a wide range of disciplines and areas of interest. He has a keen focus on quality assurance in higher education, strategic planning, online teaching and learning, Open Educational Resources (OER), accreditation of prior experiential learning (APEL), and even the fascinating realm of breeding and cloning of plants. His diverse knowledge base allows him to contribute significantly to the advancement of education in multiple fields.

Recognized as a valuable resource person and appointed lead assessor for the Malaysian Qualifications Agency and Ministry of Higher Education, Prof Liew has played an instrumental role in shaping national policies and frameworks. He has chaired the Malaysian Qualifications Agency's panel of experts in the development of General Guidelines of Practice for Accreditation of Prior Experiential Learning (APEL.C and APEL.Q), as well as the Code of Practice for Programme Accreditation for Open and Distance Learning (ODL) programs. He was also involved in the

development of General Guidelines of Practice for APEL.A during Malaysia's initial introduction of APEL in 2011.

Moreover, Prof Liew's engagement in international organizations and collaborations has granted him a vast network of peers from renowned ODL institutions across Asia, the Commonwealth of Learning, the International Council for Open & Distance Education, and UNESCO Bangkok. His contributions extend beyond national boundaries, serving as the Secretary General for the Asian Association of Open Universities from 2010 to 2012, a position that connected him with over 60 open universities and institutions across the Asia region.

In his current capacity, Prof Liew remains at the forefront of the ever-evolving landscape of higher education. His interests and involvement revolve around the digital transformation of higher education institutions, quality assurance in online learning, accreditation of prior experiential learning, and change management. Through his leadership and expertise, Prof Liew continues to make significant contributions to the advancement and innovation of higher education, both in Malaysia and on the international stage.

PRESENTED PAPER ABSTRACTS

Paper ID #1

Data Augmentation for Deep Learning-based Diabetic Retinopathy Diagnosis in Fundus Images

Tamoor Aziz, Chalie Charoenlarpnopparut, Srijidtra Mahapakulchai

ABSTRACT

Diabetic retinopathy is a leading cause of blindness, and early detection of hemorrhages can prevent severe visual impairment. The proposed method significantly advances the detection of hemorrhages in the initial stages, especially for limited data. First, the images are modified using gamma correction and contrast-limited adaptive histogram equalization to ensure that the fundus images are of high quality, which is essential for accurate detection. This step addresses common issues like non-uniform brightness and contrast, which can hinder the detection process. The data augmentation step utilizes a Gaussian match filter, entropy thresholding, and mathematical morphology to accurately localize potential hemorrhage sites. Then the objects are segmented using the seed points at the prospective hemorrhage locations. These objects are classified using state-of-the-art deep models. The proposed method demonstrates high efficacy in hemorrhage detection, achieving an accuracy of 97.88% and an F1-score of 83.85%, while outperforming conventional techniques in both classification and segmentation tasks. Its strong performance, even with limited data, highlights its potential for integration into automated diabetic retinopathy screening systems. The use of shallow models reduces training time without compromising accuracy, which makes the proposed method highly practical for real-world applications. This efficiency can lead to faster deployment in clinical settings for patients through quicker and more reliable screenings..

Keywords: data augmentation, diabetic retinopathy, fundus images, hemorrhage detection, image enhancement.

Paper ID #2

Effectiveness of Scrum in Software Development a Bibliometric Analysis

Indrajani Sutedja, Masagus Padadingsiang Luzcyrill, Luthfi Khan Alfaridzzi

ABSTRACT

To examine the current research state of SCRUM methodology, this study uses a bibliometric analysis and utilizing VOS viewer. We visualized the connection between key concepts in SCRUM literature, focusing on the impact of SCRUM in productivity, software quality, team collaboration, and customer satisfaction. The visualization resulting in a network with four different clusters. The highlight of our analysis is the centrality of SCRUM effectiveness in literature. While some node like productivity and quality are not present, they are likely to be subsumed under the broader concept of effectiveness. Key findings in this literature include both theoretical foundation and practical implementation of SCRUM. This comprehensive approach in this literature provide insight about SCRUM contribution to its overall impact on software development project. While the analysis provides a high-level overview of SCRUM, further in-depth analysis is needed to justify SCRUM impact on software development. In conclusion, between the identified cluster Scrum have indication that the impact of project outcome can be studied holistically, considering its methodology, framework, practice, and events.

Keywords: SCRUM, Software Development, Impact, Effectiveness.

Paper ID #3

The Role of Content Delivery Networks (CDN) in Improving Django Web Application Performance (Case Study: PPID Sintang)

Gat; Irawan Wingdes; Tri Widayanti; Tony Wijaya; Kusrini

ABSTRACT

Website performance is a key factor in how easily people can access public information, especially on platforms like PPID Sintang, which are designed to serve a broad community. In this study, we examined the effects of using a Content Delivery Network (CDN) on the speed and reliability of a Django-based portal. As part of the evaluation, several metrics were measured before and after the CDN was put into place, such as page load speed, latency behavior, and the consistency of static file delivery. In addition to employing tools like GTmetrix and PageSpeed Insights, we also conducted some manual latency testing for additional perspective. Static material became more reliable after deployment, especially on slower or less steady connections, and average load time decreased from 4.8 to 1.9 seconds. A local government website that was analyzed in actual online environments—uncommon in comparable studies—makes this case intriguing. However, we didn't investigate how the CDN impacts backend server load or performance during traffic surges. For that, additional testing under stress conditions and real-time monitoring would be beneficial..

Keywords: Content Delivery Network (CDN), Web Performance Optimization, Django Web Framework, Public Information Portal, Page Load Time.

Paper ID #7

Machine Learning Methods in Predicting Regulatory Elements in the Non-coding Genome

Faisal Asadi, Poa, Felix Giovan Oktaviano, Mellisa Angelin, Hany Wijaya, Deverel Vieri, Andrew Alfonso Lie

ABSTRACT

Regulatory elements in the non-coding genome, though often overlooked, play an inevitable role in controlling the temporal activation of specific genes. Over the past decade, the identification of regulatory elements has been proven to be strongly correlated with the diagnosis of various diseases. The appearance of machine learning methods brings immense potential to the prediction of regulatory elements in the noncoding DNA, that are provided by accuracy and efficiency in machine learning applications. The purpose of this literature review is to provide an overview and analysis of the implementation of different machine learning algorithms in predicting regulatory elements. With a comprehensive search strategy, this review selected 15 relevant research paper and presented an overview of the algorithms implemented, along with the accuracy achieved. Moreover, this paper also performed a comparative analysis on the batch while considering the potential trend these research showed..

Keywords: computational biology, machine learning, prediction, regulatory elements, systematic literature review.

Paper ID #8

Artificial Intelligence Technology in Rendering Design for Perfume Startup Booths

Shafira Ivana Eka Putri, Andi Pramono, Noor Anisa Nabila, Michelle Angelique and Riefky Prabowo

ABSTRACT

The perfume industry in Indonesia is expanding and attracting new customers because perfume is a daily necessity for everyone to keep their bodies fragrant and fresh. The perfume industry in Indonesia pays little attention to the design of its sales booths, a key factor in attracting customers. Arome perfume startup is here to take advantage of the opportunity by providing a perfume product concept specifically for women. The author focuses on the Arome Startup perfume booth, which features the Modern Mid Century X Indonesia concept. The author requires a prototype in the form of an image visualization to plan the booth design. This research aims to design an Arome perfume startup booth using Artificial Intelligence (AI) software. The method used is a case study focusing on design thinking and creating 3D objects with SketchUp software. This study frames the design process within the established Design Thinking methodology to ensure a structured and user-centric approach. It also leverages marketing theories related to consumer behavior, specifically how store design influences purchase decisions, and applies AI application theory to showcase the practical integration of new technologies in creative industries. Aside from that, the author uses AI-based visualization tools to render previously created 3D designs. The initial planning stage includes conducting research, creating a mood board, and incorporating the mood board into a 3D design. The result of this design is a rendering image that looks realistic and is consistent with the theme of the Arome perfume startup booth, Modern Mid Century X Indonesia..

Keywords: Artificial Intelligence, Booth Design, Perfume, Startup, Interior Design.

Paper ID #15

Laser Vision: Haptic Navigation System for The Blind

Ivan Alexander, Marcel Saputra, Matthew Filbert Tander

ABSTRACT

Independent and safe navigation is a significant challenge for people with visual impairments, especially due to the limitations of traditional aids such as white canes and guide dogs. This research aims to develop an innovative navigation aid called laser vision, which uses a TOF200C-VL53L0X sensor and a vibration motor to provide accurate haptic feedback. The laser vision device is designed with an ESP32 microcontroller as the main controller, a lithium-ion battery for longer usage life, and a lightweight and environmentally friendly polylactic acid waterproof case. Laser vision provides real-time distance information through vibration patterns calibrated based on object distance, allowing users to understand their surroundings more intuitively. Based on testing, the device can detect objects with an average error margin of 3.7% within a distance range of 5 cm to 150 cm. In addition, the device has a battery life of up to 9.37 hours of use. With a compact, efficient design and resistance to environmental conditions, Laser Vision provides an effective and sustainable solution to improve the independence of individuals with visual impairments.

Keywords: navigation aid, visual impairment, TOF sensor, haptic feedback, laser vision.

Paper ID #17

Do environmental transparency and deception practices affect firm value of energy sector in Indonesia?

Nur Yahya Iman Nuansa, Made Irma Lestari, Stella Tio Caroline

ABSTRACT

This study aims to evaluate the impact of digital transformation, ESG (Environmental, Social, and Governance) practice, and lean management on corporate value in the manufacturing sector. The research focused on manufacturing companies listed on the Indonesia Stock Exchange (IDX) during 2019-2023, using secondary quantitative data from annual and sustainability reports. The purposive sampling method selected 21 companies that consistently disclosed relevant information in 5 consecutive years. Data analysis was conducted using multiple regression, with company values measured using Tobin's Q. Digital transformation data was extracted using text analysis techniques, while ESG practices were measured based on GRI (Global Reporting Initiative) indicators, and lean management practices were assessed using a bundle model. The results show that lean management has a significant and positive effect on company value, which shows that operational efficiency and reduction of waste can improve market valuation. In contrast, digital transformation has not shown significant influence, caused by uneven adoption among companies. ESG practices have also not shown significance in the observation period, reflecting that ESG practices in Indonesia have not been fully integrated into the company's core strategy, and its impact has not been felt as a major factor in the company's assessment. The combined influence of these factors shows the potential for strategic integration to increase the value of the company. This research provides empirical evidence and strategic insights for manufacturing companies to maximize valuation through technology and sustainability initiatives..

Keywords: Digital Transformation, ESG Practice, Lean Management, Corporate Valuation, Manufacturing Sector.

Paper ID #19

Optimizing Public Transport Demand in Motorcycle-Dominated Urban Areas: An Origin-Destination Analysis of Jakarta's Bus Rapid Transit

Seftico Frig Injek B, I Ketut Dharma Wijaya Kusuma, Hansen Oktario, Alexander Agung Santoso Gunawan

ABSTRACT

Jakarta's mobility is shaped by the dominance of motorcycles alongside reliance on TransJakarta's Bus Rapid Transit (BRT) system. While the BRT serves as the backbone of public transport, service efficiency, passenger assignment, and route planning remain challenges, particularly in motorcycle-dominated areas where modal competition affects ridership. In this research, Origin-Destination (OD) analysis is applied to the TransJakarta transaction database to identify travel behavior, rush hour congestion, and high-demand stops. Results show extreme congestion at certain corridors, with peak counts reaching 1,169 tap-ins and 201 tap-outs at the same stop, underscoring the need for route optimization and strategies to reduce dependency on motorcycles. The results also show a trip duration of an average of 1.2 hours with high frequency distribution where 50% of the trips take 1 hour, and 75% take a time of 2 hours with the longest recorded time of 3 hours, showing inefficient distribution and scheduling. The study based on these results provides proposals for operational efficiency, congestion, and ease of access to public transportation that can be improved. Frequency increases on peak routes with a 15-20% increase in frequency would counteract congestion, and re-scheduling rush hours would decrease waiting time by 30% per rate. The research indicates the benefit of merging predictive models and real-time data analytics in transportation design and delivering a better public transportation system that is sustainable and more efficient..

Keywords: Public Transport, Transjakarta, Origin-Destination Analysis, Urban Mobility, Traffic Flow Optimization, Passenger Flow.

Paper ID #24

Implementation of a Cloud-Connected IoT System for Real-Time Indoor Air Quality Monitoring in Tropical Environments

Andi Pramono, Bambang Kartono Kurniawan, Muchammad Farchan, Ira Audia Agustina, Baskoro Azis, Wahyu Waskito Putra

ABSTRACT

Maintaining optimal Indoor Air Quality (IAQ) in tropical climates is crucial for comfort and health due to significant impacts from temperature and humidity. This study focuses on enhancing IAQ monitoring by integrating Internet of Things (IoT) technologies. It addresses the simultaneous management of air temperature, humidity, carbon monoxide (CO), and carbon dioxide (CO2) levels. This research aims to develop an IoT-based system that provides real-time, accurate monitoring and management of these parameters, ensuring air quality remains within safe limits. The author employed a qualitative single-case study methodology. The author configured and initialized an Arduino Nano to interact with MQ-7, MQ-135, and DHT11 sensors. This setup allowed for the continuous capture and transmission of environmental data to the ESP32 microcontroller. It is relaying data to the ThingSpeak platform for real-time analysis and visualization. The results revealed that integrating these specific sensors facilitated comprehensive monitoring of CO and CO2 levels. Moreover, it is alongside temperature and humidity, directly influencing indoor environments' thermal comfort and health safety. The Arduino-based system proved effective in providing accurate and easy-to-monitor air quality readings. It is significantly enhancing the capability to respond to IAQ issues dynamically..

Keywords: Air pollutants, Arduino, IAQ Monitoring, IoT, Sensors .

Paper ID #25

Mediating Roles of AI-Driven Adoption in IT Agility Drivers on Digital Transformation

Sandy Kosasi, Po Abas Sunarya, Susanti Margaretha Kuway, I Dewa Ayu Eka Yuliani, Utin Kasma, Febriana Giovani

ABSTRACT

Regarding AI-driven adoption being the primary catalyst for digital transformation, a considerable disparity in technology acceptance persists between large corporations and micro, small, and medium enterprises (MSMEs). Previous studies predominantly concentrate on the impact of IT agility drivers, specifically regarding IT flexibility, IT capability, and IT governance, on the facilitation of digital transformation, neglecting the correlation with AI-driven adoption. The research seeks to examine how AI-driven adoption mediates the influence of IT agility factors on enabling smooth digital transformation in MSMEs. The research methodology utilizes a convergent triangulation approach with an explanatory design supported by subsequent clarification. The research population consists of MSME companies that have been in existence for more than five years. Questionnaires were disseminated to 305 participants online through random sampling methods, yielding 262 responses, resulting in a return rate of 85.90%. Data processing utilizing the Likert scale and analytical tools employing SEM-PLS. The findings indicated that IT flexibility does not affect AI-driven adoption, and in this context, enhancing IT flexibility may impede AI-driven adoption. Furthermore, IT governance and IT flexibility do not significantly contribute to enabling a smooth and efficient digital transformation..

Keywords: IT Agility Drivers, AI-Driven Adoption, Digital Transformation.

Paper ID #26

Multimodal Approach for Depression Detection on Social Media: A Systematic Literature Review

Anas Fikri Hanif; Ema Utami

ABSTRACT

Depression is one of the most burdensome mental health conditions worldwide. With the rapid advancement of technology, the classification of depression can now be conducted using data obtained from social media platforms. However, most existing studies focus on unimodal data, leaving a gap in understanding how multimodal data can be effectively utilized. This study reviews 38 research articles published between 2020 and April 2025 that explore the use of multimodal data for depression classification through social media. The review process involved systematically retrieving relevant studies from digital libraries followed by a structured selection and analysis process guided by predefined research questions. The findings show that Twitter is the most frequently used platform for data collection. Datasets were obtained through three main strategies, which include using benchmark datasets, modifying existing datasets, and collecting new data independently. For independently collected data, annotation methods included keyword-based labeling, human annotation, a combination of both, self-disclosure, and questionnaire-based labeling. Most studies employed a combination of textual data with other modalities in their multimodal approaches. Feature-level fusion or early fusion was the most commonly applied fusion technique. Regarding evaluation, accuracy, precision, recall, and F1-score were the most widely used metrics. Further research is necessary to explore a broader range of modeling techniques and to collect data from populations with diverse cultural backgrounds..

Keywords: depression, classification, multimodal, social media, systematic literature review.

Paper ID #27

Exploring Extractive and Abstractive Summarization Methods in Indonesian Text: A Systematic Survey

Arif Nur Rohman, Ema Utami, Kusrini Kusrini, Alva Hendi Muhammad

ABSTRACT

Automatic Text Summarization (ATS) in Natural Language Processing (NLP) aims to produce concise and meaningful summaries from long texts. While research in English has advanced rapidly, studies in Indonesian remain limited due to scarce datasets, complex morphology, and inconsistent evaluation standards. This paper presents a Systematic Literature Review (SLR) of 34 articles from IEEE Xplore published between 2020 and 2025, covering research trends, methods, datasets, evaluation techniques, and open challenges. The findings show that Transformer-based models dominate abstractive summarization, while extractive summarization often relies on statistical or rule-based methods. ROUGE remains the most widely used evaluation metric, although human evaluation is increasingly applied to better capture semantic quality and readability. Beyond mapping existing works, this review highlights strengths and weaknesses of current approaches and points to future research directions, providing a reference for researchers and guidance for the development of Indonesian text summarization systems..

Keywords: Indonesian Text Summarization, Extractive, Abstractive, Natural Language Processing, Systematic Literature Review.

Paper ID #31

t-SNE and KMeans-Based Dimensionality Reduction for Explainable Unsupervised Clustering in Mental Health Data Analysis

Titan Paramayoga, Nur Alamsyah, Acep Hendra, Imannudin Akbar, Budiman Budiman, Reni Nursyanti

ABSTRACT

The analysis of mental health data presents significant challenges due to its high dimensionality and complex underlying patterns. This study proposes an explainable unsupervised clustering framework combining t-distributed Stochastic Neighbor Embedding (t-SNE) for non-linear dimensionality reduction and K-Means clustering. The dataset, consisting of lifestyle and psychological features, underwent preprocessing and feature scaling to ensure consistency across variables. Clustering quality was evaluated using Silhouette Score and Davies-Bouldin Index, where the integration of t-SNE significantly improved performance compared to traditional PCA-based approaches, achieving a Silhouette Score of 0.3850 and a Davies-Bouldin Index of 0.8415. To enhance interpretability, a Random Forest classifier was trained to predict the cluster labels, and SHAP (SHapley Additive exPlanations) was employed to identify the most influential features. Results revealed that Financial Stress, Self-Esteem, and Work Stress were key factors differentiating clusters. The proposed framework not only improves clustering performance but also provides explainable insights into mental health segmentation, contributing to better targeted interventions and personalized analysis..

Keywords: t-SNE, KMeans Clustering, Explainable Artificial Intelligence (XAI), Mental Health Data Analysis.

Paper ID #32

A Literature Review on Integrating Hybrid Intrusion Detection Systems

Aiko Nur Hendry Yansyah

ABSTRACT

The research provides a systematic review on the development of hybrid intrusion detection systems that combine signature-based and anomaly-based techniques to improve identification of attacks. The study analyzes different methods of data preprocessing, including feature selection and class imbalance mitigation, as well as model evaluation using popular datasets such as NSL-KDD, CICIDS2017, and UNSW-NB15. In addition, the integration of federated learning techniques was introduced as an approach to enhance data privacy and system scalability. This research also outlines the primary unexplored gaps in the standardization of evaluation and real-world testing of data, alongside offering tailored recommendations aimed towards developing more streamlined and efficient Intrusion Detection Systems in the future. Systematic Review Self 10 Studies highlighted the fact that the concentration was primarily focused on classification of IDS datasets. We employed machine learning techniques using Support Vector Machine, Random Forest, XGBoost, Gradient Boosting, Logistic Regression, and K-Nearest Neighbors. In deep learning there are techniques that include CNN and RNN. XGBoost and RF were remarkable in achieving accuracy on the IIS dataset but several others outperformed them on F1 score. This study illustrates the latest research in classifying datasets on IDS with various methods to determine the best one and proposes directions for future research to improve accuracy and model categorization on IDS such as Hybrid IDS and FL-IDS. .

Keywords: Intrusion Detection Systems, Machine Learning, Classification, Datasets, Literature Review.

Paper ID #35

Coral Reefs Health Detection Using Pretrained Deep Learning Models and Feature Importance Visualization on Underwater Images

Neny Sulistianingsih, Galih Hendro Martono

ABSTRACT

Coral reefs are one of the most sensitive marine ecosystems, highly susceptible to climate change and human activities, especially coral bleaching. This study aims to develop an image-based classification system to assess coral health using five pre-trained Convolutional Neural Network (CNN) architectures, namely MobileNetV2, EfficientNetB0, InceptionV3, ResNet50, and DenseNet121. The dataset consists of 923 underwater images, consisting of 438 healthy coral images and 485 bleached coral images. Preprocessing techniques performed include rotation, scaling, shearing, zooming, and horizontal flipping, applied to improve the robustness of the model. The experimental results revealed that the InceptionV3 model achieved the best performance, with a validation accuracy of 92.05% and the lowest loss value of 0.195, indicating high precision and stable training behavior. DenseNet121 and ResNet50 followed closely with validation accuracies of 90.87% and 89.32%, respectively, although signs of overfitting emerged during later epochs. Meanwhile, MobileNetV2 and EfficientNetB0 showed lower accuracy but offered faster computational efficiency and training time. To improve model transparency, several interpretability techniques were used including Grad-CAM, Guided Backpropagation, Integrated Gradients, and Saliency Map. Visual analysis showed that the model consistently focused on critical coral features such as texture and color patterns when distinguishing healthy corals from bleached ones. These findings underscore the potential of deep learning in supporting automated coral reef monitoring..

Keywords: Convolutional Neural Network, Coral Bleaching Detection, Coral Reef Monitoring, Explainable AI, Feature Importance.

Paper ID #39

Classification of Biodegradable and Non-Biodegradable Waste using Convolutional Neural Network Method with ResNet152V2 Architecture

Evi Dewi Sri Mulyani, Shinta Siti Sundari, Teuku Mufizar, Cepi Rahmat Hidayat, Dede Syahrul Anwar, Rosi Maelani

ABSTRACT

Waste classification is a crucial process in waste management, where waste is categorized based on its nature, such as biodegradable and non-biodegradable. In countries with high levels of waste production, including Indonesia, waste management becomes an increasingly urgent issue due to the rising amount of waste generated each year. This problem demands effective approaches to waste management, including the classification of waste types for subsequent processes. This study employs a Convolutional Neural Network (CNN) with the ResNet152V2 architecture to address waste classification issues. ResNet152V2 is known for its complex structure and ability to achieve high accuracy in image processing. In this research, the CNN model using the ResNet152V2 architecture, with an 80:20 dataset split and a learning rate of 2e-5, achieved an accuracy of 97% in classifying waste as biodegradable and non-biodegradable. The precision, recall, and F1-score for the biodegradable category were 96%, while for the non-biodegradable category, they reached 97%. Testing was conducted on 10 waste images, with 9 out of 10 images accurately classified by the model, demonstrating the model's reliability in identifying waste types from the given images..

Keywords: Biodegradable, Classification, Computer Vision, CNN, ResNet152V2.

Paper ID #52

Enhancing Know Your Customer (KYC) Efficiency in the Financial Sector Using Blockchain-Based Models

Adzin Zhalifunnas, Alexander Agung Santoso Gunawan, Andien Dwi Novika

ABSTRACT

Indonesia's fractured KYC processes have resulted in inefficient verification steps, high costs, and poor user experience, which remains prohibitive to financial inclusion; even amidst tremendous digital growth in the country (93M internet users and a 300% payment increase from 2018 to 2019). This paper's proposed Future KYC (FKYC) is a blockchain framework that leverages Base Blockchain (Layer 2 Ethereum) for on-chain verification hashes and encrypted off-chain KYC data storage. Using an incremental development process, FKYC is developed as a hybrid framework utilizing the combination of multiple actors, for KYC that meets this standard's requirements and allows for verification across institutions via roles-based access control (individuals, institutions, or regulators) while minimizing or eliminating duplicate or redundant checks. The prototype illustrates cryptographic separation between the public hashes (on-chain) and private data (off-chain), providing privacy while conforming to Indonesia data localization laws. FKYC is designed to provide an efficient and scalable solution for lowering costs and expanding financial access; however, to realize its potential requires off-chain integration to be completed, institutional workflows to be modified, and policy frameworks for financial institutions to collaboratively develop..

Keywords: Blockchain, Know Your Customer (KYC), Financial Institutions, Base Blockchain, Digital Identity.

Paper ID #53

Prediction for Stunting Prevention Intervention in Children Using Machine Learning Approach with Classification Method

Erfan Hasmin, Indrajani Sutedja, Oleh Soleh, Nurul Aini

ABSTRACT

Stunting, a condition caused by chronic malnutrition and resulting in impaired growth and development in children, remains a critical public health issue, particularly in low- and middle-income countries. Early intervention is key to preventing stunting, but accurately identifying at-risk children poses a significant challenge. This study explores the application of machine learning techniques, specifically classification methods, to predict stunting risk and guide preventive interventions. Various classification algorithms, including Logistic Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), and XGBoost, were utilized to analyze a dataset of key indicators such as maternal health, child nutrition, and socioeconomic factors. The XGBoost model achieved the highest accuracy, outperforming other models in predicting which children are most at risk of stunting. Key predictors included maternal education, household income, pre-pregnancy body mass index (BMI), and child nutritional status. The results demonstrate that machine learning models can provide actionable insights for public health interventions, enabling healthcare providers to target high-risk children early with nutritional support, healthcare services, and education programs. The study highlights the potential of machine learning to transform stunting prevention strategies, offering data-driven solutions that optimize resource allocation and improve child health outcomes. While the findings are promising, challenges related to data availability and the need for model validation in diverse populations are acknowledged. Future research should focus on refining models and integrating machine learning tools into public health frameworks to enhance stunting prevention on a broader scale.

Keywords: Stunting Prediction, Child Health, Nutritional Interventions, Public Health, Preventive Healthcare.

Paper ID #54

Implementation of the Internet of Things (IoT) in the Trans Jateng BRT System: Toward Smart and SPT

Yunita Primasanti, Farid Fitriyadi, Evelyne Henny Lukitasari, Erna Indriastiningsih, Bekti Nugrahadi

ABSTRACT

The rapid urbanization of Central Java has increased the demand for efficient, reliable, and environmentally friendly public transportation. The Trans Jateng Bus Rapid Transit (BRT) system plays a crucial role in meeting this demand, yet operational challenges remain, including schedule adherence, passenger satisfaction, and energy efficiency. The integration of Internet of Things (IoT) technologies offers potential to address these issues by enabling real-time monitoring, data-driven decision-making, and enhanced service quality. This study aims to evaluate the implementation of IoT within the Trans Jateng BRT system and its contribution toward achieving smart and sustainable transportation. A mixed-method approach was employed, combining quantitative surveys and qualitative interviews. Data were collected from 350 passengers, 45 bus crew members, and 10 system operators, along with IoT operational logs over a three-month period. Quantitative data were analyzed using descriptive statistics and regression analysis, while qualitative responses underwent thematic coding to identify key improvement areas. The findings reveal that IoT-enabled features—such as GPS-based vehicle tracking, smart ticketing, and automated maintenance alerts—significantly improved operational efficiency (by 18%), reduced passenger wait times (by 12%), and enhanced overall service satisfaction scores (from 78% to 89%). Furthermore, IoT integration contributed to sustainability goals by optimizing fuel usage, resulting in an estimated 9% reduction in CO_2 emissions. This study demonstrates that IoT implementation in the Trans Jateng BRT system not only enhances operational performance but also supports sustainable urban mobility. The results provide a practical framework for other regional transport systems seeking to transition toward smart public transportation models. .

Keywords: IoT, BRT, Trans Jateng, smart transportation, e-ticketing, sustainability.

Paper ID #57

Examining the Adoption of AI Chatbots in Higher Education for Academic Tasks: Perceived Security, Perceived Trust, and Information Quality

Richelle Widyananda, Maylinda, Yulius Lie

ABSTRACT

The rapid development ofiArtificialiIntelligence (AI)itechnology, especially AI chatbots, hasia significant impact on higher education by supporting tasks and increasing student engagement. However, previous studies have focused more on user intention and behavior without exploring factorsisuchiasiperceived trust, perceived risk, and information quality, which are important for safe and reliable chatbot adoption. This study fills this gap by integrating the UTAUT and TAM model with additional variables: perceived security, perceived trust, and information quality. Data was collected through online questionnaires from 452 active students of XYZ University who use AI chatbots. TheoanalysisOwas conducted usingOstructural equation modeling, discriminant validity, and bootstrapping. Theiresultsishowithatisocialiinfluence, perceivedousefulness, perceived risk, and subjectiveonorms significantly influence perceived security and perceived trust. PerceivedOease of use only influences perceived security. Perceived security and perceived trust have a positive impact on information quality, which, along with attitude, predicts the intention to use the chatbot. Theinoveltyiofithisiresearchilies in the integration of behavioral, security, and information quality variables in a comprehensive model for the higher education context, providing guidance for institutions and developers to improve chatbot design and implementation.

Keywords: AI Chatbot, Higher Education, Technology Adoption, UTAUT, Trust, Information Quality.

Paper ID #61

Utilizing Convolutional Neural Networks for Orange Fruit Identification

Abdul Haris Rangkuti , Rifdah Fajri Rosyadah

ABSTRACT

In conducting fruit identification has become a crucial part in carrying out the agricultural automation process. Especially in terms of increasing crop yield estimation, quality control, and harvest efficiency. In the latest developments in the deep learning process, especially Convolutional Neural Networks (CNN), have revolutionized fruit detection by offering the right solution to be able to handle the complex image recognition process. especially orange fruit images. CNN distinguishes important features such as color, shape, and texture, making it ideal for detecting oranges. This study presents a preprocessing flow through the right method to support the orange image recognition process. For that, there are 11 classes of orange data that are adjusted to recognize oranges by utilizing the CNN model. In general, the CNN model can handle difficult and complex events, which ultimately increases the precision and efficiency of the automatic orange fruit detection system in agriculture. After the experiment, the best model in detecting oranges based on the highest accuracy and number of correct detections from the orange similarity test data is DenseNet169 and MobileNetV2 with an accuracy of more than 95% and 86%. This research can be followed to recognize other fruit images that are more complicated and complex and require special treatment starting from preprocessing, feature extraction and image classification. .

Keywords: fruit, orange, CNN, detection, DenseNet169, MobileNetV2.

Paper ID #62

Sparse Machine Learning for Predicting Dry Matter Content in Food Hyperspectral Data

Advendio Desandros, Matthew Martianus Henry, Alyssa Imani, Muhammad Rezki Rasyak, Mahmud Isnan, Bens Pardamean

ABSTRACT

Richness of hyperspectral dataset that contains spectral and spatial information of the observed samples often comes with the challenges due to high dimensionality and noise. Sparse machine learning techniques address these issues by preserving only the informative spectral bands to reduce model complexity and to improve generalization. This study evaluated two sparse regression methods: Ensemble Canonical Correlation Analysis (EnCCA) regression and Least Angle Regression (LARS), for predicting Dry Matter Content (DMC) from hyperspectral data acquired from SpectroFood's Leek and Mushroom datasets. To run the experiment, both datasets were split into 80% train and 20% test. Models' performance was evaluated on the test set using the coefficient of determination (R^2) and Prediction Interval Coverage Probability (PICP) to measure accuracy and robustness under uncertainty. Compared to LARS, EnCCA regression achieved higher R^2 values with acceptable PICP on the Leek dataset (R2: 0.87, PICP: 69.97%) and achieved higher in both metrics on Mushroom dataset (R2: 0.71, PICP: 86.00%). Despite giving decent PICP scores, LARS failed to surpass EnCCA regression's R2 on both datasets. However, EnCCA selected a larger feature space than LARS, which led to a slightly less interpretable and heavier regression model. These findings highlight EnCCA's potential application in food the industry, specifically as a tool to automate quality control process and chemical analysis using hyperspectral imaging techniques..

Keywords: hyperspectral, sparse machine learning, dry matter content, EnCCA, LARS, uncertainty quantification..

Paper ID #64

Computer Vision-Based Pose Estimation for Student Engagement Detection: Trends and Challenges

Gabriel Asael Tarigan, Gregorius Natanael Elwirehardja, Kuncahyo Setyo Nugroho, Bens Pardamean

ABSTRACT

Engagement reflects a student's interest, interaction, and effort in learning activities that foster persistence and successful task completion. Despite its importance, current engagement detection systems often suffer from limited dataset diversity, high annotation costs, and difficulty capturing body pose cues in complex classroom environments. This systematic literature review addresses these challenges by identifying and analyzing recent computer vision–based pose estimation trends for student engagement detection. Existing methods were categorized into object detection, pose estimation, and hybrid approaches, with YOLO-based object detection emerging as the most widely adopted method due to its robustness in complex scenarios. CNN-based methods demonstrated high data efficiency and adaptability for smaller datasets. Key challenges identified include extensive manual annotation requirements, dataset imbalance, and reduced accuracy under occlusion or in crowded settings, while opportunities for future research include efficient data collection, multimodal fusion, and the deployment of lightweight models for real-time engagement monitoring..

Keywords: Student engagement, computer vision, object detection, pose detection, image classification .

Paper ID #68

Enhancing Classification Performance of k-NN and SVM with Firefly Algorithm

David, Gusti Syarifudin, Ponti Harianto, Nanja Alamin, Edy Victor Harianto S

ABSTRACT

In the realm of machine learning, optimal parameter selection plays a critical role in determining classification performance. Two widely adopted algorithms Support Vector Machine (SVM) and k-Nearest Neighbors (k-NN) are highly sensitive to specific parameters. Manual tuning of these parameters is often time-consuming and may not yield optimal outcomes. This study proposes the use of the Firefly Algorithm (FA), a swarm intelligence method inspired by the flashing behavior of fireflies, to automatically determine optimal parameter values. A set of datasets from the UCI Machine Learning Repository is utilized to evaluate the effectiveness of the proposed approach. For SVM, the parameters tuned include C and gamma, while for k-NN, the optimal number of neighbors (k) is determined. The results demonstrate that FA enhances classification accuracy and produces more stable models due to reduced performance variance. The findings suggest that FA is a viable and efficient solution for parameter tuning in SVM and k-NN, particularly valuable for researchers seeking to construct reliable classification models without the burden of manual configuration..

Keywords: Firefly Algorithm, Parameter Optimization, Support Vector Machine (SVM), k-Nearest Neighbors (k-NN).

Paper ID #70

Fine-Tuning and Model Size Effects on NLLB-Based Minangkabau-Indonesian Translation: A Comparative Analysis

Vallerie Alexandra Putra, Evelyn Christine, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana

ABSTRACT

Minangkabau, one of Indonesia's many regional languages, faces digital underrepresentation and endangerment. Advances in machine translation, particularly using multilingual models like No Language Left Behind (NLLB), present an opportunity to preserve such low-resource languages through effective translation systems. This study investigates and compares the impact of fine-tuning three NLLB model variants: distilled 600M, distilled 1.3B, and full 3.3B, on bidirectional Minangkabau-Indonesian translation tasks. Using a 10,969-sentence parallel corpus, each model is fine-tuned under consistent hyperparameters. Performance is evaluated using sacreBLEU and chrF++ metrics. Fine-tuning led to significant improvements across all model sizes. The 3.3B model achieved the best results in the Minangkabau–Indonesian direction, with a sacreBLEU of 59.80 and chrF++ of 76.97. In the reverse direction, the 1.3B model performed best, with a sacreBLEU of 55.53 and chrF++ of 74.58. The results demonstrate the effectiveness of fine-tuning multilingual models for low-resource language pairs. Additionally, larger model sizes generally yielded better performance, though the observed improvements at larger scales were relatively modest in this setting..

Keywords: Machine Translation, Low-Resource Languages, Minangkabau, NLLB, Fine-tuning.

Paper ID #79

Early Detection of Apple Plant Diseases : Deep Learning and Similarity Measurement

Abdul Haris Rangkuti, Johan Muliadi Kerta, Sian Lun Lau, Budi Juarto, Rasyad Muhammad Aridzal, Ahmad Syamil

ABSTRACT

Apple crops are highly susceptible to a variety of diseases that can severely impact both yield and fruit quality. Early and accurate detection of these diseases is critical for effective crop health management and minimizing economic losses for farmers. To address these challenges, this study proposes a deep learning-based approach for the automated early detection of diseases in apple crops through the analysis of leaf and fruit images. The proposed system employs Convolutional Neural Networks (CNNs) to classify common and emerging apple diseases. The model is trained and validated on publicly available datasets, achieving high accuracy in disease identification. To enhance performance, advanced techniques such as data augmentation, transfer learning (evaluated across six CNN architectures), and hyperparameter optimization are applied. Experimental results demonstrate that the MobileNetV2 model achieves over 92% accuracy, while ResNet50V2 attains 90% accuracy, with further validation using Cosine and Euclidean distance metrics. These deep learning models significantly outperform traditional machine learning approaches. The system provides a timely, cost-effective, and scalable solution for farmers, enabling prompt intervention to mitigate crop damage. By integrating AI-driven diagnostics into smart farming practices, this research advances precision agriculture, contributing to more sustainable and efficient apple production.

Keywords: apple, fruit, CNN, Cosine, Euclidean, disease.

Paper ID #84

Development of Artificial Intelligence for Sentiment Analysis on Social Media in Facing the Impact of Social Media on Education in Indonesia

1.Kevin Yanuar, 2.Jason Lee, 3.Matthew Christian Hansel Budhiono, 4.Sulistyo Heripracoyo

ABSTRACT

The advancements in Aritifical Intelligence (AI) technology and its effects on specific sectors, including education, have received a lot of attention. Users of social media platforms, particularly X/Twitter, have shared their opinions on the effects of AI in education, classifying them as positive, negative, or neutral. To capture their sentiment, this research conducted sentiment analysis on a sample of 11,000 comments from X (Twitter), Instagram, Youtube, and Facebook. A model using a Simple Recurrent Neural Network (Simple-RNN) and Bidirectional architecture performed the best in the positive category, achieving precision and recall metrics of 88% and F1-score close to 90%. For the negative category, recall was 84% and precision was 75%. For neutral sentiment, recall dropped to 72%. This suggests the proposed AI model serves well for positive sentiment classification but fails to enhance the detection of neutral sentiment which undermines balanced classification..

Keywords: Artificial Intelligence, education, sentiment, analysis, social media, machine learning.

Paper ID #87

IoT-Based Automatic Plant Watering System With Sensor, Microcontroller and Solar Cell

Rolly Junius Lontaan, Jacquline M. S. Waworundeng, Gregorius Vincent Adam, Jordy Alfa Elroy Waturandang, Wilsen Grivin Mokodaser

ABSTRACT

Efficient plant watering is a key aspect of garden maintenance, both in campus environments and in modern agricultural practices. This study aims to design and develop a prototype of an automatic plant watering system based on the Internet of Things (IoT) that operates according to soil moisture levels. The system is built using various components, including the NodeMCU ESP8266 microcontroller, a soil moisture sensor, a solar panel, a solar charge controller, a lead-acid battery, an LM2596 step-down module, a USB charger, a relay, a solenoid valve, a sprinkler, and the Blynk application as the user interface. Through this application, users can monitor soil moisture and control the watering process directly via a smartphone. Test results show that the system functions well, automatically watering plants based on the detected soil moisture conditions. Therefore, this research is expected to make a significant contribution to the implementation of IoT technology as an innovative solution for smarter and more efficient plant watering management..

Keywords: ESP8266, soil moisture, Blynk, automatic watering.

Paper ID #88

Application of Fuzzy Logic Mamdani to Optimize Traffic Light Timing at Intersections

I Kadek Defa Danuarta, Dustin Manuel, Christian Jodi Wisnuwardana, Bakti Amirul Jabar, Jurike V. Moniaga

ABSTRACT

Traffic congestion is a significant challenge in many cities in Indonesia, driven by rapid urbanization and the increasing number of private vehicles. It reduces productivity and worsens the environment through increased air pollution and greenhouse gas emissions. Automated traffic systems have been implemented to optimize signals, regulate flow, and provide real-time updates. However, they often face challenges from irregular vehicle movements, weather changes, and accidents. A Mamdani fuzzy logic approach enables intelligent decision-making under uncertain traffic conditions. By processing real-time vehicle counts (from camera feeds via YOLO), the Mamdani controller optimizes signal timing based on traffic density and queue length, improving traffic flow. In simulations, the proposed fuzzy-vision controller significantly outperforms a fixed-time signal on three metrics. On average, waiting time decreased by 28.7%, delay by 34.1%, and queue length by 8.4%. Overall, the Mamdani fuzzy logic system yields lower congestion and faster throughput than conventional timing..

Keywords: urbanization, fuzzy logic, mamdani, computer vision, SUMO.

Paper ID #89

YOLOv9 for Food Recognition Benchmark Dataset

Mahmud Isnan; Rudi Nirwantono

ABSTRACT

The need for food detection applications is increasingly important, especially for monitoring nutritional intake in medical and healthcare contexts. One of the main challenges in developing automatic food recognition technology is the availability of high-quality and accurately annotated datasets. MyFoodRepo-273 is one of the latest benchmark datasets that has previously been used to train the Hybrid Task Cascade (HTC) object detection model with the ResNet101 backbone. However, there is still an opportunity to explore more modern and efficient models, such as YOLOv9. In this study, a small variant of YOLOv9 was used to train a food detection model on the MyFoodRepo-273 dataset. The experimental results showed that YOLOv9 performed better than the previous model, with an increase in the mAP@50 value from 0.53 to 0.66. To understand the interpretability of the model, Eigen-CAM was used to generate a heatmap showing the visual features used by the model in recognizing objects. In addition, the trained model was also implemented into a web-based interface application..

Keywords: Food recognition, YOLOv9, Eigen-CAM, object detection, heatmap.

Paper ID #90

Mitigating Language Variation Bias in AI-Based Text-to-Speech Systems: A Sociolinguistic Study In NLP

Titik Ceriyani Miswaty, Fahry, Bambang Krismono Triwijoyo, Elyakim Nova Supriyedi Patty

ABSTRACT

This study examines language variation bias in Indonesian Text-to-Speech (TTS) systems through a mixed-methods approach. Two research questions guide the investigation: (1) how accurately current TTS systems reproduce major regional accents, and (2) how users perceive the “neutrality” of TTS voices and which sociolinguistic factors influence these perceptions. The dataset comprised 1,500 TTS-generated samples and human recordings in four regional accents (Javanese, Sundanese, Batak, Minangkabau), alongside 1,500 user comments and survey responses from 250 participants.On the technical side, acoustic features were extracted and classified using a CNN model with stratified 5-fold cross-validation. Evaluation metrics included accuracy, precision, recall, F1-score, AUC, and visualization through confusion matrices and t-SNE clustering. Results showed higher accuracy for Javanese (F1 = 0.88) and Sundanese (F1 = 0.85), but weaker performance for Batak (F1 = 0.76) and Minangkabau (F1 = 0.73), revealing bias toward dominant accents. On the perceptual side, sentiment analysis with IndoBERT found 42% positive evaluations emphasizing clarity, while 23% were negative, citing Jakarta-accent bias, robotic quality, and lack of expressiveness. Topic modeling (LDA and BERT embeddings) identified six thematic clusters, including neutrality, accent bias, rhythm, and emotional resonance. Survey data confirmed that Jakarta-based voices were rated highest for neutrality and clarity but lowest for expressiveness, while regional accents were perceived as marked or informal. The novelty of this study lies in its integration of computational modeling with sociolinguistic analysis to examine Indonesian TTS for the first time. Unlike prior work focusing solely on technical performance, this research demonstrates that neutrality is not linguistically universal but socially constructed around Jakarta-based speech, providing new insights for developing more inclusive and culturally sensitive speech technologies

Keywords: Accent Bias, Text to Speech, Sociolinguistics, Natural language Processing, AI-based system.

Paper ID #91

A Comparative Study of Isolation Forest, LOF, OCSVM and Elliptic Envelope for Anomali Detection in Insurance dataset

Wilsen Grivin Mokodaser, Green Arther Sandag, Semmy Wellem Taju, Raissa Camilla Maringka, Rolly Junius Lontaan

ABSTRACT

Data analysis plays a crucial role in the insurance industry for processes such as claim prediction, risk management, and fraud detection. One of the major challenges in this field is the presence of outliers—values that significantly deviate from normal patterns in financial data. This study applied four anomaly detection algorithms—Isolation Forest (IF), Local Outlier Factor (LOF), Elliptic Envelope (EE), and One-Class SVM (OCSVM)—to a dataset consisting of 766 insurance records, each containing monthly income data from January to December. The detection results show that IF, LOF, and EE each identified 39 anomalies, while OCSVM detected 38. Among these, 36 records were flagged as anomalies by at least two algorithms, 22 by at least three, and 17 were consistently identified by all four methods, forming a high-confidence anomaly subset. A comparison of results highlights that IF and LOF often overlap in their detections, suggesting strong suitability for joint use in financial anomaly detection. OCSVM displayed a more conservative approach, detecting fewer anomalies, while EE, based on Gaussian distribution assumptions, produced distinct results compared to distancebased methods. Overall, the findings indicate that while no single algorithm is universally superior, Isolation Forest and LOF demonstrated the best balance of consistency and responsiveness in detecting anomalies within monthly insurance income data..

Keywords: Isolation Forest, LOF, OCSVM, Elliptic Envelope.

Paper ID #92

Utilizing AI-Powered Anomaly Detection to Counter DDoS Attacks: A Comparative Study of Random Forest and XGBoost Algorithm in Network Protection

Kevin Joseph Handoyo, Brhanselino Satrio Edipurtta, Nico Wijaya Hariyanto, Bakti Amirul Jabar, Jurike V. Moniaga

ABSTRACT

This research addresses the current challenge of Distributed Denial-of-Service (DDoS) detection by investigating whether ensemble learning methods are able to provide enhanced security compared to traditional systems. While a few studies have utilized machine learning for traffic analysis in networks, not much research exists that applies ANOVA F-test feature selection and SMOTETomek resampling on UNSW-NB15, along with a rigorous comparison between XGBoost and Random Forest. Our contribution is to compare not only the performance measures but also to compare the two methods based on interpretability, computational complexity, and robustness to class imbalance. Experimental results show that both models perform well, with XGBoost very slightly better than Random Forest in precision (96.52% vs. 95.73%) and ROC-AUC (0.99443 vs. 0.99379). In practice, the findings highlight the importance of choosing algorithms that balance false positive and false negative threats, which directly affect the availability of legal network traffic..

Keywords: Machine Learning, Distributed Denial-of-Service, Random Forest, XGBoost, Network Protection.

Paper ID #95

Explaining Gender Bias in Machine Learning Hiring Systems: An XAI-Based Impact Assessment

Davita Khowati, Erik Sanjaya, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana

ABSTRACT

Machine learning-based hiring systems are increasingly adopt-ed in recruitment due to their efficiency. However, the systems can inadvertently introduce or amplify biases, particularly gender bias, leading to ethical and legal concerns. This study aims to detect gender bias in AI-based hiring systems through the application of Explainable Artificial Intelligence (XAI) techniques. A controlled bias-perturbation framework is im-plemented using a job application dataset, where progressively imbalanced training sets favoring male candidates are gener-ated. Two classification models–Logistic Regression and XGBoost–are trained and evaluated. SHAP (SHapley Additive Explanations) and LIME (Local Interpretable Model-agnostic Explanations) are utilized to analyze the decision-making pro-cesses of AI models and interpret feature contributions under different bias conditions. The analysis indicates that SHAP provides more reliable and interpretable insights into model behavior compared to LIME. Additionally, XGBoost exhibits greater robustness to biased data than Logistic Regression, maintaining relatively consistent accuracy and interpretability. These findings demonstrate the vulnerability of hiring models to gender-related bias and underscore the importance of inte-grating XAI tools to enhance transparency and fairness in AI-driven recruitment systems..

Keywords: Machine learning hiring system, gender bias, XAI, SHAP, LIME.

Paper ID #96

Generative AI for Mobile App UI Mockups Using Stable Diffusion with the EveryDream2 Fine-Tuner and GLIGEN

Abraham Arthur Fendy, Yosi Kristian, Lukman Zaman P. C. S. W.

ABSTRACT

User Interface (UI) is an essential component in software development, especially on mobile devices with limited screen sizes. This makes the role of UI designers important, as they are responsible for creating mockups of the applications. However, despite tools like Figma and Moqups, drawing the mockups themselves remains time-consuming, limiting the exploration of design ideas. This paper explores the utilization of Stable Diffusion to generate mobile UI mockups faster than traditional methods. Stable Diffusion is a text-to-image model that can generate various images from a prompt. Because the pre-trained Stable Diffusion model still struggles to generate specific image concepts such as mobile UIs, the Rico dataset is used to fine-tune the model on individual UI components cropped from UI screenshots first before fine-tuning it again on the screenshots themselves using the EveryDream2 fine-tuner, which can easily fine-tune Stable Diffusion on large image-text datasets using consumer-grade hardware. To assist Stable Diffusion, GLIGEN is used to position objects, such as UI components, in the image through direct bounding box input. By fine-tuning on real-world UI screenshots, the fine-tuned model, named Rico Diffusion, can produce high-quality mockups from textual prompts and grounding information with the help of a pre-trained GLIGEN model. Human evaluations show that Rico Diffusion's mockups outperformed the results from the base model, demonstrating significant improvements in mobile UI mockup generation. This is corroborated by quantitative results such as CLIP Score and FID, which showed 60% and 80% of mockups outperformed the base model's results..

Keywords: Mobile UI Mockup Generator, Stable Diffusion, EveryDream2, GLIGEN.

Paper ID #97

Exploring the Utilization of Perplexity AI for Academic Information Retrieval with Valid References Sourcing: A Study on Bina Nusantara Students

Sulistyo Heripracoyo, Sharon Levina Saputra, Jane Safirin Yusri, Angelina Fredlin

ABSTRACT

The rapid advancement of artificial intelligence (AI) has transformed academic information retrieval, yet many students still face challenges in efficiently finding credible references. This study examines the use of Perplexity AI, a generative artificial intelligence tool, for academic information retrieval among students at Bina Nusantara University. The respondents consisted of 100 active undergraduate students who had prior experience using Perplexity AI in academic contexts. The questionnaire instrument demonstrated strong construct validity, with Average Variance Extracted (AVE) values above 0.5 and Composite Reliability (CR) values between 0.806 and 0.905. Reliability analysis using Cronbach's Alpha ranged from 0.652 to 0.860, confirming acceptable internal consistency. Using the IS Success Model and a quantitative approach with questionnaires, 100 respondents and PLS-SEM analysis, the research evaluates the effects of information quality, service quality, and system quality on usage intention, user satisfaction, and perceived benefits. Results show that information quality, service quality, and user satisfaction significantly influence usage intention and perceived benefits. System quality affects user satisfaction but has no significant impact on usage intention. These findings highlight the importance of reliable content and responsive service over technical system aspects in encouraging AI tool adoption in higher education..

Keywords: Perplexity AI, academic information retrieval, IS Success Model, user satisfaction, higher education, artificial intelligence.

Paper ID #98

Ensemble Stacking For Cardboard Box Defect Detection Using ResNet-50 and Inception V3

Evan Santosa, Henry Wunarsa, Alexander Agung Santoso Gunawan, Rilo Chandra Pradana

ABSTRACT

Cardboard is a commonly utilized material in the packaging industry, but its defects can compromise product quality and usability. Given the scale of cardboard production, there is a growing need for automated quality inspection processes through deep learning techniques. Many studies have explored several techniques, but the ensemble learning techniques remain underexplored in cardboard defect detection. This study aims to explore the ensemble stacking of Inception V3 and ResNet-50 for cardboard box defect detection. The dataset used for this research is the Carton Can Detection dataset, consisting of four classes, which are “Normal Carton Box”, “Opened Carton Box”, “Wet Carton Box”, and “Cracked Carton Box.” Due to class imbalance, the performance was evaluated using F1-Score as the main metric, with recall, precision, and accuracy as the supporting metrics. The result shows that the ensemble stacking approach, with ResNet-50 as the base learner and Inception V3 as the meta learner, has improved classification performance compared to individual models. This approach achieved an F1-Score of 79%, a precision of 79%, a recall of 80%, and an accuracy of 80%, outperforming the baseline CNN model and individual models. This approach shows the potential of ensemble learning to enhance performance, reduce reliance on manual inspection, and improve quality control in cardboard defect detection. .

Keywords: Convolutional Neural Networks (CNN), ResNet-50, Inception V3, Ensemble Stacking, Cardboard Box Defect Detection, F1-Score.

Paper ID #99

Comparative Analysis of Machine Learning Models for Diabetes Prediction

Albertus Januario, Davin Miguel Sanjaya, James Tanuwijaya, Bakti Amirul Jabar, Jurike V. Moniaga

ABSTRACT

Diabetes is a chronic metabolic disease and increasingly wide spread disease around the world and early diagnosis is crucial. Methodology In this study, the performance of three machine learning models (Logistic- Regression, K-Nearest Neighbour (KNN) and Naive Bayes) is reviewed under the task of diabetes classification using Pima Indians Diabetes Dataset. To tackle the class imbalance, we applied imputation, SMOTE for the data pre-processing, and Min-Max Scaling to enhance the prediction performance. Further, we have applied the ensemble learning and stacking, where all the three models have been used as meta classifier. The results indicate that KNN had the best individual model performance (accuracy 77.27%, AUC 0.8444%) but the stacking ensemble with meta-model being Logistic Regression is superior to any model (accuracy 80.52%, AUC 0.8604%). This justifys that the ensemble learning can also improve the accuracy of diabetes diagnosis..

Keywords: Diabetes prediction, Machine learning, Logistic Regression, K-Nearest Neighbors, Naive Bayes, Stacking ensemble, SMOTE, Pima Indians Dataset, Classification.

Paper ID #101

Deep Learning to Recognize Book Titles: Leveraging the Front Image Feature

Erwin Rommel, Michael Christopher Yuvi, Kenzie Timothy Ebenezer, Abdul Haris Rangkuti

ABSTRACT

Manual book management in libraries often results in inefficiencies, delays, and human errors that negatively affect service quality and inventory accuracy. This study proposes an automated book cover recognition system using deep learning methods to recognize book covers such as computer vision techniques. By researching methods such as the You Only Look Once (YOLO) object detection models, to address these issues. Five YOLO versions (v8 to v12) were trained and evaluated on a curated dataset of book covers, annotated and processed according to standard object detection workflows. Performance was assessed using precision, recall, mean Average Precision (mAP), and confusion matrix analysis. Experimental results show that YOLOv10 outperformed other versions by achieving the best balance between detection accuracy and coverage, with the highest precision (0.7273) and strong recall (0.6953). Confusion matrix analysis revealed that all models effectively identified visually distinctive genres, while struggling with categories that have overlapping or subtle features. The findings highlight that model selection must be empirically validated, as newer versions do not always yield superior results. This work provides a benchmark for deploying AI-based book recognition systems and lays the groundwork for future multimodal approaches integrating both image and text features.

Keywords: artificial intelligence, book cover detection, computer vision, library automation, you only look once.

Paper ID #105

Trust and Quality in AI-Driven Tools: The Influence on Intention to Use ChatGPT Among University Students in Manila

Lianna Wijaya, Kinmeng Cheng, Lourdes Lasian, Made Irma Lestari, Johannes Widjaja Wahono, Nova Nur Anisa

ABSTRACT

Universities are adopting conversational tools for coursework, yet evidence is mixed on what drives students' intention to use them in higher education, especially in Metro Manila. Prior work rarely integrates credibility factors with belief-based predictors, so we test information quality and source trustworthiness alongside effort and performance expectancy to explain intention. Using a cross-sectional research design, primary data were collected through an online survey distributed via email and WhatsApp to students from Metro Manila. A total of 256 valid responses were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal that source trustworthiness has a significant impact on both effort expectancy and performance expectancy, while effort expectancy has a strong predictive relationship with performance expectancy. In turn, performance expectancy is the most significant predictor of intention to use ChatGPT. However, the study found that information quality does not significantly influence performance expectancy, and effort expectancy does not directly influence intention to use. The study's novelty is the integrated UTAUT–ELM model estimated on a Manila student sample, clarifying how credibility shapes usefulness beliefs and intention. Practically, instructors should emphasize transparent use, verification scaffolds, and course-aligned examples to raise perceived usefulness and credibility..

Keywords: UTAUT, Information Quality, Metro Manila, Source Trustworthiness, Intention to Use.

Paper ID #107

Implementation Artificial Intelligence on Cheating Detection for Online Examinations

Ivan Robinson, Maulin Nasari and Alfi Zakiyyah

ABSTRACT

Online examinations have become an essential component in delivering course certifications and assessing learners for remote learning, especially in certification programs, maintaining integrity and verifying participants' identity are critical to ensuring credible outcomes.This study aims to develop an AI-powered system that can detect cheating in real time using facial expression, gaze, eye movement, and head tracking. Unlike previous systems, our research introduces a real-time automated cheating detection that leverages AI, deep learning principle and federated learning to ensure privacy and reduce false positives alarm. This system implemented FER-2013 and evaluated through qualitative experimental methods by comparing the previous cheating detection model with our model. The results showed that previous model or LeNet prediction suspicious behavior (such as screen absence and gaze deviation, triggering alerts and logging evidence) accuracy and precision inconsistent, while for FER-2013 has higher accuracy and precision which makes it suitable for cheating detection system. Specifically, the FER-2013 model reached an accuracy of 80.43%, significantly outperforming LeNet, which only achieved 43.92% accuracy. The conclusion highlights the potential of FER-2013 model which can replace the previous model that is used for cheating detection system. This has significant implications for online education , promoting fairness while maintaining user privacy..

Keywords: Cheating Detection, Artificial Intelligence, Gaze Tracking, Online Examination, Federated Learning.

Paper ID #108

Brain Tumor Prediction based on a Robust Hybrid CNN Model

Istabraq H. Jassim, Zakariya A. Oraibi, Entesar B. Talal

ABSTRACT

Brain tumors represent a significant global health challenge, with early and accurate diagnosis being fundamental for effective treatment planning to ensure improved patient outcomes. Classical diagnostic methods rely on manual inter pretation of medical images with help from ph, physicians which can be time-consuming, prone to inter-observer variability, and may lack the accuracy required for nuanced classification. In this paper, an ensemble approach based on deep learning is introduced to accelerate the process of brain tumor detection. The proposed method consists of using two state-of-the-art architectures called: EfficientNetB4 and VGG16. First, we extract their feature maps and concatenate them. Second, we train the concatenated model from scratch. Finally, softmax layer is used to perform the classification task on brain tumor cancer images. This hybrid technique is applied on a challenging dataset called: Kaggle7023 which consists of four classes: Meningioma, Notumor,Pituitary, and Notumor. In the experiments, our proposed method achieved 99.54% accuracy which outperforms state-of-the-art methods. As a result, the new model can be used in clinics to help doctors..

Keywords: Brain Tumor, Ensemble Learning, Deep Learn ing, VGG16, EfficientNet.

Paper ID #109

Water Quality Classification Using the Naive Bayes Algorithm

Rinci Kembang Hapsari, Ahmad Naufal Lubabsyah, Tsania Mahja Waldani, Devina Christabel, Purbandini, Abdullah Harits Salim

ABSTRACT

Water is a naturally complex compound found on the Earth's surface. Water has a vital role in the survival of life; however, not all minerals and substances can be accepted and appropriately digested in the human body, especially if the water is exposed to household and industrial waste. Therefore, it is necessary to distinguish between types of water that can and cannot be consumed. The problem in this research is how to differentiate and classify the types of water that can and cannot be consumed. Data mining can solve this problem by using the concept of classification. In this research, the classification algorithm used is Naïve Bayes. Optimization is achieved through data preprocessing, thereby improving algorithm performance. The learning and testing process was carried out using the Water Quality dataset, which includes nine parameters: Conductivity, Hardness, Organic carbon, pH, Trihalomethanes, Solids, Turbidity, Sulfate, and Potability. Testing on an imbalanced dataset yielded an average accuracy of 84.5%, precision of 84.1%, and recall of 58.6%. Meanwhile, testing on a balanced dataset yielded an average accuracy of 89.7%, precision of 88.7%, and recall of 90.8%..

Keywords: classification, data mining, naïve bayes, quality, water.

Paper ID #110

Analysis of User Experience in the Blood Donor Information System Using the User Experience Questionnaire Plus (UEQ+) and Usability Testing: A Case Study at RSUD Dr. Moewardi

Muhammad Fahman Yusuf, Widyanida Amalia Pramesti, Pebry Putri Pratiwi, Sunardi

ABSTRACT

The Dr. Moewardi Hospital in Surakarta Central Java needs more than 2,000 blood bags monthly. The hospital created SINORAH (Blood Donor Information System of RSUD Dr. Moewardi) as a digital platform to help with donor screening and support blood donation efforts. This study aims to assess the user experience of SINORAH and to identify areas for improvement using a mixed-method approach. The User Experience Questionnaire Plus (UEQ+) was used to collect data from 104 participants while usability testing was conducted with 8 participants. The results of the UEQ+ showed that the system was perceived as useful (2.34), perspicuous (2.01), efficient (1.99), and attractive (1.93) by the users. The Trust dimension scored the lowest (1.81), which reflects the concerns about data security. The usability testing showed that the overall task success rate was 85.9%, but the updating WhatsApp number tasks had higher error rates and the data entry for old users is repetitive. The average user satisfaction was 3.55 out of 5. The recommendations are presented in the form of user interface (UI) redesigns. This research contributes to academics by giving insights into user experience evaluation using a mixed-method approach combining UEQ+ and Usability Testing. In practice, this research provides recommendations for improving the system's usability and user experience, potentially increasing donor participation and supporting blood supply availability in hospitals..

Keywords: blood donation, blood donation system, user experience questionnaire plus, usability testing.

Paper ID #111

Monte Carlo Synthetic Data Generation for Durian Cultivation Based on Smart Farming IoT

Rifqi Sigwan Nugraha, Aji Gautama Putrada, Ryan Lingga Wicaksono

ABSTRACT

Abstract—Data scarcity is a common challenge in the application of Artificial Intelligence of Things (AIoT) for smart agriculture, especially for high-value crops such as Durian (Durio zibethinus), which experience limitations in sensor application and irregular data collection cycles. This study examines the performance of two synthetic data generation techniques, namely Monte Carlo Simulation (MCS) and Gaussian Mixture Model (GMM), applied to Internet of Things (IoT)-based environmental datasets in durian cultivation. Both methods are evaluated using the Kolmogorov-Smirnov (K–S) statistics test, mean decrease in impurity (MDI) feature importance, and crop classification using extreme gradient boosting (XGBoost). The results of the K-S statistic test show that the two durian synthetic dataset features of the two methods have similar kernel density estimates (KDEs). In contrast, the two features have different but insignificant KDEs. Then, the "Rainfall" feature exhibits a different KDE shape between the GMM and Monte Carlo methods. The results of the MDI feature importance test indicate that the new dataset with synthetic durian data generated by MCS has better feature quality than GMM, with the highest feature score being "Year," at 0.579. Finally, the durian synthetic dataset from MCS demonstrated a significant effect on XGBoost crop classification, achieving optimum accuracy, precision, recall, and F1-score compared to random forest and gradient boosting, with values of 0.87, 0.86, 0.86, and 0.86, respectively..

Keywords: Gaussian mixture model, Monte Carlo simulation, synthetic data, durian, smart farming.

Paper ID #112

Harmonizing Public Sentiment Analysis on Indonesia's New Capital (IKN) on X Using Machine Learning

Evangelo Wincent, Justin Jovito, Raven Derrick Bee, Evaristus Didik Madyatmadja

ABSTRACT

The relocation of Indonesia's capital city has sparked widespread public discourse, particularly on social media platforms such as X. This study aims to analyze public sentiment towards IKN using both deep learning and traditional machine learning techniques. Tweets in relation to IKN were collected using authentication–based crawling approaches and then subjected to extensive preprocessing. The IndoBERT model was involved to classify tweets as positive, neutral, or negative, but only positive and negative sentiments were highlighted and retained for binary classification purposes. TF-IDF was used to vectorize data, classifying it into three models: Naive Bayes, Support Vector Machine, and Random Forest. SVM was found to outperform the other models in terms of precision and recall by achieving the highest accuracy at 87%. Additionally, word clouds were employed to visualize key terms in both sentiment types. This study displays the possibility of obtaining accurate, data-driven insights into public sentiment regarding nation policy initiatives such as IKN's capital move through integrated transformer-based models with machine learning approaches..

Keywords: Sentiment Analysis, IKN, IndoBERT, Social Media, Machine Learning, Public Opinion.

Paper ID #120

BERT-Based Classification Model to Detect Answer Relevance in Online Academic Forum

Revan Bagus Amrulloh, Afrizal Muhardianto, Yulius Denny Prabowo

ABSTRACT

The widespread adoption of elearning systems demands intelligent support for asynchronous scholarly discourse. One key issue, among many, is the large amounts of student submissions to course discussion forums that are irrelevant, and which also remain unaddressed by instructors, which in turn detract from engagement and effectiveness of instructional materials. In this work, we present an NLP based system, namely, BERT for RElevance Classification (BERT-REC) which is able to classify the relevancy of students' answers to pre-definited discussion topics. The system was incrementally developed based on an Agile process and evaluated over four datasets generated from virtual assistants, web-based articles, and actual forum discussions for 50 topics for 10 computer science courses. Cross validation and fine-tuning methods were used to analyze the model. The highest performance score was an accurate score of 93% with data obtained from fora. The results support that the integration of language models contextualized information and structural manipulation in the preprocessing of the data results in a more reliable automatic relevance classification. This model presents notable integration with institutional LMS to help instructors to personalize the academic discussion in a more targeted way..

Keywords: BERT, classification, online discussion forum, relevance detection.

Paper ID #122

Development of an IoT-Based Smart Waste System with RTC Time Logging for Cleaning Assistance

Jeremy Axel Suryamiharja, Leony Agustin, Talitha Zasizki Gunara, Mochammad Haldi Widianto

ABSTRACT

Maintaining cleanliness in public spaces is a constant challenge, especially when trash bins aren't monitored regularly. Overflowing waste can create unsanitary conditions and public discomfort. To address this issue, the authors developed an IoT-based Smart Waste System that uses the Blynk app for real-time monitoring and alerts, along with a Real-Time Clock (RTC) module to record events. The system tracks the bin's fill level using an ultrasonic sensor and records the times when the bin becomes full or is emptied. It also includes a basic prediction feature to estimate when the bin will likely fill up again. Based on the results of research that has been carried out, there are sensors with good accuracy, such as ultrasonic sensors with an RMSE value of approximately 0.062 cm, and RTC modules with an RMSE value of approximately 75 seconds. However, the prediction system, although functional, has an RMSE value of around 7.7 hours, which shows that further improvement is needed. Overall, the system performed well under expected conditions and offers a more efficient alternative to traditional waste collection methods that rely on manual inspections..

Keywords: Smart Bin, IoT, Waste Management, Ultrasonic Sensor, Real-Time Clock.

Paper ID #123

Classification of JKN Mobile User Sentiment with Support Vector Machine, Naïve Bayes and Logistic Regression

Siti Rihastuti, Afnan Rosyidi, Dyah Rosna Yustanti Toin and M. Nur Juniadi

ABSTRACT

This study aims to classify the sentiment of JKN Mobile application users based on reviews on the Google Playstore platform. The research stages include data collection, data labeling, data pre-processing, TF-IDF feature extraction, data division, algorithm testing using models, result analysis and cross validation. The algorithms used for sentiment classification testing are Support Vector Machine (SVM), Naïve Bayes and Logistic Regression. The test results using the three models on 1000 datasets with a comparison of 10% test data and 90% training data, produced the highest accuracy of 97% for SVM and Logistic Regression, and 96% for Naïve Bayes. To optimize the validity of the results, the Stratified K-Fold Cross Validation technique was used to evaluate the test results. As a result, the Logistic Regression model produced the highest average accuracy of 94.80%, Naïve Bayes 94.70% and SVM 94.50, with standard deviations of 1.52%, 2.14% and 2.38% respectively. Overall, the three models are very effective in classifying the distribution of user sentiment, most of which give positive reviews to the JKN Mobile application..

Keywords: Sentiment analysis, JKN Mobile, SVM, Naïve Bayes, Logistic Regression.

Paper ID #132

Design of pH Monitoring Device in IoT-Based Eco Enzyme Fermentation Process

Muhamad Zefa Heryana, Zery Gallanta, Mochammad Haldi widianto

ABSTRACT

In today's modern era, waste problems are increasing. The increase in population and wasteful lifestyles cause waste, especially household waste, to continue to increase every day. Unfortunately, much of this waste, especially organic waste, has not been managed properly. In fact, organic waste has great potential if tilized properly. Eco enzyme is one effective solution because it can solve two problems at once, reducing organic waste and replacing the use of household chemical products. In addition to being environmentally friendly, eco-enzyme is also economical, because it can be made at home with easily found ingredients. One indication of the maturity of eco enzyme is pH by knowing the pH of eco enzyme, we know whether this eco enzyme is mature or not. To facilitate monitoring of eco enzyme, a pH measuring tool is needed. One design that can be used is to use the Arduino Uno microcontroller which can be directly connected to a mobile device..

Keywords: —Eco-enzyme, pH, Internet of Things, Waste, Organic, Arduino .

Paper ID #133

Sentence Similarity Task Performance with Data Augmentation and Pre-trained Transformers

Andrea Stevens Karnyoto, Mahmud Isnan, Gregorius Natanael Elwirehardja, Fitya Syarifa Mozar, Bens Pardamean

ABSTRACT

In Natural Language Processing (NLP), especially for data retrieval and text mining, the task of sentence similarity is crucial. To improve sentence similarity, this paper examines how our approach integrates text augmentation and Transformers. Additional training examples are generated through text augmentation, which involves various transformations such as random swapping, synonym replacement, random deletion, and random insertion of the original sentence or text. By expanding the dataset, we aim to capture a wide variety of sentence variations. We used 1,800 pairs of human-written English sentences were obtained from two testing datasets, namely The Stanford Natural Language Inference (SNLI) corpus (version 1.0) and the Sentences Involving Compositional Knowledge (SICK). The Bidirectional Encoder Representations from Transformers (BERT) model, which is very effective in NLP, employs a self-attention mechanism to collect contextual data. To encode the input sentence into a high-dimensional representation, this paper uses a pre-trained transformer model. As a first step, we extend the original sentence pair by adding part of the text using easy data augmentations. Then, we calculate the similarity between sentence transformation and sentence embedding using sentence BERT (SBERT). We found that random swap augmentation achieved the highest F1-score in the all-MPNET-base-v2 model; however, for the experimental group using the all-roberta-large-v1 model, random insertion achieved the highest F1-score..

Keywords: Sentence Similarity, Text Augmentation, Transformers-Based Approach, Natural Language Processing.

Paper ID #134

Can Robots Prescribe Happiness? A Control-Theoretic Approach to AI-Driven Emotional Enhancement

Annie Rachmawati Musslifah, Hardika Khusnuliawati, Faqih Purnomosidi, Dhian Riskiana, Rusnandari Retno Cahyani, Evelyne Henny Lukitasari

ABSTRACT

This study develops and tests the effectiveness of a control theory-based artificial intelligence system to improve human emotional well-being through computerized interactions. By combining predictive control algorithms (MPCs), multimodal emotion analysis, and positive psychology principles, the system is designed to recognize and modulate the user's affective state adaptively. The study method applied a four-week longitudinal mixed-methods approach to 48 participants, combining quantitative measurements (HEAT scale, SWLS, and physiological data) with a qualitative analysis of subjective experiences. The results showed significant improvements in the components of emotional valence ($d = 0.89$, $p < 0.001$) and life satisfaction ($d = 0.62$, $p = 0.003$), with the strongest effect observed in individuals with negative affective baseline. The SHAP analysis revealed the dominance of visual features (smile intensity, eyebrow activity) in the system's decision-making, while the qualitative data highlighted the critical role of empathy perception in intervention acceptance. These findings extend the application of control theory to the psychological domain while offering an innovative framework for the development of ethical and human-centered affective technologies. Key limitations include the relatively short duration of the intervention and the reduced sample characteristics, opening up opportunities for further research with a more inclusive design and extended observation period. In practical terms, this prototype provides a foundation for applications in digital mental health and the development of psychological work environments, while theoretically enriching an interdisciplinary dialogue on the integration between systems engineering and psychological science..

Keywords: happiness, emotional, artificial intelligence.

Paper ID #137

https://docs.google.com/forms/d/e/1FAIpQLSdugCtVuTFA5_E_StVBckuIDcuSj7YIJDqHECDjQgWUUYuoeQ/viewform

Muhammad Muhaimin Nur, Andi Hutami Endang, Furqan Zakiyabarsi

ABSTRACT

Automatically recognizing Arabic handwritten characters (AHCR) is very difficult because writing is continuous and the elements look different depending on whether they are at the beginning, middle, or end or stand alone in a word. This research suggests the use of a custom-made artificial neural network (CNN) to address this challenge and accurately identify Arabic handwritten characters in various positions. The CNN model was built and thoroughly tested using the Arabic Handwritten Alphabets, Words, and Paragraphs Per User (AHAWP) dataset, which includes 53,199 images showing 65 different types based on 18 basic Arabic letters and their variations. In the preprocessing stage, image resizing and data augmentation are performed systematically to improve the dataset's quality and increase the model's generalizability. The proposed model achieved an overall testing accuracy of 90%, with a validation accuracy of 90.62% and a training accuracy of 94.22%. The study consistently recorded precision, recall, and F1-score values of 0.90, indicating balanced performance across different character classes. These findings highlight the effectiveness of the CNN architecture in identifying discriminative features for AHCR, especially in handling subtle positional variants of Arabic letters, thus making a significant contribution to the advancement of digital Arabic text processing..

Keywords: Arabic Handwritten Character Recognition (AHCR), Convolutional Neural Network (CNN), Positional Variants, Pattern Recognition, Optical Character Recognition (OCR).

Paper ID #138

Sentiment Analysis of Electronic Voting System on Indonesia Election Using Machine Learning with Deep Learning Approach

Darren Christian, Ahmad Nurul Fajar

ABSTRACT

E-Voting was a digitization of conventional or traditional voting that used a ballot paper to vote. In Indonesia e-voting is rarely used in elections or in other events, e-voting has many benefits that can be achieved by using it, such as cutting the cost or efficiency in vote counting even giving the ease of use to the e-voting user to give their suffrage. Implementing e-voting can be hard because of the negative citizen sentiment about e-voting. Fraud that often happened in election process trigger citizen perception to negative, the same happened as the e-voting method that have negative sentiment on citizen point of view. Cyber-attack possibilities made another reason to questioning about e-voting safety and security. This study purpose is to analyze the Indonesian citizen sentiment on X social media using machine learning with deep learning, sentiment about e-voting in Indonesian citizens can be useful to implement e-voting in Indonesia, especially the word the used in sentiment analysis can give an insight to better improvement. BERT as deep learning model was use in this study to ensure its performance and accuracy. CRISP-DM was used as the methodology of this study as the standard process of data mining process. The result of e-voting sentiment analysis in Indonesian citizens was visualized with chart to made better readability for this study. After a certain process of analyzing and gathering the sentiment data, the result was mostly negative sentiment. With the most appeared word represent lack of trustworthiness in e-voting..

Keywords: E-Voting, X Social Media, CRISP-DM, Machine Learning, Sentiment Analysis, BERT.

Paper ID #139

Performance Comparison of Supervised Machine Learning Models in SMS Spam Detection

Hizkia Jericho, Celina Sadilla, Kayla Susantio, Rezki Yunanda

ABSTRACT

Short message service (SMS) has become an effective and commonly used communication medium, but the increasing number of spam messages is causing problems for users. This project develops an SMS spam detection system using a multi model classification approach to compare the performance of various machine learning algorithms. The system implements four classification algorithms: Naive Bayes, Support Vector Machine (SVM), Decision Tree, and Logistic Regression, which are trained using the SMS Spam Collection dataset from the UCI Machine Learning Repository. This dataset consists of 5,574 messages that have been labeled as “spam” or “ham” (not spam), and went through a preprocessing stage including text cleaning, tokenization, stopwords removal, stemming, and vectorization using TF-IDF. The system is implemented in the form of a web application using the Flask framework, which allows users to input SMS messages and select the classification model to be used. Evaluation results showed that the SVM model achieved the highest accuracy of 98.2%, followed by Naive Bayes (97.8%), Logistic Regression (97.4%), and Decision Tree (96.5%). Further analysis showed that features such as promotional words, reward offers, and urgent instructions were strong indications of spam messages. The system provides a user-friendly interface and allows users to compare detection results from various models..

Keywords: spam detection, machine learning, natural language processing, text classification.

Paper ID #141

Search Engine Query Analysis for Indonesian Business Trend Prediction Using Google Trends Integration and LSTM Networks

Sabar Aritonang Rajagukguk; Longinus Tito Hertiandito; Yanto Setiawan

ABSTRACT

The proliferation of digital technologies has transformed business intelligence, with search engine queries emerging as valuable predictive indicators. This study presents a framework for predicting Indonesian business trends through Google Trends data integration with Long Short-Term Memory (LSTM) neural networks. We analyzed 520 business-related search terms in Bahasa Indonesia across 34 provinces from 2020-2024, incorporating regional patterns and economic indicators. Our Google Trends Integration Model (GTIM) employs a hybrid approach combining LSTM networks, ARIMA, and Vector Autoregression models. The ensemble achieved 78.3% predictive accuracy for business trends 3-4 weeks in advance, with digital-related queries showing 295% correlation with actual digital business adoption. Search volume changes preceded consumer behavior by 2.1-5.8 weeks, providing actionable intelligence for strategic planning. The study contributes to business intelligence methodologies by offering enterprises an early warning system for market opportunities in emerging Southeast Asian economies..

Keywords: Google Trends, LSTM neural networks, business prediction, Indonesian market, time series forecasting, digital intelligence.

Paper ID #142

Betel Leaf Disease Classification Using EfficientNet-B7 Architecture With Triplet Attention

Rima Tri Wahyuningrum, Nurul Faizah, Indah Agustien Sirajuddin, Irmalia Suryani Faradisa

ABSTRACT

Traditional medicine is a medical practice that has been passed down from generation to generation, which uses natural herbal ingredients. In Indonesia, there are various forms of traditional medicine, one of which is the use of betel leaves. Betel leaf is one part of a traditional medicinal plant that is still popular today because it has various benefits in preventing and treating various diseases. One part of the betel plant that is often affected by pest attacks is the leaves. As an alternative, the Convolutional Neural Network (CNN) method of EfficientNet B7 architecture and EfficientNet B7 combined with Triplet Attention is used in image classification. Using the EfficientNet B7 architecture, the MBConv architecture which originally used the Squeeze-and-Excitation module was changed to use the Triplet Attention module. In this study, using a dataset of 4000 images that have been divided into four classes, namely Healthy Green betel leaf, Anthracnose Green, Rust Green, Healthy Red. The dataset division is 80% for training data and 20% for testing data. The training data is evaluated by dividing the system performance into training data and validation data using k-fold = 5, learning rate = 0.01, epoch = 50. Based on the trial, the best results using the EfficientNet B7 model combined with Triplet Attention resulted in 70.62% accuracy, 71.60% precision, 70.62% recall and 70.13% F1-Score with a time of 18.11 seconds..

Keywords: Traditional Medicine, Betel Leaf, EfficientNet-B7, Triplet Attention.

Paper ID #144

Feasibility Of Behavior-Based Bot Detection With Random Forest And Xgboost

Ferdinand Laurel Edison, Kevin Jeremia, Moreno Patrizio Darmawidjaya, Kristien Margi Suryaningrum, Ricky Reynardo Siswanto

ABSTRACT

Web-scraping bots have become increasingly difficult to detect, often imitating human browsing patterns to evade traditional security measures such as IP blocking and CAPTCHA challenges. We present a feasibility study of Random Forest and XGBoost on session-level behavioral features for web-scraping bot detection, on 2,000 web browsing sessions (half real users, half bots generated by Puppeteer). We used 14 behavior-based signals (mouse movements, scrolling, typing patterns, session timing, etc.), both models hit 97-98 percent accuracy when evaluated on data drawn from the same setup. To see how stable they are, we held sessions by different parameter settings, injected in some random noise, and even dropped key features one at a time, our biggest dip in F1 was 0.11. On a cross-framework set of 2000 sessions (1000 human, 1000 unseen Playwright-driven bots), Random Forest achieved 88 percent accuracy and XGBoost 84 percent, suggesting transferability beyond the original Puppeteer setup. Finally, we validate on 2000 sessions generated by the external Botasaurus library, both models achieving accuracy of 82 percent, confirming true external generalization. Our results demonstrate that behavioral data alone can be a reliable indicator for detecting web-scraping bots, even when tested against bots from previously unseen tools. This approach gives a lightweight and effective defense mechanism that does not rely on traditional signatures or CAPTCHAs.

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Keywords: Behavioral Analytics, Cyber Security, Machine Learning, Random Forest, Web Scraping Bot Detection, XGBoost.

Paper ID #146

Automatic Pill Dispenser to Improve Medication Adherence in Elderly and Chronic Disease Patients

Elissa Patricia, Erika Roselyn Husen, Sharon Hermawan, Moh. Erdda Habiby

ABSTRACT

This research showcases an Arduino-driven automatic pill dispenser designed to enhance medication adherence by providing scheduled dispensing and user notifications. The system integrates an RTC module, servo motors, an alarm buzzer, and an interactive LCD display with push buttons, enabling users to configure several medication schedules. It does not require a net connection, which will make this product very applicable for those areas with limited internet access. First, an initial 10-cycle laboratory test intended to simulate a three-times-a-day medication regimen was conducted, followed by a prolonged 30-cycle stress test under the same conditions. A cycle would be considered successful if pills are released at the scheduled time without mechanical jams or servo malfunction. Tests performed did show that the system repeatedly dispensed pills at defined time intervals, with an average timing deviation of +1.75 seconds and a maximum deviation of +2 seconds, achieving an overall success rate of 80%—well within clinically permissible limits for non-critical medication..

Keywords: Arduino, RTC module, Medication Adherence, Automatic Pill Dispenser, Embedded System, Servo Motor..

Paper ID #148

Application of GoogLeNet Architecture (Inception-V3) for Rice Seed Image Classification

Kurniawan Eka Permana; Iwan Santosa ; Abdullah Basuki Rahmat; Nurhaliza

ABSTRACT

Rice variety classification plays a strategic role in ensuring seed purity, increasing agricultural productivity, and supporting food quality assurance. This research proposes a GoogLeNet-based model (Inception-V3) to classify five rice varieties, namely Arborio, Basmati, Ipsala, Jasmine, and Karacadag, by utilizing gray-scale images. Preprocessing was performed through image resizing, data augmentation, and pixel normalization, with evaluation using classification report and confusion matrix. Experimental results demonstrate that GoogLeNet consistently achieves high accuracy, ranging from 98% to 99.4%, across a range of hyperparameter settings, confirming its robustness and adaptability. The model performs particularly well in classifying Ipsala and Jasmine varieties, with minimal misclassifications observed in the best-performing configurations. Compared to other deep learning models such as CNN, VGG19, and ResNet50, GoogLeNet exhibits superior accuracy and greater stability under parameter variations. Benchmarking against traditional classifiers and recent studies further reinforces its effectiveness, showing consistently high performance across five rice varieties: Arborio, Basmati, Ipsala, Jasmine, and Karacadag. Furthermore, this research supports Sustainable Development Goal 2 (SDG 2) by enhancing agricultural productivity through the precise classification of rice varieties. By ensuring seed purity and optimizing farming inputs, the proposed model contributes to higher crop yields and sustainable food production, addressing global food security challenges..

Keywords: rice variety classification, GoogLeNet, deep learning, image processing, agricultural productivity.

Paper ID #160

Sentiment and Stance Analysis on Jokowi's Credential Controversy Using IndoBERT and Rule-Based Heuristics

Sri Huning Anwariningsih, Erwin Kartinawati, Destina Paningrum, Erna Indriastiningsih,Rusnandari Retno Cahyani, Faqih Purnomosidi

ABSTRACT

The controversy surrounding the authenticity of President Joko Widodo's educational credentials has polarized public opinion across both mainstream and digital platforms. While prior studies have explored legal aspects of the case, little research has mapped the public discourse using sentiment and stance analysis across diverse sources. This study examines the discourse surrounding the presidential academic credentials issue through IndoBERT-based sentiment and stance classification, which is enhanced with rule-based heuristics. The dataset comprises narratives from Kompas, Tempo, CNN Indonesia, MetroTV, iNews, and YouTube comments. The results show that negative sentiment dominates (67.7%), followed by neutral sentiment (20.5%) and positive sentiment (11.8%). In terms of stance, neutral narratives are most prevalent (67.9%), while doubtful narratives (20%) frequently appear on CNN, INews, and YouTube, characterized by terms like "doubted" and "lawsuit." Supportive narratives (12.1%) mainly originate from YouTube, referencing official clarifications and forensic validation. These findings suggest that platform type has a significant impact on sentiment intensity and stance distribution, with social media platforms promoting more polarized expressions of sentiment. Although neutral in tone, mainstream media content may still shape public perception depending on its contextual framing. .

Keywords: IndoBERT, rule-based heuristic, sentiment analysis, stance classification.

Paper ID #161

Optimization of Fuzzy Tsukamoto Membership Functions Using Genetic Algorithm for Cattle Weight Prediction

Bain Khusnul Khotimah, Winarni, Andharini Dwi Cahyani, Rika Yuntarini, Mohammad Unis Iswahyudi, Yeni Kustiyahningsih

ABSTRACT

Cattle are an important supplementary source of income for farmers in Indonesia. However, achieving optimal cattle weight remains a common challenge, as it directly affects market value based on age-specific weight standards. This study employs the Fuzzy Tsukamoto method with membership functions optimized using a Genetic Algorithm (GA) to minimize the Mean Absolute Percentage Error (MAPE). The dataset consists of 100 beef cattle, divided into 80% training data and 20% testing data. Experimental results demonstrate that the GA-optimized Fuzzy Tsukamoto model significantly improves prediction accuracy. The best configuration, a population size of 100, crossover rate of 0.6, mutation rate of 0.4, and 80 generations, achieved an MAPE of 2.561% for the training set and 3.030% for the testing set. Furthermore, the non-optimized model recorded substantially higher errors, with MAPE values of 17.533% and 17.777%, respectively. Although GA-based optimization increased computational time by approximately 80 minutes, it provided a marked enhancement in predictive performance. This hybrid GA–Fuzzy Tsukamoto approach demonstrates strong potential for optimizing cattle weight and improving overall livestock productivity..

Keywords: Genetic Algorithm, Cattle Weight, Fuzzy Tsukamoto, MAPE.

Paper ID #163

Determination of Optimal Frequency Band Features in Electroencephalogram Signal Using Bandpass Filter for Emotion Recognition

Ayu Desi Darmawati, I Made Agus Wirawan, I Made Gede Sunarya

ABSTRACT

Electroencephalogram-based emotion recognition is an essential aspect in the development of human-computer interaction systems that are adaptive to the user's emotional state. Electroencephalogram signals consist of several component frequency bands. Not all frequency bands significantly influence emotional responses; therefore, selecting the optimal band is crucial for enhancing classification accuracy. This study utilizes secondary data from the DEAP dataset to examine the impact of filter order and classification method on emotion recognition accuracy. Preprocessing was performed using the butterworth algorithm, specifically 2nd and 4th order bandpass filters, to reduce noise and retain relevant signal components. Features are extracted using the differential entropy with baseline technique reduction. Two classification methods were applied, namely artificial neural network and support vector machine learning, to identify emotions based on electroencephalogram band frequencies. The results show that the combination of theta, alpha, beta, and gamma bands produces the best performance in distinguishing high and low conditions in the arousal and valence dimensions. The highest accuracy was achieved by the artificial neural network method with a 4th-order filter, namely 95.37% for arousal and 94.52% for valence. These findings emphasize the importance of selecting filter orders and classification methods in improving the performance of electroencephalogram-based emotion recognition systems..

Keywords: electroencephalogram, emotion recognition, frequency band, butterworth bandpass filter, brain-computer interface.

Paper ID #165

Emotion Detection in Indonesian E-Commerce Product Review Using BERT

James Lay, Muhammad Amien Ibrahim

ABSTRACT

E-commerce enables users to conduct transactions with sellers online and receive goods directly. The rapid growth of e-commerce in Indonesia is largely driven by the continuous increase in internet users, resulting in a surge of product reviews generated by consumers. These reviews provide valuable data that can be analyzed for various purposes, including emotion classification. However, existing research on emotion classification in Indonesian product reviews has primarily focused on a single Bidirectional Encoder Representations from Transformers (BERT) variant, IndoBERT. Therefore, this study explores additional BERT variants to compare their performance in emotion classification tasks for Indonesian language product reviews. This study utilizes the PRDECT-ID dataset, an Indonesian product review dataset, to classify emotions expressed in user reviews. Several BERT-based models were employed in this research, including IndoBERT, multilingual BERT (mBERT), DistilmBERT, and XLM-RoBERTa (XLM-R). Among these, XLM-R achieved the highest performance, with both the F1-Score and Accuracy reaching 72%. This study aims to assist sellers in evaluating their products and support buyers in making informed purchasing decisions..

Keywords: e-commerce, product review, emotion classification, BERT, natural language processing.

Paper ID #168

An Explainable AI Approach to Multimodel Sentiment Classification Using LIME

Rajnaparamitha Kusumastuti, Tommy Dwi Putra, Dewi Oktafiani, Hadis Turmudi

ABSTRACT

This study aims to enhance transparency and trust in sentiment classification by integrating Explainable Artificial Intelligence (XAI) into a multimodel framework. It focuses on comparing classical machine learning algorithms Logistic Regression, Naive Bayes, Support Vector Machine, and Random Forest against a transformer based model (BERT), employing the Twitter sentiment dataset (16,363 tweets). After conducting exploratory data analysis and representing texts via TF-IDF vectors or fine-tuning BERT, models were evaluated for accuracy and consistency. Local Interpretable Model Agnostic Explanations (LIME) was then applied to visualize feature contributions and compare interpretability across models. Results indicate that classical methods achieve comparable accuracy (87–92%) but fail to capture contextual nuances such as irony and negation, whereas BERT attains robust predictive performance and correctly handles semantic contrasts. LIME effectively exposes model specific reasoning patterns, highlighting BERT's superior context awareness. The findings underscore the necessity of combining high performance models with XAI tools to produce reliable, transparent sentiment classifiers.

Keywords: Explainable Artificial Intelligence (XAI), Sentiment Analysis, Multi-Model Classification, BERT, LIME.

Paper ID #170

Development of an Automatic Trash Sorting System Using Vision Transformer (ViT) Model

Rafael Dillon Hasan; Vincent Gavrila Aprilliano; Edmund Abraham Setiady; Maulin Nasari; Alfi Yusrotis Zakiyyah

ABSTRACT

The success of environmental sustainability depends heavily on solving waste management challenges. Waste management can be improved through the implementation of automated sorting systems which separate organic materials from recyclables during the initial segregation stage. Such a system uses a classification model as its core component to analyze images of waste and trigger a mechanical sorter. For this purpose, we developed an image classification model that uses a Vision Transformer (ViT), which is a deep learning model with self-attention mechanisms. A Google-pretrained Vision Transformer model received fine-tuning through a specialized waste dataset before deployment. The PyTorch framework was used to deploy the model into a Flask web application which enables users to submit images for real-time classification results. The model shows excellent prediction capabilities through the evaluation of precision, recall, F1-score, and AUC-ROC metrics, which validates its suitability for real-world deployment. This study proves that Vision Transformers show immense potential for developing modern, environment-focused visual classification systems that can power automated sorting machinery..

Keywords: Automatic Trash Sorting, Deep Learning, Vision Transformer (ViT), Waste Image Classification.

Paper ID #174

Fake News Detection Utilizing Ensemble Learning and Explainable AI

Bryan Anthony, Davon Perry Nugroho, Henry Lucky, Derwin Suhartono

ABSTRACT

The rapid spread of misinformation poses a significant threat to public trust and decision-making. This research involves training XGBoost and LightGBM classifiers on the ISOT and WELFake datasets, employing TF-IDF, BERT, and Word2Vec for feature extraction, followed by SHapley Additive Explanations (SHAP) and Local Interpretable Model-agnostic Explanations (LIME) for explainability analysis of the model predictions. Among all configurations, the best performance was achieved by combining Word2Vec with LightGBM, reaching 0.979 accuracy and 0.980 F1-score on the ISOT dataset. SHAP effectively highlighted globally important features from sparse TF-IDF inputs, while LIME provided localized insights for dense embeddings. These results demonstrate the potential of explainable ensemble methods for fake news detection across varying text styles, offering a scalable and transparent solution, with future research in multilingual and multi-modal contexts..

Keywords: Fake News Detection; XGBoost; LightGBM; Ensemble Learning; SHapley Additive Explanations; Local Interpretable Model-agnostic Explanations.

Paper ID #175

Machine Learning Algorithms for HIV/AIDS Prediction using Explainable AI

Nicholas Ho, Anthony Davidson Salim, Geoffrey Gohtama

ABSTRACT

Early detection of HIV/AIDS is important in order to reduce transmission rate. By evaluating different machine learning algorithms, this research identifies the best algorithm or model for HIV/AIDS detection based on socio-behavioral data. Even though there are previous research that has shown good results, they still have some challenges to be solved. This study addresses the problems of model interpretability by using an Explainable AI library called SHAP in order to improve model interpretability and transparency. The methodology includes data collection from a public dataset, preprocessing, model training, evaluation using standard metrics (accuracy, precision, recall, F1-score), and interpretability analysis using SHAP. The results show that ensemble models, particularly Random Forest, achieve the highest accuracy at 0.97, outperforming traditional models. SHAP analysis highlights key features such as partner-seeking behavior and drug use as significant predictors. The study concludes that ensemble learning combined with explainability offers a reliable and interpretable approach for HIV/AIDS prediction, thus can help improve the overall result in a medical setting..

Keywords: machine learning, HIV/AIDS, early detection, explainable AI, healthcare.

Paper ID #187

IoT-Based Smart Indoor Plant Care System with Automatic Irrigation and UV Light Control

Nazzar Hibatullah, Rueben Gabriel Ismail, Benediktus Evandy Unamo, Annisa Istiqomah Arrahmah

ABSTRACT

The Internet of Things (IoT) is one of the rapidly developing technologies and is starting to be applied in various fields, including agriculture. This study aims to design and implement a simple IoT system based on an ESP32 microcontroller that functions to monitor soil moisture and water plants automatically. This system consists of several main components, namely a soil moisture sensor, a mini water pump, and an ESP32 microcontroller module. The sensor plays a role in detecting the moisture content of the planting medium in real-time, then the data is processed to determine whether watering is needed. If the humidity value is below a certain threshold, the system automatically activates the pump to water the plants until the soil condition returns to optimal. In addition, this system can also be further developed to send data to a web-based monitoring platform using additional modules such as ESP8266, so that users can monitor plant conditions remotely. The test results show that the system can function well in maintaining soil moisture automatically, increasing the efficiency of water use, and reducing dependence on manual watering, especially for ornamental plants or home-scale gardens. This system can be a simple but effective solution to support smart farming practices, especially in urban environments or areas with dense user activity. This system is tested over a seven day period using the plant Ledebouria petiolata as the sample. Evaluation is carried out by monitoring and recording the soil moisture level and the duration of pump activation. The results indicate that the system can maintain soil moisture automatically, help boost water efficiency, and also reduce dependency on manual watering..

Keywords: Internet of Things, automatic plant watering, smart agriculture, remote monitoring, automated irrigation systems.

Paper ID #188

Machine Learning Algorithms for Attack Detection on Encryption Systems Based on Activity Logs

Tri Kuntoro Priyambodo

ABSTRACT

This paper presents a machine learning-based attack detection approach for encrypted systems, leveraging network activity logs. Conventional intrusion detection systems (IDS) often struggle to identify complex attacks on encrypted traffic due to limited visibility into the payload. In this study, features such as entropy, packet count, connection duration, and block size are extracted from the log data to identify behavioral patterns indicating network anomalies. The Random Forest algorithm is used to learn these patterns and distinguish between normal and malicious activities. The developed model performs very well with an accuracy of 92.8%, a precision of 91.5%, a recall of 93.2%, and an F1-score of 92.3%. To ensure transparency, one- and two-dimensional visualization techniques are used to visualize the contributions and interactions between features. The results show that features such as entropy and packet count play a significant role in influencing the model predictions and are effective in identifying anomalies in encrypted traffic. This approach supports the application of explainable machine learning models to real-world security infrastructures and has the potential to form the basis for intelligent intrusion detection systems that can adapt to modern encrypted communication environments..

Keywords: Intrusion Detection, Encrypted Traffic, Random Forest, Network Feature Extraction, nterpreted Machine Learning.

Paper ID #190

Vehicle Plate Recognition in Residences Using YOLOv11 and OCR

Bernardus William Santosa, Derick Joewono, Ferdinand Mayraldo, Alfi Yusrotis Zakiyyah, Maulin Nasari

ABSTRACT

The increasing number of theft incidents in residential areas is often attributed to the limitations of security personnel who cannot continuously monitor vehicle access for 24 hours. This paper presents the development and performance evaluation of a Smart CCTV system utilizing You Only Look Once (YOLOv11) and PaddleOCR for Automatic Number Plate Recognition (ANPR) in residential environments. The system aims to automate the vehicle identification process to enhance neighborhood security. A quantitative approach was applied to assess system performance across various conditions, including low lighting and angled views. Experimental results indicate that the integration of YOLOv11 with PaddleOCR achieved superior performance, with license plate detection accuracy of 94%, OCR accuracy of 91.96%, and an average processing time of 0.48 seconds per frame. Compared to alternative OCR methods such as EasyOCR and Tesseract, this configuration demonstrated higher robustness and reliability. These findings support the potential of the proposed ANPR system to improve residential security through accurate and efficient real-time vehicle recognition, reducing the reliance on manual monitoring..

Keywords: YOLOv11, PaddleOCR, ANPR.

Paper ID #192

Large Language Models for Disease Diagnosis using Symptom-Based Dataset: Exploring Reasoning and Non-Reasoning

Robert Wiliam, Jessica Ryan, Alexander Ivan Gumilang, Derwin Suhartono

ABSTRACT

Diagnostic errors are a major global health challenge that demonstrates the need for better clinical decision support. The emergence of Large Language Models (LLMs), with their powerful natural language processing capabilities, provides a novel opportunity to mitigate this global challenge. This study aims to quantitatively assess and compare the diagnostic capabilities of various LLMs on a symptom-based disease classification task. We compare models based on their architecture (reasoning vs non-reasoning), and the impact of enhancement strategies such as Retrieval-Augmented Generation (RAG) and Supervised Fine-Tuning (SFT). Using the CoD-PatientSymDisease dataset, we examined a sample of open-source and API-accessed models. Our result shows a positive correlation between model size with its diagnostic performance. Evidence also shows that for symptom-based diagnostic tasks, non-reasoning models outperform their reasoning model counterparts. For example, GPT-4.1 accessible via the API had the highest precision using RAG (62.75\% accuracy and 56.90\% F1 score). Other open-source models such as LlAma-3.1 8B and Qwen-3 Non-Think 8B also showed competitive performance, especially when enhanced with SFT. Using SFT on the language model also generally increases its diagnostic performance, which bodes well for the adaptability of LLMs to specific domains. Overall, our findings suggest that in a practical symptom-based diagnostic context, adaptive techniques, such as fine-tuning, produce better results than reasoning alone, which suggests the benefit of domain-based contextual training for AI diagnostic support products. These insights highlight the importance of domain-specific adaptation in AI rather than relying solely on complex reasoning architectures..

Keywords: Large Language Models, Disease Diagnosis, Symptom-based, Reasoning.

Paper ID #197

Evaluating Geometric Transformations, FA-GAN Augmentation, and CutMix to Improve Facial Expression Recognition

Kelson Vincien, Albert Tandy Harison, Augusto Jonathan Chandra, Meiliana, Mohammad Faisal Riftiarrasyid

ABSTRACT

This study evaluates three data augmentation techniques—Geometric Transformations, FA-GAN, and CutMix—to address the severe class imbalance of the "Disgust" expression within the FER2013 dataset. Facial Expression Recognition (FER) is a key area in computer vision, but the performance of Convolutional Neural Networks (CNNs) is often hampered when certain expressions are underrepresented. While various augmentation techniques exist, a systematic comparison under consistent conditions remains a research gap. To address this, we trained a baseline CNN and three separate models, each using a dataset augmented with 500 synthetic "Disgust" images generated by one of the techniques. Performance was assessed using F1-score to directly measure the impact on the target class. Our findings indicate that FA-GAN yielded the best performance, achieving an F1-score of 0.39 for "Disgust" recognition. This result significantly surpassed both Geometric Transformations (0.35) and CutMix (0.33), while the baseline model failed to recognize the expression entirely. This suggests that generating high-quality, realistic synthetic data is more effective than simpler data manipulation for improving the recognition of severely underrepresented expressions in imbalanced datasets..

Keywords: Facial Expression Recognition, Class Imbalance, Data Augmentation, CNN, FA-GAN, Geometric Transformations, CutMix, FER2013.

Paper ID #199

Deciding the most suited algorithm for food recognition: A Comparative Study

Tristan Nafi Agung Kurniawan, Rafi Satria Putra Sudrajat, Riccosan

ABSTRACT

In this research, we will compare YOLOv8, CNN-Based ResNet-18, and Vision Transformer (ViT) architectures specifically on food-image datasets. The system we make utilizes deep learning algorithms for food recognition and nutrition intake. To find the most suited algorithm, we conduct a comparative study in accordance with the evaluation metrics of accuracy, precision, recall, and F-1 Score. We found out that the Vision Transformer (ViT) model is the highest in accuracy at 88.97%. While it is the most accurate, it is also the most computationally demanding. Compared to YOLOv8, it is a model that is not the most accurate, yet it is not computationally demanding, with an accuracy of 82.9%. And Resnet-18 provides a balance between accuracy and performance with 88.72%. With such a low difference compared to the most accurate model (ViT), while also more efficient than ViT. When developing an application with resource constraints, ResNet-18 becomes a good choice as it balances accuracy and performance..

Keywords: YOLOv8, Vision Transformer, ResNet-18, CNN, Computer Vision, Comparative Study, Machine Learning.

Paper ID #200

Privacy-Preserving Threat Intelligence Sharing in Smart Cities Using Homomorphic Encryption and Federated Analytics

Mehdi Houichi, Faouzi Jaidi, Adel Bouhoula

ABSTRACT

In smart cities, the need for cross-sector collaboration to detect and respond to cyber threats is increasingly critical. However, concerns around data privacy, confidentiality, and regulatory compliance often hinder the sharing of threat intelligence among different municipal entities. This paper proposes a privacy-preserving framework for threat intelligence sharing using homomorphic encryption and federated analytics. The framework enables multiple smart city sectors—such as transportation, utilities, and public health—to collaboratively analyze threat indicators without revealing raw or sensitive data. Leveraging homomorphic encryption ensures that data remains encrypted throughout the analytical process, while federated analytics enables decentralized, privacy-aware model training across institutions. We implement and evaluate the system in a simulated smart city environment, demonstrating its effectiveness in maintaining data confidentiality, ensuring GDPR compliance, and preserving threat detection accuracy with minimal computational overhead. The proposed solution offers a scalable and secure approach to collaborative cyber defense in modern urban ecosystems..

Keywords: Smart cities, Threat intelligence sharing, Homomorphic encryption, Data privacy..

Paper ID #203

Evaluation and Combination of XGBoost, Artificial Neural Network, and Fuzzy Models for Credit Card Payment Default Classification

Bq Nadila Nuzululnisa, Dadang Priyanto, Raisul Azhar, Suriyati, Muhamad Wisnu Alfiansyah, Mitranikasih Laia

ABSTRACT

Credit card default is a major risk in banking, causing significant financial losses and instability. This study evaluates and combines three classification models Extreme Gradient Boosting (XGBoost), Artificial Neural Network), and Fuzzy using the UCI Credit Card dataset with 30,000 records and 25 features. The data were preprocessed through normalization, irrelevant feature removal, and split into 80% training and 20% testing. Model performance was assessed with Accuracy, Precision, Recall, F1-score, and AUC. Results show that XGBoost achieved the highest accuracy (95.61%, AUC = 0.95), Fuzzy obtained the highest recall (0.94), while ANN reached perfect precision (1.00). The hybrid Artificial Neural Networks-XGBoost model provided a balanced trade-off between precision and recall, whereas Artificial Neural Networks-Fuzzy performed the weakest. These findings highlight that XGBoost is the most effective model for accuracy, Fuzzy is more sensitive in detecting defaults, and Artificial Neural Networks-XGBoost offers a practical balance for credit risk management. Future improvements may involve data balancing techniques such as SMOTE to enhance sensitivity to minority cases..

Keywords: Credit Card Default, XGBoost, Artificial Neural Network, Fuzzy, Ensemble Learning.

Paper ID #207

Big Brain in a Nano Tank: Deep Policy Learning for Micro-Ecosystem Control

Iwan Fitrianto Rahmad, Syahril Efendi, Poltak Sihombing, T. Henny Febriana Harumy

ABSTRACT

Nano-scale aquatic systems ("nano tanks") represent very difficult control issues since they are so dynamic and nonlinear. Water quality parameters such as pH, dissolved oxygen (DO), and ammonia concentration have been seen to respond immediately to even small perturbations, and hence real-time adaptive controls become the necessity. PID and fuzzy logic controllers are seen to fall short in being able to provide the necessary responsiveness and adaptability. This study proposes a smart control system based on Deep Deterministic Policy Gradient (DDPG) reinforcement learning. The controller is integrated with a high-fidelity digital twin system via OpenAI Gym and real-time Internet of Things (IoT) sensor data. A multi-objective reward function is designed in such a way that both short-term and long-term regulatory compliance with the Indonesian environmental regulations is ensured. Simulation results demonstrate the DDPG-based controller's capability to sustain operation above 93% uptime in compliant operating ranges. Performance metrics include a root mean square error (RMSE) of 0.28 mg/L for dissolved oxygen, indicating reliable and precise control. The formulated strategy has potential to provide robust water quality management in complex micro-ecosystems..

Keywords: Nano tanks, water quality control, reinforcement learning, DDPG, IoT, digital twin, dissolved oxygen, ammonia, pH..

Paper ID #221

Heart Disease Prediction Using Random Forest In Machine Learning Using The Concepts Of Data Mining

Shane Ryu Cahya, Jonathan Hartanto, Bakti Amirul Jabar, Jurike V. Moniaga.

ABSTRACT

Heart disease remains one of the leading causes of death worldwide, making early prediction essential for treatment and prevention. This study applies machine learning techniques, specifically the Random Forest algorithm, to predict the likelihood of heart disease based on patient data. Using the standard UCI heart disease dataset, we employed data mining techniques for cleaning, preprocessing, and feature selection to ensure model reliability. The Random Forest model, implemented with bagging as an ensemble method, achieved an accuracy of 90.16%, outperforming several other classification algorithms and exceeding results reported in previous studies. These findings highlight the potential of Random Forest, supported by effective data mining strategies, as a practical tool for clinical decision-making and early intervention in heart disease management..

Keywords: heart disease, prevention, machine learning, random forest.

Paper ID #222

Comprehensive Evaluation of Traditional and AI-Based Steganography under Adversarial Attacks Using Explainable AI

Indrawan Ady Saputro, Moch. Hari Purwidiantoro, Widiyanto Hadi, Iwan Ady Prabowo, and Nurhidayanto

ABSTRACT

Steganography is essential for concealing sensitive data within digital media to avoid detection. Traditional methods like Least Significant Bit (LSB) and Discrete Cosine Transform (DCT) are simple but increasingly vulnerable. In contrast, AI-based techniques such as Convolutional Neural Networks (CNNs) and Generative Adversarial Networks (GANs) provide improved stealth through adaptive embedding. This study presents a five-stage evaluation framework: data acquisition, message embedding, FGSM adversarial attacks, Grad-CAM interpretability, and performance evaluation. Using the Oxford Flowers 102 dataset, results show LSB achieves the highest visual quality (PSNR: 76.30; SSIM: 0.99), while GAN—despite a low initial PSNR (10.55)—improves under attack (PSNR: 39.99; SSIM: 0.92), indicating adaptive behavior. Grad-CAM reveals that CNN and GAN hide data more diffusely, enhancing security but reducing interpretability. ROC curve analysis shows poor detection performance for LSB and CNN (AUC ≈ 0.5), while DCT and GAN yield better separability (AUC ≈ 0.63 and 0.73). This multidimensional framework effectively combines imperceptibility, robustness, and explainability, highlighting the limitations of traditional metrics and the need for adversarial resilience. It offers a foundation for future steganographic systems that are not only secure and efficient but also interpretable. .

Keywords: Adversarial Attack, Explainable AI, Grad-CAM, Robustness, Steganography.

Paper ID #224

Implementation of Continuous Convolutional Neural Network for Pattern Recognition of Balinese Vowel Modifiers in EEG Signals

Made Agastya Maheswara, I Made Agus Wirawan, I Gede Mahendra Darmawiguna

ABSTRACT

The convolutional process in traditional neural network methods may result in the loss of critical spatial information in Electroencephalogram signals, despite their ability to extract useful features. To address this issue, this study employs the Continuous Convolutional Neural Network method to classify Balinese vowel patterns in EEG signals effectively. The proposed model utilises an optimised architecture consisting of four Continuous Convolution layers with 64, 128, 256, and 128 filters, respectively, and kernel sizes of 3×3×4, 3×3×64, 3×3×128, and 1×1×256 for the first to fourth layers. Differential Entropy supports this architecture for feature extraction and the 3D Cube method for feature representation, which together enhance the model's ability to capture spatial and frequency-based information in EEG data. The dataset used in this study consists of EEG recordings from 31 Balinese university students performing imagined vowel spelling tasks. The proposed architecture achieved classification performance scores of 90.69% accuracy, 91.14% precision, 90.90% recall, and 91.39% F1 score. The model contains 5,719,800 trainable parameters and requires an average of 30 epochs during training, demonstrating its balance between classification performance and computational efficiency..

Keywords: electroencephalogram, continuous convolutional neural network, balinese vowel, differential entropy, 3D cube..

Paper ID #226

Enhancing Cross-Domain Sentiment Analysis with Stacking Ensemble and Domain Adaptation Techniques

Yoseph Oktavianus Yusanto, Silverius Calvin, Melly, Irene Anindaputri Iswanto, Setiawan Joddy

ABSTRACT

Recent advances in cross-domain sentiment analysis have predominantly focused on deep learning and transformerbased models due to their strong representational capabilities. However, these models often require substantial computational resources and large amounts of labelled data, which are not, always available. This research aims to explore an alternative approach by improving the performance of traditional machine learning models using stacking ensemble learning combined with domain adaptation techniques. The study investigates the use of Supervised Partial Domain Adaptation and Structure Correspondence Learning (SCL), aiming to enhance model generalization when trained on data from one domain and tested on another. Several models, including SVM, KNN, RF, and XGBoost, were evaluated individually, as well as in a stacking ensemble configuration, where XGBoost served as the meta-model. The results reveal that the combination of Stacking + Supervised Partial Domain Adaptation yields the highest accuracy of 91.20% and provides the most balanced performance across both positive and negative sentiment classes..

Keywords: stacking, ensemble learning, cross domain, imbalance, sentiment analysis.

Paper ID #234

Predictive Analytics of Text Message Confusion Using Supervised Machine Learning Models

Wilbert Winardi, Clayton Koh, Christofer Valentinus Kosasih

ABSTRACT

Long distance communication with the main goal of convey information is getting relevant with using digital media. As such confusion in digital communication can hinder understanding and decision making. The process of confusion often leads to misunderstanding either caused by the content itself or by how it is conveyed. This study aims to evaluate the effectiveness of three machine learning model: Logistic Regression, Random Forest, Support Vector Machine. The primary objective is to identify the most accurate model for predicting text confusion level based on the content of the text therefor help to mitigate confusion. The proposed method involves a multi-stage pipeline consisting of data collection, initial labeling, machine learning-based refinement, preprocessing, feature extraction, model training, and evaluation. The results reveal that Support Vector Machine using CountVectorizer excels at handling confusing text which got 98.65% accuracy, 98.65% precision, 98.65% recall, and 98.64% f1-score, outperforming the other models in accuracy, precision, recall, and f1-score, despite the other model also showing excellent performance in detecting confusion. This research underscores the value of machine learning in enhancing digital communication clarity by detecting potentially confusing messages and guiding users to clarify content before it is shared..

Keywords: communication, confusion, logistic regression, machine learning, supervised learning.

Paper ID #237

Driving Sustainable Development Through Data: A Looker Studio Dashboard for Philippine HEIs

Adrian Jaleco Forca, Desiree Gallarda Morales, Dan Christian Gallo Gellada, James Ryan Balictar Ga

ABSTRACT

Data serves as backbone to the operation of a higher education institutions for more data-driven decision making, however with significant and volumes of data due to multiple commitments and engagements. The lack of centralized data source for quick insights still exists caused by scattered and unprocessed data across different offices. The increasing demand for rapid and accurate reporting in HEIs motivated the researchers to adapt the latest computing tools towards sustainability of goals leading to data visualization. In this study, the researchers devised an interactive dashboard that is connected to various dataset sources and aggregated using Google Looker Studio. Using this platform data fields and types were defined: calculated fields, selection of appropriate visualization types, dashboard layout, and interactivity. Results presents actionable insights offerings a clear picture of progress, challenges, and opportunities related to the goals particularly SDGs. Evaluation results were seen in the report that there are increase in the following: users average engagement time; the Platform measurement card yielding 100% that can be accessed thru mobile and desktop; reaching 3 out of 10 ASEAN nations (including the Philippines) which shared their location while accessing the dashboard..

Keywords: Actionable, Insights, Data Visualization, Higher Education Institution, SDG.

Paper ID #240

A Machine Learning Approach to Predict and Analyze Student Academic Performance Using Random Forest and SVM with SMOTE for Imbalanced Data Handling

Ni Luh Gede Pivin Suwirmayanti, Ricky Aurelius Nurtanto Diaz, Putu Adi Guna Permana, Dian Pramana, I Gde Agus Satya Pratama, Adolf Christian Pardomuan Siregar

ABSTRACT

Education plays a crucial role in shaping the quality of human resources. One of the indicators of the effectiveness of the learning process is the academic achievement of students. Educational Data Mining (EDM) uses an algorithm-based analytical approach that utilizes machine learning to evaluate and predict learning outcomes with higher objectivity than traditional methods. The purpose of this study was to compare the performance of two classification algorithms, Support Vector Machine (SVM) and Random Forest (RF), in predicting students' academic achievement. To overcome the problem of data imbalance between classes, an oversampling approach using the Synthetic Minority Oversampling Technique (SMOTE) was applied. The data used were obtained from both academic and non-academic sources, which we collected independently. The results show that the SVM algorithm exhibits stable performance in terms of accuracy and is effective in classifying the majority class, whereas the Random Forest is more effective in classifying the minority class. The application of the SMOTE technique helps to improve the balance of predictions between classes, although it does not necessarily improve overall accuracy. These findings suggest that SVM is better suited for use when overall accuracy consistency is a priority, whereas Random Forest is more effective at improving classification performance in minority classes under conditions of unbalanced data distribution..

Keywords: support vector machine, random forest, smote, student academic performance, machine learning.

Paper ID #250

Smart Warehouse Monitoring System with License Plate Recognition for Vehicle and Goods Movement

Dharma Vija Putra Sugianto, Gabrielle Jeconiah Christiando, Wijaya Pratama Suteja, Mochammad Haldi Widianto

ABSTRACT

This study proposes a Smart Warehouse Monitoring System to automate the monitoring of vehicle and goods movement using computer vision, specifically by using an Automatic Number Plate Recognition (ANPR) approach. The primary objective is to design and evaluate a pipeline that integrates YOLOv8 Medium, character recognition using EasyOCR, and validation against the official government vehicle database (Bapenda Jabar) for a plate detection system. The primary contributions are: (1) detection-OCR pipeline integration linked to official government databases for verification, (2) a lightweight image-processing system suitable for and can be applied to resource-limited devices, and (3) comparative analysis of YOLOv8 and YOLOv11 on an internal dataset. Three sample categories (Kaggle, foreign plates, and direct captures; n_total = 13 images) used for initial testing showed correct readings for all samples; however, the results have yet to be generalized as the results are limited by the small size and low variability of the dataset. Detection metrics, average inference time, environmental limitations, and plans for further improvement are included in the discussion. However, the overall results of the initial testing have proved the very effective potential that exists within the proposed system for implementation in Automatic Number Plate Recognition as well as Intelligent Transport Systems.

Keywords: License Plate Recognition, Computer Vision, Smart Warehouse Monitoring.

Paper ID #251

Understanding the Decision-Making Process in Brain Tumor Classification: A Comparative Grad-CAM Analysis of ResNet50, VGG16, EfficientNetB3, DenseNet121, and InceptionV3

Calvin Suharjono, Ringo Gary Buntono, Stefanus Abel Filio, Meiliana Meiliana, Mohammad Faisal Riftiarryasyid

ABSTRACT

Early and accurate detection of brain tumors through MRI scans is vital for improving patient outcomes. However, manual interpretation of MRI images is time-consuming and prone to error, motivating the adoption of deep learning-based classification systems. This study investigates the performance and interpretability of five pre-trained convolutional neural network models—ResNet50, VGG16, EfficientNetB3, DenseNet121, and InceptionV3—using the Grad-CAM technique to visualize model decision-making processes. A dataset of 7023 brain MRI images categorized into four classes (glioma, meningioma, pituitary, and healthy) was used, with preprocessing steps including resizing, grayscale conversion, contour-based cropping, and data augmentation. Each model was fine-tuned and evaluated using accuracy, precision, recall, F1-score, and confusion matrices, while Grad-CAM heatmaps assessed model interpretability. Results showed that all models achieved high classification accuracy, with DenseNet121 and EfficientNetB3 performing best in terms of accuracy and generalization. ResNet50 demonstrated the most stable and interpretable predictions, as indicated by the lowest Average Drop value. This research highlights the importance of combining accuracy with interpretability for AI-assisted clinical diagnosis and recommends ensemble approaches for optimal performance..

Keywords: CNN, MRI, ResNet, VGG, EfficientNet, DenseNet, Inception, Grad-Cam, Average Drop.

Paper ID #252

ResNet 50: A Convolutional Neural Network Technology for Corn Leaf Disease Recognition

Aeri Rachmad, Fifin Ayu Mufarroha, Yuli Panca Asmara, Husni, Eka Mala Sari Rochman, Yoga Dwitya Pramudita

ABSTRACT

The development of artificial intelligence (AI) has opened new opportunities in precision agriculture, particularly in plant disease detection through digital imagery. Corn, as a major food commodity, is highly susceptible to various leaf diseases that can reduce productivity and threaten food security. Manual diagnostic methods are often inefficient, time-consuming, and prone to subjective errors, necessitating a fast and accurate automated detection system. This study applies deep learning techniques with the ResNet-50 Convolutional Neural Network (CNN) architecture to classify corn leaf conditions into four categories: healthy, leaf spot, blight, and common rust. ResNet-50 was chosen because it can overcome the problem of decreasing accuracy in deeper networks through residual connections, allowing for more effective image feature extraction. The model was trained with hyperparameter settings such as learning rate, batch size, optimizer, and number of epochs to achieve optimal performance. The test results showed excellent performance with 96% accuracy on the training data and 94% on the validation data, indicating the model's robustness and generalization ability..

Keywords: Artificial Intelligence, Corn Leaf, Classification, ResNet 50.

Paper ID #257

Imbalanced Text Classification using Artificial Neural Networks

Ika Oktavia Suzanti, Maulana Malik Ibrohim, Rika Yunitarini, Zahra Arwananing Tyas, Arif Muntasa, Hanifudin Sukri

ABSTRACT

Text Mining is a process in searching, analyzing and extracting information hidden in unstructured text data. By using text mining, text classification, information extraction and automatic summarization can be carried out. Artificial Neural Network (ANN) is a Deep Learning method that requires a lightweight computing machine. In this study, a classification of Indonesian language tourism news texts was carried out using ANN. Classification devided into 4 classes namely natural tourism, artificial tourism, cultural tourism and non-tourism. Based on initial analysis, the data was unbalanced so data balancing was carried out using Synthetic Minority Oversampling Technique (SMOTE). The results show ANN and SMOTE provide the highest accuracy value of 97.34% compared without smote by 96.96%, but the use of SMOTE increases computation time required by up to 1.5 times than without using SMOTE..

Keywords: Text Mining, Text Classification, Artificial Neural Network, Imbalance Data, Tourism News.

Paper ID #259

Hybrid Naïve Bayes–ARIMA Model for Crop Yield Forecasting in South Kalimantan

Satria Daffa, Razka Fawazzil Hakim, Kristien Margi Suryaningrum, Ricky Reynardo Siswanto

ABSTRACT

Agricultural productivity in South Kalimantan is highly vulnerable to dynamic and unpredictable climate patterns. This research aims to enhance the accuracy of crop yield predictions by combining the Naive Bayes classification algorithm with the ARIMA time series model, utilizing weather data such as rainfall, temperature, humidity, and wind speed. By integrating both classification and forecasting techniques, the study provides a robust approach to decision-making in agriculture. Retrieved data extracted from publicly available BMKG (Badan Meteorologi, Klimatologi, dan Geofisika) dataset from year 2019 to 2021 was used for model training and validation. The findings show that the hybrid model shows promising results despite the low data sample provided as a sample training to the ARIMA model due to the lack of publicly available crop yield data of South Kalimantan. It was concluded that ARIMA(0,1,0) was the most optimal ARIMA model in predicting crop yields as it showed the least error probability based on the given trained features data. The ARIMA model training results show that humidity and wind speed contributes significantly on increasing crop yields productivity. The Naive Bayes model also predicted crop yields productivity of the next 5 years (2022-2026) will fall on "Medium" category with 100% confidence level showing potential for crop yields classification and prediction. Further research and more data samples are needed to verify the results presented in this paper. With more training and research, this hybrid model may serve as an intelligent decision-support tool for farmers and policymakers in managing agricultural planning and mitigating crop failure risks..

Keywords: Crop Yield Prediction, Naive Bayes, ARIMA, Weather Data, South Kalimantan, Machine Learning.

Paper ID #260

Detecting Image Manipulation Using a ResNet50–SVM Hybrid Model

Miftakhurrokhmat, Robi W. Abdullah, Tinuk Agustin, Ina S. Widiati, Febrianta S. Nugraha, Shofiyati N. Karimah

ABSTRACT

The development of the digital world brings new challenges in distinguishing original photos from edited photos, especially on social media and other digital sites. The spread of fake images that are difficult to recognize directly becomes a serious problem because they can be used for purposes that are detrimental to many people. This study proposes the use of the Residual Network 50 (ResNet50) architecture with a Support Vector Machine (SVM) approach to detect changes in digital images. ResNet50 functions as a model to extract important features from images, while SVM functions as a classification algorithm to distinguish between original images and edited images. The dataset used consists of two categories, namely original images and edited images, evaluated under three scenarios: Scenario 1 with 700 images (350 original and 350 modified), Scenario 2 with 1,400 images (700 original and 700 modified), and Scenario 3 with 2,100 images (1,050 original and 1,050 modified). All images were taken from the Kaggle platform, where edited images were created using Photoshop with several editing variants and exported as PNG files sized 256×256. Testing of the model was carried out to assess the performance of the detection system that has been created. The highest accuracy, 84%, was achieved in Scenario 2 (1,400 images) using ResNet50 feature extraction combined with an SVM classifier with an RBF kernel. This configuration achieved a Precision value of 0.85, Recall value of 0.82, F1-score of 0.83 in the original image class, and a Precision value of 0.83, Recall value of 0.85, and F1-score of 0.84 in the edited image class. These findings indicate that the proposed model is a promising and effective solution for the automatic detection of fake images across various digital platforms..

Keywords: machine learning, SVM, ResNet, detection, digital.

Paper ID #261

Achieving Balanced Learning Groups: An Application of K-MeansWith Predefined Cluster Cardinality

Sudipto Prabangkoro Adristo , Farrel Eleazar Gunawan, Maulin Nasari, Alfi Yusrotis Zakiyya

ABSTRACT

It is essential that the construction of well-balanced student learning groups be used in creating strong working and ensuring a fair participation by group members. The research proposed to cluster similar individuals according to their final grade with balanced numbers of students. Hence, we implement K-Means with predefined cluster cardinality. Experimental results verify that the algorithm is effective in forming balanced clusters without sacrificing much internal cluster similarity. The approach is applicable in educational contexts where group balance and fairness are important. From the running process, the standard k-means results are obtained as follows, Silhouette Score: 0.6171776288913178 and WCSS: 208.09523809523807. There are modified k-means, namely: Silhouette Score: - 0.010314289980389118 and WCSS: 911.2..

Keywords: Balance groups, K-Means, constrained clustering, student grouping, educational data analysis.

Paper ID #264

A Hybrid LSTM and Savitzky–Golay Approach for NDVI Forecasting in Protected Rice Field

Mulaab, Abdullah Basuki Rahmat, Mohammad Syarief, Firdaus Solihin, Dwi Kuswanto

ABSTRACT

The Normalized Difference Vegetation Index (NDVI) is widely used to assess vegetation health and density from remote sensing data. Forecasting NDVI supports crop yield estimation and agricultural planning, including irrigation, fertilization, planting schedules, and climate change adaptation. It also aids decision-making in disaster mitigation and resource management for protected rice fields. In this study, Long Short-Term Memory (LSTM) was used to forecast one-day-ahead NDVI values using Sentinel-2 imagery. A hybrid approach was implemented, combining Savitzky–Golay (SG) filtering for noise reduction and missing data interpolation with LSTM for learning temporal patterns. Preprocessing included masking with a Gaussian kernel and SG filtering. The model was trained on 1,629 daily observations. To evaluate the impact of SG filtering, two models were compared: LSTM without SG and LSTM with SG. Performance was assessed using MAE, MSE, MAPE, and MASE. Results showed that the hybrid model (LSTM with SG) achieved lower errors: MAE = 0.0068, MSE = 0.0001, MAPE = 1.53%, and MASE = 2.6744. In contrast, the LSTM without SG performed worse (e.g., MAE = 0.0079, MASE = 3.3534), indicating higher sensitivity to noise and data gaps. This study demonstrates that integrating Savitzky–Golay filtering as preprocessing significantly improves LSTM performance by smoothing noise while preserving key temporal trends in NDVI time series. The hybrid approach proves effective for forecasting in high-variability agricultural environments, particularly in protected rice field monitoring.

Keywords: NDVI Forecasting, LSTM, Vegetation Indices,Time Series, Protected Rice Field areas,Sentinel 2.

Paper ID #265

Improving Edible and Toxic Plant Recognition with CLIP and Zero-DCE in Low-Light Conditions

Aurelia Tera Puspita, Scholastica Celine Wahyudi, Andien Dwi Novika, Azani Cempaka Sari

ABSTRACT

Recognition of low-light poisonous and edible plants in the forest is an elementary security concern. In this manuscript, we present a pipeline that employs the zero-shot learning capability of the Contrastive Language-Image Pre-training model, incorporating the Zero-Reference Deep Curve Estimation image improvement technique. We evaluated this solution by applying the classification of low-light images of non-poisonous and toxic plants, pre-processing as well as non-pre-processing using Zero-DCE. Results show that adding images to Zero-DCE greatly enhances classification accuracy without training the model on Top-2/Top-3 accuracy greater than 80%. The model also had poor Top-1 accuracy for toxic plant classification, which is a disturbing safety issue. While much of the CLIP and Zero-DCE pipeline holds the potential for real-world deployment, efforts are still required towards developing it into a safety-critical robust task..

Keywords: forest plant classification, deep learning, zero-shot learning, lighting variability, edible and toxic plants.

Paper ID #267

Comparative Analysis of Machine Learning Models for Flood Risk Prediction

Darryl Thorian, Nico Handoko, Muhammad Ibrahim

ABSTRACT

Floods are among the most frequent and devastating natural disasters worldwide, causing economic losses, environmental damage, and death. Many regions have highlighted the need for accurate and timely flood risk prediction driven by climate change and other impactful factors. Recent studies have demonstrated that machine learning models can overcome these limitations, however with all the models available, model selection remains a challenge. This paper presents a comparative analysis of the reliability of several machine learning algorithms in predicting flood risk based on environmental factors, the models include: Random Forest, XGBoost, LightBGM, and KNN. This paper focuses on handling regression type data. The models were assessed and presented using standard regression metrics such as R2, RMSE, and MAE. This study highlights the potential of machine learning to enhance early flood warning systems.The analysis showed that gradient boosting methods, particularly XGBoost and LightGBM. This outcome aligns with existing research, which highlights gradient boosting effectiveness in modeling the complex and nonlinear relationships commonly found in flood-related datasets..

Keywords: flood, machine learning, prediction, model training.

Paper ID #268

Artificial Intelligence Synthetic Image Detection Using Ensemble Convolutional Neural Network Model

Tohru Djunaedi Sato, Yoel Kharis Wijaya Wong, Theona Arlinton, Bakti Amirul Jabar, Jurike V. Moniaga

ABSTRACT

Artificial intelligence has advanced rapidly in recent years, particularly in image generation, producing highly realistic synthetic images that are difficult to distinguish from their real counterparts. While such technology has practical benefits, it also poses risks, including the spread of misinformation and identity theft. This study addresses these concerns by proposing an ensemble Convolutional Neural Network (CNN) model for synthetic image detection. Unlike individual CNNs, the ensemble approach integrates multiple feature extraction techniques to improve robustness and accuracy. Using the CIFAKE dataset of real and AI-generated images, the ensemble CNN achieved superior performance compared to single architectures. Experimental results show that the ensemble model reached an accuracy of 98.04%, with a precision of 98% and ROC-AUC of 0.998, outperforming ResNet (96.15%), RegNet (97.05%), and DenseNet (97.48%). These findings highlight the effectiveness of ensemble learning in identifying AI-generated content and underscore its potential for strengthening digital security and safeguarding social media integrity through real-time detection systems..

Keywords: Artificial Intelligence, Ensemble CNN, Synthetic Image, Digital Security.

Paper ID #270

Hybrid Approach on Plagiarism Detector using SVM and GNN

Reynard Lie, Fikri Syahputra

ABSTRACT

Plagiarism is the unethical act of using someone else's work without permission or proper reference and its become a problem within the academy sector. One of the hardest plagiarisms to detect is paraphrased plagiarism. To solve this, the intrinsic plagiarism detection method is used to detect the change of style in writings and coherency of the text. This research proposes a hybrid approach which uses SVM for stylometric feature extraction and GNN for detecting the overall structure between sentences/nodes. The result is when it comes to detecting intrinsically plagiarized sentences in texts at the accuracy score of 54.40%, precision score of 57%, recall score of 54%, and f1 score of 55.68% which is unideal for detection system. Although the result is unideal, it raises a point in the challenges difficulties of detecting intrinsic plagiarized texts and requires a more sophisticated and robust method..

Keywords: academy, GAT, GNN, GCN, plagiarism, SVM, text, Machine Learning, Deep Learning.

Paper ID #271

Image Oversampling Enhancement Method Using Kolmogorov-Arnold Networks

Fendy Wijaya, Wilbert Yang, Ivan Setiawan, Tjeng Wawan Cenggoro

ABSTRACT

Imbalanced dataset has become a critical challenge to achieve ideal performance in classification. One of the most frequently used methods to overcome this problem is oversampling. In the case of image oversampling, DeepSMOTE was one of the options that has outperformed several GAN-based methods. DeepSMOTE implemented a set of MLP layers for image processing. However, as deep learning capabilities have grown, alternative studies also emerged, leading to Kolmogorov-Arnold Networks (KAN), which may replace MLP in some circumstances. This study is intended to integrate BSRBF-KAN as one of the most implemented KAN, in order to solve imbalance dataset problem. The conducted experiments showed that BSRBF-KAN is quite comparable with MLP in terms of performance evaluation. Additionally, BSRBF-KAN outperformed MLP in the majority of cases with respect to latent representation size, but remained comparable in terms of number of trainable parameters. Regarding to the experimental results, it can be concluded that KAN can be an analogous architecture towards MLP for solving image oversampling problems. The source code is publicly available at https://github.com/vanssnn/DeepSMOTE-BSRBF-KAN..

Keywords: Kolmogorov-Arnold Network (KAN), imbalanced dataset, DeepSMOTE, oversampling, class imbalance.

Paper ID #272

Improvement of cosine similarity-based drug information retrieval system using part-of-speech tagging

Husni, Fika Hastarita Rachman, Muhammad Syarief, Risky Sulistiyani, Yoga Dwitya Pramudita, Aeri Rachmad

ABSTRACT

Cosine similarity computation and the term frequency–inverse document frequency (TF-IDF) text representation, which serve as the baseline in many information retrieval systems, tend to assign high weights to frequently occurring terms even when such terms are not semantically important. In a drug information retrieval system, whose role is to identify, select, and rank the relevance of drugs from a corpus based on symptom-related information, the semantics of each term becomes a priority. In this context, nouns such as “fever”, “nausea”, “paracetamol”, and verbs such as “reduce” and “relieve” represent the core terms. This study explores the impact of implementing Indonesian part-of-speech (POS) tagging, which attaches grammatical category labels (e.g., noun, verb, adjective) to each key term, on the performance of a drug retrieval engine that is part of the Indonesian Language Search Engine (SEBI). Within SEBI, POS tagging complements the operation of TF-IDF and cosine similarity in computing similarity between a query and the drug information collection provided by a private hospital in East Java, Indonesia. Experimental results show that incorporating POS tagging improves the precision@K of cosine similarity computation by 10%, reaching 90% when SEBI is configured as a single-answer IR system (K=1). However, the precision@K decreases as the number of returned answers (K) increases..

Keywords: information retrieval, part-of-speech tagging, cosine similarity, precision@K.

Paper ID #280

Comparative Analysis of YOLOv8, YOLOv10, and YOLOv12 for Multi-Class Defect Detection in Cans and Plastic Bottles

Abdul Haris Rangkuti, Candra Hidayattuloh , Rio Ferdinand, Stanley Christian Darmawan

ABSTRACT

Quality control is one of the crucial aspects in a factory in producing a product. Quality control must ensure that product quality can meet product standards, be consistent, and reliable as it should be. In the past, quality control still used traditional or even manual technology, which resulted in slow work speed, prone to errors, impractical, and less efficient for large-scale production. However, along with the rapid development of technology, computer vision has emerged as a new game changer, this has given rise to the idea of creating quality control using computer vision. By considering aspects of image processing, machine learning, and artificial intelligence, quality control using a computer vision system can detect non-conforming bottles and cans quickly and accurately, such as measuring product dimensions, and classifying them into products that must be recycled or are not suitable for release to the market. This detector uses the YOLOv8, YOLOv10, and YOLOv12 methods. This breakthrough answers the question of how to make manufacturers find the most efficient and easiest way to monitor their products. This method has many advantages over traditional methods, The findings highlight its potential to increase efficiency, reduce costs, and improve accuracy in various industries..

Keywords: Quality control in manufacture, Deep Learning, Computer Vision, Convolutional Neural Networks. YOLOv8, YOLOv10, YOLOv12.

Paper ID #281

Enhanced Cervical Cancer Cell Detection Using CNN Transfer Learning with Strategic Layer Freezing

Felicia Audrey Tanujaya, Audrey Theodora Phang, Kelly Natalia, Dave Christian Thio, Dave Christian Thio, Gregorius Natanael Elwirehardja, Bens Pardamean

ABSTRACT

Cervical cancer remains a leading cause of cancer- related mortality among women, particularly in regions with limited access to early and accurate diagnostics. This study explores the use of deep learning for automated cervical cell classification in resource-constrained settings. The SIPaKMeD dataset, comprising 4,049 expert-labeled single-cell images in five morphological classes, was selected for its quality and represen- tation of real-world cytology variability. Data were partitioned into training, validation, and test sets through stratified sampling to preserve class balance. Four Convolutional Neural Network (CNN) architectures were evaluated in base and fine-tuned configurations, chosen for their proven ability to extract spatial features from medical images. Transfer learning from ImageNet weights addressed limited medical image availability, with early layers frozen to retain general features and deeper layers adapted for domain-specific patterns. Fine-tuned ResNet50V2 achieved the highest F1-score of 0.9154, with consistent performance gains across all models and metrics. These results demonstrate the potential of combining transfer learning with selective layer freezing to enhance cervical cancer detection in limited-data scenarios, offering a practical pathway for AI-assisted screening in low-resource healthcare environments..

Keywords: cervical cancer, deep learning, convolutional neural networks, transfer learning.

Paper ID #288

Skin Cancer Detection and Classification Based on Deep Learning Using the CNN Approach

Christopher Gondorahardjo, Azka Aristyan, Liauw Marvelle

ABSTRACT

Early detection of cancer is crucial since it is most treatable in the early stages, preventing patients from death. Dermatologists rely on visual examination and manual analysis to determine malignance of skin lesions, this method can lead to potential diagnostic errors and variations in accuracy. This research aims to show the effectiveness and reliability of Convolutional Neural Networks in detecting skin cancer as well as skin lesion classification. Our CNN consists of 3x3 convolutional layers with 256, 128, 64 channel outputs, each followed by a 2x2 pooling layer and dropout rate of 0.3, followed by a dense layer and softmax classification layer. We compared four different optimizers through 60 training epochs. Nadam performed the best, achieving 78.10% test accuracy, followed by Adam with 77.33% accuracy, RMSprop with 76.38% accuracy, while SGD underperformed, achieving 61.53% accuracy. Our results suggest that CNN is a promising tool for cancer detection and skin lesion classification..

Keywords: Skin cancer, skinlesion, CNN, classification.

Paper ID #290

"SmartMovie: Designing a Smart Web-Based Movie Recommendation System Using BERT with Semantic Synopsis Filtering”

Arie Imanuel Wawukah Bingan, Husein Husein, Muhammad Arshyil Azzim, Alfi Yusrotis Zakiyyah, Maulin Nasari

ABSTRACT

In the era of digital content overload, discovering relevant and engaging movies efficiently has become increasingly difficult. This study presents a smart web-based movie recommendation system that leverages the BERT (all MiniLM-L6-v2) model to generate recommendations based on semantic similarity of movie synopses and genres, rather than just keywords. Unlike traditional systems that rely on user interaction history or exact title matching, this system analyzes the contextual meaning within movie metadata using SentenceTransformer embeddings and cosine similarity..

Keywords: BERT, NLP, Movie Recommendation, User Experience.

Paper ID #291

Student Career Preferences Segmentation Based on Personality, Interests, and Competencies

Angdy Erna, Sitti Harlina, Khaerunnisa Hanapi, Indo Intan, Erni Marlina Kadang, Arham Arifin, Muhammad Sadik, Sutan Azwar

ABSTRACT

The disparity between graduate capabilities and industrial needs has significant implications for higher education. Consequently, institutions are expected to produce graduates whose skills align with the evolving demands of labor market societies, thereby contributing to inclusive and sustainable economic growth. However, many Indonesian institutions still lack a structured, data-driven mechanism to align students' personalities, interests, and competencies with suitable career pathways. This study addresses this gap by applying the K-means algorithm to analyze career preference patterns among 100 students at Dipa University of Makassar. In segmentation research, this algorithm is a preferred method due to its balance of simplicity and power, particularly in areas like customer profiling, career guidance, and educational analytics. Our data on the 100 students included demographic profiles, personality types (introvert, extrovert, ambivert), dominant interests (analytical, creative, interpersonal), and competencies (data science, programming, intelligent systems, graphic design). The analysis identified three distinct profiles: Cluster 0 namely The Balanced Adaptors, characterized by a balanced mix of personalities with versatile interests and moderate technical skills; Cluster 1 namely The Creative Communicators, predominantly introverted, with strong creative and interpersonal inclinations and proficiency in graphic-related skills; and Cluster 2 namely The Analytical Ambiverts, mainly ambiverted, exhibiting pronounced analytical and computational strengths. These findings underscore the potential of cluster-based analysis techniques for generating actionable student profiles, enabling institutions to design data-informed career guidance policies. The proposed approach offers a viable model for reducing the skills-industry mismatch and enhancing graduate employability within the Indonesian higher education context..

Keywords: skills-industry mismatch, data-driven mechanism, cluster-based technique, k-means algorithm.

Paper ID #292

Advancing Automatic Essay Scoring using Synonym-Aware Rabin-Karp Algorithm

Andharini Dwi Cahyani, Ari Basuki, Bain Khusnul Khotimah, Muhammad Yusuf, Ika Suzan Oktavianti, Fifin Ayu Mufarroha

ABSTRACT

This study aims to improve Automatic Essay Scoring (AES) accuracy by optimizing the Rabin-Karp algorithm with synonym recognition. AES systems play a critical role in education by providing fast and consistent feedback, yet they face persistent challenges in handling varied vocabulary, often misinterpreting correct concepts expressed with different wording. To address this limitation, the Rabin-Karp algorithm, which applies hashing for efficient text pattern matching, is extended with synonym recognition and systematic parameter tuning. Specifically, the effects of the k-gram value (k) and prime base (b) are analyzed to determine their impact on scoring accuracy. Evaluation using Mean Absolute Percentage Error (MAPE) demonstrates that smaller k-gram values, particularly k = 2, consistently deliver superior accuracy. In contrast, larger k-grams reduce reliability due to natural variations in student writing that limit exact sequence matches. The most accurate configurations were k = 2 and b = 7 without synonym recognition, and k = 2 and b = 13 with synonym recognition. These findings highlight the importance of incorporating synonym recognition into AES, as it enables systems to capture conceptual equivalence and provide fairer, more reliable assessments. The results contribute to advancing AES methodologies by demonstrating how algorithmic optimization can enhance semantic sensitivity in automated scoring..

Keywords: Natural Language Processing (NLP), Automatic Essay Scoring (AES), Rabin-Karp Algorithm, Synonym Recognition, Software Engineering.

Paper ID #295

Enhancing Operational Efficiency and Profitability in Poultry Farming Through IoT-Based Innovations

Isminarti, Alang Sunding, Irvawansyah, Riska Veronika, Muhammad Ali Chandra, Nur Azhary Iriawan Eka Putra

ABSTRACT

Poultry farming in developing regions faces persistent challenges related to feed efficiency, environmental control, and high mortality rates, particularly in open-house systems. This study proposes and evaluates an IoT-enabled closed-house poultry management system designed to optimize operational efficiency through automated feeding and real-time environmental monitoring. The experimental design compared two rearing systems: an IoT-assisted closed house with 4,000 broilers and a conventional open house with 2,500 broilers over a 6–7 week cycle. Performance was evaluated using FCR, MR, and FE. Results indicate that the closed-house system achieved superior outcomes, with a lower FCR (1.51 vs. 1.66) and reduced MR (4.8% vs. 10%), reflecting improved flock survival and resource utilization. Although FE appeared slightly higher in the open-house system (63%), this was largely influenced by higher mortality rather than true efficiency. The findings demonstrate that IoT-based automation enhances feed management consistency, reduces production risks, and supports the sustainability of poultry farming enterprises. These results underscore the potential of digital technologies to strengthen food security and profitability in the poultry sector..

Keywords: IoT, poultry farming, feed conversion ratio, mortality rate, feed efficiency, closed housing system.

Paper ID #302

Comparative Study of TF-IDF and Word Embedding in the Classification of Hoax Political News

Aprillia Dwi Dayani, Christofer Satria, Victoria Cynthia Rebecca, Anthony Anggrawan, Peter Wijaya Sugijanto, Hasbullah

ABSTRACT

Political hoaxes are a form of disinformation that contains government policies or strategies that have not been confirmed as accurate and often do not follow the facts, thus becoming a serious threat to the spread of information globally. The significant risk of spreading false information highlights the need for effective mitigation strategies, which include early detection and classification of news. Additionally, utilizing machine learning as a technological solution is crucial. This study aims to compare the performance of feature extraction from Term Frequency-Inverse Document Frequency (TF-IDF) and Word Embedding (Word2Vec) in classifying political hoax news. This research method employs three machine learning methods: Random Forest (RF), Naïve Bayes (NB), and Support Vector Machine (SVM). The follow-up process in this study aims to enhance the performance of the machine learning algorithm analysis used. The results of the study show that the TF-IDF provides a more stable and accurate classification performance than Word2Vec. The RF model utilizing TF-IDF achieves the highest accuracy of 99%, followed by NB at 98% and SVM at 96%. Meanwhile, Word2Vec also demonstrates high accuracy, with a rate of 94% in RF, and the lowest rates are 93% in SVM and NB. The conclusion of this study shows that TF-IDF has advantages in selecting relevant words with political themes when compared to the word embedding method..

Keywords: Hoax, TF-IDF, Word Embedding, Classification, Machine Learning, Feature Extraction.

Paper ID #303

Comparative Study of Machine Learning Algorithms for Sentiment Analysis on the Public Housing Savings Program

Christofer Satria, I Nyoman Yoga Sumadewa, Anthony Anggrawan, Baiq Elsa Virga Dewanti Destiana, Muhamad Azwar, Muhammad Maulana

ABSTRACT

The rapid growth of social media users has led to the emergence of various sentiments and opinions related to events, issues, and dilemmas that develop on the platform. In addition, social media has become the primary medium for people to express their opinions, one of which is through Twitter. Given that opinion data on social media can be processed into valuable information through sentiment analysis and data mining methods, this study mines Twitter data to identify and estimate the most dominant sentiments in tweets, including positive, negative, and neutral sentiments. The results of this study provide a solution for analyzing the sentiment of user opinions on Twitter related to the People's Housing Savings program. It is worth noting that sentiment analysis has recently garnered increasing attention from researchers. Therefore, this study aims to conduct sentiment analysis using the classification methods of Support Vector Machine (SVM), Random Forest (RF), eXtreme Gradient Boosting (XGBoost), and Naïve Bayes (NB). The results of the study show that the SVM method achieves the highest accuracy of 84%, followed by RF with 81% accuracy, XGBoost with 78% accuracy, and NB with 75% accuracy in classifying positive and negative sentiments, as well as neutral tweets on Twitter. Likewise, the precision, recall, and F1-score of SVM outperform RF and XGBoost..

Keywords: Sentiment Analysis, Data Mining, Random Forest, XGBoost, Naïve Bayes, Social Media.

Paper ID #311

Evaluating User Satisfaction in Online Balinese Script Handwritten Recognition Using EUCS and IPA Methods

Ni Putu Linda Santiari, I Putu Ramayasa, N.Dinda Maharani

ABSTRACT

Balinese script is a significant part of Indonesia's cultural heritage that faces the risk of declining use among younger generations. This study evaluates user satisfaction with an online handwritten recognition system designed for Balinese script learning, targeting elementary students in grades 3 to 6. A total of 82 respondents participated through questionnaires, direct system usage, observations, and short interviews. Two evaluation methods were applied: End-User Computing Satisfaction (EUCS) and Importance-Performance Analysis (IPA). Results show that the average satisfaction score using EUCS was 3.25 (satisfied), while IPA yielded a performance score of 3.33 (very satisfied). However, the IPA quadrant analysis revealed attributes requiring improvement, particularly feedback speed and recognition accuracy. These findings highlight the practical value of combining EUCS and IPA for evaluating child-centered cultural education systems. This research contributes methodologically to the evaluation of educational technologies and supports efforts to preserve Balinese script in the digital age. Future work should integrate adaptive recognition models and involve broader user groups to strengthen system effectiveness. .

Keywords: Balinese script, user satisfaction, handwritten recognition, EUCS, IPA, elementary school students.

Paper ID #314

Simulation of Anti-Aging Skincare Effects on Facial Images Using Pix2Pix and Generative Adversarial Networks

Indriyani, Paula Dewanti

ABSTRACT

This research proposes a system to simulate anti-aging skincare effects on facial images using a Generative Adversarial Network (GAN). The model is based on the Pix2Pix architecture, enhanced with VGG Perceptual Loss, and trained on a paired dataset of 200 before-and-after skincare facial images. A U-Net generator and a PatchGAN discriminator were employed, optimized with a composite loss combining GAN Loss, L1 Loss, and VGG Perceptual Loss. The system achieved strong quantitative results, with an average PSNR of 32.65 dB and SSIM of 0.936, reflecting high image quality and structural similarity. Qualitative results showed realistic skincare transformations, smoother skin, reduced pores, and even tone while preserving individual identity, making the system practical for cosmetic product visualization and dermatological applications..

Keywords: Skincare Simulation, Pix2Pix, Generative Adversarial Network (GAN), PatchGAN, Anti-Aging, Facial Images.

Paper ID #323

XGBoost vs. LSTM: A Comparative Performance Analysis for Global Stock Market Prediction

Krisna Adiyarta M., Bambang Adiwinoto, Tri Sugihartono, Marini, Rahmat Sulaiman, Hidayat Febriansyah

ABSTRACT

This study evaluates XGBoost and LSTM for stock price prediction using ten years of data from Tesla (TSLA) and Alibaba (BABA). We find that model performance depends on stock volatility and market behavior. For Tesla, a high-volatility stock (standard deviation: 106.44; average annual return: 58.54%), LSTM achieved higher accuracy (R^2: 0.9728, MAPE: 2.93%) than XGBoost (R^2: 0.8948, MAPE: 4.65%). In contrast, for the more stable Alibaba (standard deviation: 57.22; annual return: 6.67%), XGBoost performed best (R^2: 0.9877, MAPE: 3.21), outperforming LSTM (R^2: 0.7592, MAPE: 19.27). Our results indicate that LSTM is better suited for volatile, momentum-driven assets, while XGBoost excels with stable, less noisy time series. These findings offer practical guidance for selecting machine learning models in stock forecasting based on asset characteristics..

Keywords: Machine Learning; Stock Prediction; XGBoost; LSTM; Global Financial Markets.

Paper ID #328

Utilizing the C4.5 Algorithm to Evaluate Public Satisfaction for Village Administration System using Client-Server Based

Goenawan Brotosaputro, Rahmat Sulaiman, Tri Sugihartono, Bambang Adiwinoto, Agustina Mardeka Raya

ABSTRACT

This study applies the C4.5 Algorithm in deciding public satisfaction with the services received at the Village Office. The C4.5 Algorithm is a classification algorithm with a well-known decision tree technique and is favored because it has advantages. These advantages include being able to process numeric and discrete data, being able to handle missing attribute values, producing rules that are easy to interpret and the fastest. This type of research is classification with the concept of data mining involving 20 community questionnaire data at the Village Office which are categorized as: cheap, expensive, appropriate, inappropriate, fast, long, comfortable, uncomfortable. There are four attributes that affect public satisfaction, including: handling costs, service procedures, handling time and comfort. From the results of the research that has been conducted by the researcher, it can be concluded. Service satisfaction at the Office can be predicted and evaluated by utilizing data mining techniques using the C4.5 Algorithm to predict public satisfaction with services at the Village Office. the results of this study are that there is an increased level of accuracy from before. The results demonstrate that the C4.5 algorithm is effective in identifying critical attributes that impact satisfaction, thereby providing actionable insights for improving public service delivery at the village level..

Keywords: C4.5, Data Mining, Customer Satisfaction, Administration System, Client-Server.

Paper ID #332

Accuracy and Performance Evaluation of Machine Learning Algorithms for Used Car Price Prediction

Nello Aurelius, I Yajamana, Hafizh Shiddiqi, Sonya Manalu

ABSTRACT

The prediction of used car prices is a complex problem that involves numerous variables, such as car specifications, mileage, brand, model, and market conditions. This research explores the application of machine learning algorithms for predicting the prices of second hand cars. Various machine learning techniques, including Linear Regression, Random Forest Regressor, Gradient Boosting Regressor, and XGBoost Regressor, were evaluated on a dataset containing features like car model, year, fuel type, transmission type, and mileage. The models were trained on a training set and tested using a separate test set, with performance measured using critical metrics such as R^2, MSE, RMSE, and MAE. The results showed that Random Forest outperformed the other models, achieving the highest R^2 score of 0.77, the lowest MSE of 54,236,000,169.42, the lowest RMSE of 232,886, and the lowest MAE of 131,495. XGBoost also performed well, with an R^2 of 0.75, MSE of 58,266,300,612.67, and RMSE of 241,384, though slightly behind Random Forest. Linear Regression was found to be the least effective, showing large prediction errors with an R^2 of 0.35 and the highest MAE of 229,020. The research demonstrates the utility of ensemble methods, particularly Random Forest and XGBoost, for accurate predictions in complex tasks such as used car price estimation..

Keywords: Machine Learning, Random Forest, XGBoost, Linear Regression, R^2, MSE, RMSE, MAE, Prediction Accuracy, Used Car Price Prediction.

Paper ID #335

Analysing How User Knowledge and Behaviour Correlate with Personal Data Security Risks in the Use of Meta AI Chatbots on WhatsApp

Jordi Austin Iskandar, Marco Rava Irawan, Sonya Rapinta Manalu, Hafizh Ash Shiddiqi

ABSTRACT

The rapid integration of artificial intelligence (AI) into messaging platforms like WhatsApp has brought both convenience and new challenges, particularly concerning user data privacy and security. This study investigates the relationship between user knowledge, user behaviour, and the perceived risk of personal data security when using Meta AI chatbots on WhatsApp. Using a quantitative research method, data were collected through an online survey involving 101 respondents aged 18–35 who had interacted with Meta AI. Descriptive statistics showed that participants reported moderate levels of knowledge (M = 2.5861, SD = 0.53982), behaviour (M = .6713, SD = 0.42103), and perceived risk (M = 3.2713, SD = 0.44144). Kendall's tau-b correlation analysis revealed weak and statistically insignificant relationships between the variables: the correlation between user knowledge and perceived risk was $\tau = -0.036$ ($p = 0.630$), while the correlation between user behaviour and perceived risk was $\tau = 0.115$ ($p = 0.130$). Additionally, user knowledge and behaviour were only weakly correlated, with $\tau = -0.027$ ($p = 0.717$). These findings suggest that neither knowledge nor behaviour significantly affect perceived data security risk, implying that other psychological or contextual factors may play a more substantial role in shaping user perceptions. The study underscores the complexity of data security concerns in AI- driven interactions and calls for more comprehensive approaches to understanding risk perception in digital environments..

Keywords: Meta AI chatbot, WhatsApp, user knowledge, user behavior, data security, perceived privacy risk.

Paper ID #336

Comparison Between Support Vector Machine, Naïve Bayes, and Long Short-Term Memory Methods on Sentiment Analysis Performance

Lilik Widyawati, Christofer Satria, Aprillia Dwi Dayani, Anthony Anggrawan, Heroe Santoso, Rini Anggriani

ABSTRACT

The importance of sentiment analysis has been widely recognized. Sentiment analysis is effective in evaluating public opinion for decision-making. Sentiment analysis is constructive in extracting opinions and classifying sentiments to determine their polarity. Therefore, sentiment analysis has received considerable research attention from scholars to analyze various news and public information, categorizing it as positive, neutral, or negative. Additionally, research on various sentiment analyses using different technical methods and approaches has become a recent focus of study. That is the reason why this study aims to conduct sentiment analysis and research it using more than one method. This study compares the performance of three sentiment analysis machine learning algorithms: Support Vector Machine (SVM), Naïve Bayes (NB), and Long Short-Term Memory (LSTM). The study results show that SVM achieves the best performance, with an accuracy of 83.60%, an F1-score of 89%, and a recall of 95%. Naïve Bayes follows with an accuracy of 81.20%, precision of 77%, recall of 100%, and F1-score of 87%. LSTM records an accuracy of 81.40%, precision of 87%, recall of 90%, and F1-score of 83%. .

Keywords: Sentiment Analysis, Naïve Bayes, SVM, LSTM, Machine Learning.

Paper ID #339

IoT-Based Air Quality Monitoring System Using Tsukamoto Fuzzy Logic

Christopher Michael Lauw, Dadang Priyanto, Husain, I Made Yadi Dharma, Muhamad Wisnu Alfiansyah

ABSTRACT

Abstract— Air quality control systems are essential for addressing pollution issues in Indonesia, a country facing significant air quality challenges due to rapid urbanization and industrialization. Over a 30-day testing period, the system successfully transmitted 98.7% of 43,200 data packets to a MySQL server via HTTP protocols with an average transmission delay of 2.3 seconds. The Tsukamoto fuzzy inference engine achieved 94.2% accuracy when validated against standard air quality measurements, processing environmental parameters with a response time of 150ms. This research proposes the design and development of an Internet of Things (IoT)-based air quality monitoring system using Tsukamoto Fuzzy Logic to provide realtime air quality assessments. The system employs DHT11 sensors to measure temperature and humidity, and MQ135 sensors to detect gas and smoke levels, with data processing conducted on an ESP32 microcontroller. The processed data is transmitted via HTTP protocols to a MySQL server for storage and further analysis. This prototype includes a web-based dashboard that visualizes air quality data through graphs and logs, enabling users to monitor environmental conditions effectively. The integration of Tsukamoto Fuzzy Logic ensures accurate categorization of air quality into good or poor conditions. The system provides actionable insights for government interventions and promotes public awareness to mitigate the adverse health effects of air pollution. This work contributes to smart city initiatives by offering a scalable, real-time solution for air quality control, enhancing urban livability and sustainability..

Keywords: Keywords—Air Quality, Tsukamoto Fuzzy Logic, IoT, Embedded Systems, Real-Time Data.

Paper ID #340

Comparative Accuracy Of Prediction Classification Using Supervised Machine Learning

Goenawan Brotosaputro, Ellya Helmud, Rahmat Sulaiman

ABSTRACT

Machine learning is one part of Artificial Intelligent that gives systems the ability to learn from data and experience, as well as make predictions or decisions without needing to be explicitly programmed supervised learning is also one approach in machine learning where algorithms are taught trained using data that has been labeled. The main purpose of classification is to recognize patterns or relationships in data so that the model can provide accurate predictions for new data that has never been seen before. From several models formed from the supervised learning classification model, researchers will compare datasets from Indian employees taken from public datasets to obtain the most accurate level of accuracy from several models formed. The results of testing machine learning methods showed an accuracy rate for neural networks of 61.36%, logistic regression of 65.12%, SVC of 61.36%, gradient boosting classifier of 79.59%, extra trees classifier of 72.36%, bagging classifier of 74.38%, Boost classifier of 75.40%, gaussian NB of 64.25% MLP classifier of 49.06%, XGB classifier of 74.67%, LGBM Classifier classifier of 77.86%, K nearest neighbor classifier of 69.32%, Decison Tree Classifier is 70.48%, Random Forest Classifier is 72.94%. From 14 supervised machine learning models, it can be concluded that the ensemble learning algorithm has the highest accuracy rate of 79.59%.

Keywords: Artificial Intelligence, Machine Learning, Supervised Learning, Comparison, Accuracy.

Paper ID #341

Student Academic Status Classification using Neural Network and Interpretable LIME Based Approach

Immnuela Puspasari Saputro, Yaya Heriyadi, Ilvico Sonata, Abba Suganda Girsang, Lili Ayu Wulandhari

ABSTRACT

Graduating students on time is still challenging for several countries' higher education institutions. After the pandemic, the increase in graduate competency standards is one of the challenges that affects the potential of students in completing their studies or not. Although some studies have shown that some institutions already have a student status prediction system, there is still little explanation for what significant factors affect student status so that appropriate intervention actions can be taken to help reduce the rate of potential dropout students and increase the potential of enrolled students. This study aims to create a model that can classify student status in three classes, namely Dropout, Enrolled, and Graduate, using Artificial Neural Network (ANN) based on supervised learning. To improve the model's performance, hyperparameter tuning is required using grid search. After tuning, the model achieved accuracy in the test data of 74.6% and showed a balanced F1-score across all classification classes with an increase in the Enrolled minority class, which had a slight data spread compared to the Graduate class. To increase transparency, the model results were interpreted using the Local Interpretable Model-Agnostic Explanations (LIME) technique. LIME identified important features such as course participation in the first semester, number of approved credits, and academic involvement as significant contributors to classification results. This approach supports more equitable classification and allows for data-driven decision-making in higher education settings..

Keywords: Academic, status, classification, Neural Network, LIME.

Paper ID #344

Hybrid Fuzzy-RL Framework for Intelligent Customer Targeting in E-Commerce

Darwin Tandi, Rashawn Yashadhana, Jason Loren, Azani Cempaka Sari

ABSTRACT

Understanding and predicting customer behavior is essential for developing effective personalized marketing strategies in the digital economy. However, traditional segmentation techniques such as k-means or rule-based models struggle to handle the ambiguity and evolving nature of real-world customer data. This paper presents a hybrid framework that integrates Fuzzy C-Means (FCM) clustering with Weighted Interval-Valued Dual Hesitant Fuzzy Sets (WIVDHFS) and Deep Q-Network (DQN)-based reinforcement learning to enable adaptive and interpretable customer targeting. Using a cleaned version of the publicly available Online Retail dataset from the UCI Machine Learning Repository, customers are segmented via a weighted RFM (Recency, Frequency, Monetary) model, and a hesitancy score is derived from fuzzy membership uncertainty. These segments inform a reinforcement learning agent that selects optimal marketing actions—such as discounts, cross-selling, waiting, or reordering—based on customer state and context in a simulated environment. Experimental results show that fuzzy clustering achieved a Fuzzy Partition Coefficient (FPC) of 0.6423, indicating robust segmentation with moderate overlap. Among nine reinforcement learning models tested, those prioritizing inventory efficiency (w_2 = 0.7) achieved the highest average reward of 73.0, consistently favoring a waiting strategy. This outcome highlights the framework's ability to generate strategic, context-aware marketing decisions based on revenue and inventory which demonstrates a path toward intelligent marketing automation. The main limitation of this work is that it has only been validated in a simulated setting, and results may differ in real-world deployment..

Keywords: Customer segmentation, fuzzy clustering, reinforcement learning, RFM model, marketing strategy, machine learning, WIVDHFS.

Paper ID #359

Predicting Water Levels for Flood Early Warning in Jakarta Using LSTM and Transformer-Based Models

Jovian Hizkia, Marcellino Bonamutial, Abram Prabowo

ABSTRACT

There are many ways to predict floods, such as conventional methods and methods that used recent technology in the form of machine learning or deep learning. Using recent technology, floods in an area can be predicted using local climate data and nearby water levels. The purpose of this research is to predict the water levels of several flood gate locations using various models and also to find the best performing model for each flood gate location based on performance metrics. The models used are various models of long short-term memory (LSTM), transformer, and combination of the two. The result shows various suitable models from three flood gate locations in Karet, Marina Ancol, and Pasar Ikan. The best performing models are determined based on the results, with transformer-BiLSTM for Karet datasets, BiLSTM for Marina Ancol datasets, and LSTM for Pasar Ikan datasets. The best model of all is BiLSTM which is taken from Marina Ancol..

Keywords: flood prediction, lstm, bilstm, transformer.

Paper ID #366

Automated Scrap Metal Sorting System Using Magnetic, Resistive, and Visual Features

Joseph A. Escuro II, Kyla Nicole G. Cruz, Charmaine C. Paglinawan

ABSTRACT

This study presents the development of an AI-assisted scrap metal classification and sorting system designed for small-scale junk shop applications. Focusing on aluminum, copper, and steel, the system integrates a convolutional neural network with visual, magnetic, and resistive sensing to achieve automated material identification. A two-level prototype featuring a conveyor and servo-based sorting mechanism was built to demonstrate full operation. The classification model achieved 96.77% accuracy, while the sorting system maintained an average accuracy of 93.55%. Errors were minimal and primarily due to misclassification, sensor delays, or mechanical handling issues. The results highlight the system's potential to improve recycling efficiency and support a more consistent valuation of scrap materials in resource-constrained settings..

Keywords: scrap metals, automated waste sorting, convolutional neural networks, recycling systems, junk shop automation.

Paper ID #373

Implementation of Load Balancing on a Quiz Web Application Using the Least Connection Algorithm with Reverse Proxy Technique

Danang Haryo Sulaksono, Citra Nurina Prabiantissa, Rinci Kembang Hapsari, Latiful Sirri, Djuniharto, Dwi Yulian R.L

ABSTRACT

The growing demand for scalable web-based applications requires efficient load balancing to sustain performance under varying traffic loads. This study using the Least Connection algorithms implemented via Nginx reverse proxy in a networked quiz application used for Jaringan Komputer laboratory sessions at ITATS. The system architecture comprised one reverse proxy server and two backend servers, with Apache JMeter simulating 100, 300, and 600 HTTP requests per second, each repeated three times. Key metrics—average response time, throughput, CPU and memory usage, bandwidth, and error rate—were monitored using Nginx-UI. For Testing we compare the Least Connection And Round Robin Algorithm, and results show Least Connection consistently achieved lower response times (1,100 ms, 3,335 ms, 6,333 ms) and higher throughput (40.5, 43.5, 46.0 req/s) than Round Robin, but required more CPU resources. Round Robin maintained lower CPU usage and slightly higher inbound bandwidth. The novelty lies in a real-world, metric-based comparison within an educational environment, offering practical insights for algorithm selection based on performance or resource efficiency..

Keywords: Load Balancing, Least Connection, System Availability.

Paper ID #385

Generative AI-Based Verilog Generation for Scalable ALU Architectures in FPGA Prototyping

Robby Kurniawan Harahap, Antonius Irianto Sukowati, Dyah Nurainingsih, Widyastuti Widyastuti, Raden Ayu Sekar Ciptaning Anindya, Erfiana Wahyuningsih

ABSTRACT

The increasing complexity of digital systems demands accessible and efficient hardware design workflows. This paper investigates the feasibility of using generative AI—specifically ChatGPT-4 to produce synthesizable Verilog HDL for Arithmetic Logic Unit (ALU) modules based solely on natural language prompts. A lightweight methodology called Prompt2HDL is proposed, enabling the automatic generation of Verilog modules and testbenches for 4-, 8-, and 16-bit ALUs without manual coding or fine-tuning. Functional correctness is verified through simulation, and synthesis on an Artix- 7 (XC7A100T-1CSG324C) FPGA confirms structural validity. Simulation waveforms validate logical behavior across all selector inputs, while synthesis results demonstrate scalable hardware metrics: LUT usage grows from 7 to 66, IOBs from 14 to 51, and total power from 2.1 W to 8.8 W. All modules are synthesized without structural errors. These findings confirm that large language models can reliably produce combinational logic circuits that are simulation-valid and synthesis-ready. While this study focuses on synchronous, combinational logic, the results establish a practical foundation for prompt-driven hardware prototyping and AI-assisted design education..

Keywords: Generative AI, Verilog HDL, Arithmetic Logic Unit (ALU), FPGA synthesis, RTL simulation, prompt engineering, digital design automation..

Paper ID #389

Comparative analysis of transformer-based models for hate speech detection

James Alvin Dhanardi, Fredy Purnomo, Anang Prasetyo

ABSTRACT

This study presented a comparative analysis of transformer-based models for hate speech detection, evaluating BERT, RoBERTa, DistilBERT, XLNet, and DeBERTa across performance, fairness, and computational efficiency. HateXplain dataset is used to conduct both three-class (hate speech, of- fensive, normal) and binary (toxic vs. non-toxic) classification tasks. The results showed that DeBERTa performed best in fine-grained classification, while BERT achieved superior perfor- mance in binary classification and fairness. DistilBERT offered competitive accuracy with notable efficiency advantages. The findings also highlight visible performance disparities across certain demographic groups, namely Asian, Caucasian, and Refugee, emphasizing the challenges of building unbiased con- tent moderation systems..

Keywords: hate speech detection, transformers, bias and fairness, computational efficiency, content moderation, natural language processing.

Paper ID #395

Development of an Affordable Bionic Prosthetic Arm with Mechanical Sensors for Amputee Patients : Preliminary Study

Laily Asna Safira, Evi Triandini, Djoko Kuswanto, Faizal Rezky Dhafin

ABSTRACT

Upper-arm amputee patients often experience a reduced quality of life (QoL) due to the loss of limbs that are essential for daily activities. Assistive devices such as prosthetic arms are sometimes prescribed based on medical recommendations. This study presents the design and development of a bionic prosthetic arm using a 3D modelling and fabrication approach to produce an affordable and precise structural frame. Mechatronics design and a closed-loop control algorithm were implemented to achieve effective grasping and releasing hand movements. Utilizing FSR402 as the mechanical sensor provides flexibility for integration with the prosthetic arm, is cost-effective, and allows for easier data processing compared to using Electromyography (EMG) signals to control the prosthetic. Additionally, a user interface was developed as an independent calibration tool, enabling patients to adapt the prosthetic to changes in motor function and sensor response during use. For this preliminary study, performance testing was done without the real patient subject, with the success rate reaching 88%, and the gap error still having the potential to improve. .

Keywords: Prosthetic design, Bionic arm, Amputee patient, Low cost, Mechanical sensor .

Paper ID #396

Hamming Distance Optimization for 16-QAM Symbol Labeling Using GA and SA Algorithms

Limbran Sampebatu, Andani Achmad, Intan Sari Areni

ABSTRACT

Symbol labeling optimization in modulation is essential for improving Bit Error Rate (BER) in wireless communication systems, particularly under noise and fading. This study investigates 16-QAM symbol labeling using Genetic Algorithms (GA) and Simulated Annealing (SA), focusing on logical-layer optimization of bit-to-symbol mapping on a fixed constellation, thereby enhancing performance without altering hardware. The optimization objective is to minimize the average Hamming distance (HD) between adjacent symbols to reduce BER in Rayleigh fading channels. Simulation results show that GA achieves an average HD of 1.167, compared to 1.33 for Natural, 1.7 for SA, 2.16 for Random, and 1.00 for Gray mapping achieved. At a BER level of 10-2, Gray reaches this target at approximately 23 dB, GA requires 0.5–1 dB more, SA and Natural require about 2 dB more, and Random is nearly 3 dB worse. These findings confirm that GA and SA provide measurable BER gains over Natural and Random, while closely approaching Gray performance. Overall, this work serves as a proof-of-concept validation of logical-layer mapping optimization as a low-complexity, hardware-compatible enhancement for future 5G/6G systems..

Keywords: 16-QAM Modulation, Bit-to-Symbol Mapping, GA, BER, Hamming Distance Optimization.

Paper ID #404

CNN-BoostForest: A Synergistic Approach for Pneumonia Detection

Jazzlyn Amelia Lim, Cindy Noveiren, Meiliana Meiliana, Mohammad Faisal Riftiarrasyid

ABSTRACT

Pneumonia remains a serious global health issue, claiming millions of lives each year. Accurate interpretation of chest X-rays is crucial for effective recovery. In previous research, Convolutional Neural Networks (CNNs) have been the most widely used algorithms for clinical image analysis. Most studies employ CNNs either as end-to-end models or in hybrid approach with an ensemble method, such as bagging or boosting. The BoostForest algorithm, introduced by Zhao et al., integrates both bagging and boosting techniques in parallel and has demonstrated strong results in other fields. However, it has not yet been applied to real-world cases, specifically in medical imaging. In this study, we aim to explore CNN-BoostForest, a method that utilizes DenseNet201 for feature extraction and BoostForest for classification. Its performance was evaluated against end-to-end CNN and four other CNN-based hybrid classifiers: Random Forest, Extra Trees, XGBoost, and LightGBM. CNN-BoostForest achieved an accuracy of 93.95%, precision of 94.03%, recall of 93.95%, F1-score of 93.95%, and an AUC of 0.97—outperformed other classification models. CNN-BoostForest shows strong potential for pneumonia detection from chest X-ray images, despite high computational costs due to the predictive stability. By optimization of computation time, CNN-Boostforest could become a practical choice for real-world clinical applications..

Keywords: Pneumonia Detection, Hybrid Models, Ensemble Learning, Bagging, Boosting, BoostTree, BoostForest, Convolutional Neural Network, Chest X-ray.

Paper ID #405

Coffee Bean Quality Classification Using the Variational Autoencoder and Support Vector Machine Algorithms

Marsellus Oton Kadang, Indrabayu, Syafruddin Syarif

ABSTRACT

The conventional process for sorting coffee bean quality on a large scale in the downstream coffee industry is still prone to human error, labour-intensive, and time-consuming. This research utilises autoencoder and support vector machine (SVM) techniques to develop a coffee bean quality classification model with four categories: ripe, unripe, non-coffee, and damaged beans. Additionally, this study aims to evaluate the model's performance using F1 score metrics, confusion matrix analysis, and k-fold cross-validation. A total of 1,000 image samples were used and evenly distributed into four classes. This was then further divided into a training subset of 70%, a validation subset of 20%, and a testing subset of 10%. The proposed model achieved a classification accuracy of 96%, demonstrating a high level of reliability. Additionally, the weighted average F1 score of 0.961 indicates a strong balance between precision and recall values across all classes. VAE + SVM outperformed the baseline CNN in classifying coffee bean quality, increasing accuracy by 3% from 93% to 96%. These results confirm the model's ability to effectively predict coffee bean quality and highlight its potential as a robust solution for automating the sorting process in real-world coffee..

Keywords: classification, coffee bean quality, autoencoder, SVM, confusion matrix..

Paper ID #418

AI Model Comparison for Early Skin Cancer Detection Using Mobile Images

Christian Ikajaya, Farhandy Ramadhan, Edy Irwansyah

ABSTRACT

One of the leading cancer types worldwide is skin cancer. Its primary cause stems from prolonged ultraviolet light exposure which leads to DNA damage in skin cells and subsequent mutation risks. Basal cell carcinoma and squamous cell carcinoma represent two common skin cancer types which become treatable when detected early but melanoma stands as the deadliest form. Skin cancer detection at an early stage plays a crucial role because it leads to better treatment outcomes and minimizes the chance of enduring complications. The availability of diagnostic equipment remains restricted primarily to urban areas and resource-rich locations. This study examines how artificial intelligence through mobile phone applications functions as a tool to detect skin cancer at its early stages. The research evaluates the performance of YOLOv11 and MobileNetV3 and EfficientNetB0 and ResNet50 deep learning models for identifying malignant lesions from dermatoscopic images to create a fast and accessible and accurate skin cancer screening system..

Keywords: Skin Cancer, Early Detection, Artificial Intelligence, Deep Learning, YOLOv11, Mobile Application, Dermatoscopic Images.

Paper ID #419

AI vs. Rule-Based Approaches in Time-Series Anomaly Detection

Ferlie Hernata, Matthew Ethan Laurent, Sonya Rapinta Manalu, Hafizh Ash Shiddiqi

ABSTRACT

Real-time anomaly detection in time-series data is crucial for a wide range of applications, from Internet of Things (IoT) networks to financial regulation, where data quality has an immediate impact on decision-making. Timeseries data structures often carry missing values, outliers, and irregular patterns, thus complicating the process of anomaly detection. This research aims to perform a comparative analysis of the performance of rule-based approaches and artificial intelligence methods—Random Forest and LSTM Autoencoders—on detecting and correcting anomalies in largescale, real-time sensor datasets. Based on the Intel Lab Sensor Dataset, comprising more than 2.3 million records, we compare detection performance (Precision, Recall, F1-score), correction performance (MAE, RMSE), and computational performance (execution time). The rule-based approach demonstrated perfect detection scores with minimal processing time (0.36 seconds) but lacked adaptability. The Random Forest algorithm approximated the labels derived from the rule-based method with high precision; however, it demonstrated signs of overfitting. The LSTM Autoencoder demonstrated excellent reconstruction performance (MAE = 0.074568, RMSE = 0.114595) but did not detect most of the anomalies due to its low recall (0.02). These results highlight the intrinsic trade-off between speed, interpretability, and adaptability. While rulebased approaches are defined by their efficiency and interpretability, AI-based models offer superior flexibility but require more computational power. The findings suggest that hybrid models, combining both approaches, can represent an optimal solution for scalable and accurate real-time anomaly detection in dynamic environments..

Keywords: Anomaly Detection, Time-Series Data, Rule-Based, LSTM Autoencoder, Random Forest, Real-Time.

Paper ID #433

The Impact of Rule-Based Opinion Extraction on Sentiment Classification Using Support Vector Machine (SVM)

Fika Hastarita Rachman, Ika Oktavia Suzanti, Imamah, Firdaus Solihin, Salmatul Farida, Nenden Siti Fatonah

ABSTRACT

E-health is continually evolving to keep pace with today's technology and is supported by the availability of E-money that provides non-cash transactions. Both of these technologies help people live a cashless and simple life. One of the most used E-money platforms in Indonesia is Dana. Dana has service advantages and has been downloaded as many as 100 million times on the Google Play Store. To improve service and user trust, it is necessary to evaluate the reviews provided. However, the reviews contain positive and negative opinions, and it takes time to read them manually. We employed a support vector machine to classify sentiment analysis and a rule-based approach for opinion extraction to address this issue. The data used consists of 500 user reviews from the Google Play Store. There were 1683 rules and 899 opinions in the extraction process. The results showed that the opinion extraction before classified sentiment analysis using a Support Vector Machine (SVM) could increase the accuracy to 92.61%..

Keywords: E-health, E-Money, Text Mining, Opinion Extraction, Sentiment Analysis, Natural Language Processing, SVM.

Paper ID #438

PNEUMONIA CLASSIFICATION AND DETECTION FROM CHEST X-RAY IMAGES USING TRANSFER LEARNING

Kevin Benedict Lolong, Puti Andam Suri

ABSTRACT

Pneumonia is a significant global health concern, especially in developing countries where timely diagnosis is critical. This research proposes a deep learning based solution for automatic pneumonia classification using chest X-ray images. An ensemble model combining EfficientNetV2B2 and ResNet50 architectures was developed, leveraging transfer learning to improve performance on a three-class classification task: Normal, Pneumonia-Bacterial, and Pneumonia-Viral. preprocessing pipeline included image resizing, categorical label encoding, and efficient batching. The model was trained in two stages: initial training with frozen layers followed by fine-tuning. Evaluation metrics such as accuracy, precision, recall, and F1-score were employed, along with confusion matrix analysis and classification reports. The final ensemble model achieved an outstanding accuracy of 97%, surpassing several recent transfer learning benchmarks in pneumonia detection. These results highlight the potential of ensemble deep learning architectures in supporting clinical diagnostics and improving medical image analysis. .

Keywords: Pneumonia, Transfer Learning, Ensemble Learning, EfficientNetV2, ResNet.

Paper ID #446

Time Series Prediction Of Martapura River Water Level Utilising Ensemble Stacked LSTM, BPNN, Random Forest And XGBoost

Jehan Aprillia Rahma, Silvia Ratna, M. Muflih, Muhammad Amin, Desy Ika Puspitasari, Haldi Budiman

ABSTRACT

In this paper, the performance of four of the machine learning algorithms Long Short-Term Memory (LSTM), Backpropagation Neural Network (BPNN), Random Forest, as well as Extreme Gradient Boosting (XGBoost) are assessed and compared in time series prediction, using univariate hourly time series data to predict the water level of the Martapura River. This attention has not been well researched in hydrological predictions, especially in the flood disaster region like South Kalimantan, Indonesia. The data set includes hourly water level values over a specific period. It has been preprocessed to handle missing values, normalise the data, and create a sliding window. The models were evaluated using the mean absolute error (MAE), root mean squared error (RMSE), and mean squared error (MSE). The experimental outcomes reveal that the stacking ensemble model, which combines the strengths of all base models, outperformed others in all three data split cases, achieving the best accuracy. In the Pipeline 3 (90:10 split), the stacking model recorded an MSE of 0.00001, RMSE of 0.00259 and MAE of 0.00159. On this basis, the current study shows that the utilisation of a stacking ensemble as a means to predict the water level of the Martapura River is a novel yet effective method, not only capable of capturing the temporal trend but also showing great potential in being applied as a real-time flood early warning mechanism in similar systems. The method can make a sizeable contribution to the enhancement of the reliability of predictions and facilitation of flood risk mitigation in the area..

Keywords: Water Level Prediction, Stacking Model, Time Series, Machine Learning, Martapura River.

Paper ID #451

Predictive Framework for Adaptive Learning: Integrating Clickstream Analytics and Assessment Outcomes in LMS

Akbar Zaidan Rohman, Hasyid Fitra Hasaini, Reina Setiawan, Reinert Yosua Rumagit

ABSTRACT

This research presents a predictive framework for adaptive learning that leverages both clickstream interactions and assessment records from the Open University Learning Analytics dataset. The framework combines behavioral engagement patterns with academic performance to detect students at risk and to design personalized learning pathways. Through clustering, three distinct learner groups were identified, representing low-engagement participants, moderately active learners, and highly engaged students with consistent submission habits. For predictive modeling, Decision Tree, Random Forest, and XGBoost were employed, with Random Forest delivering the most reliable results, achieving 91% accuracy, an F1-score of 0.69, and a ROC-AUC of 0.97. The analysis of feature importance revealed that overall click frequency and daily average clicks were the most influential indicators of persistence, followed by the number of active days and timely submissions. Based on these insights, the framework suggests differentiated interventions: standard content delivery for low-risk students, enrichment resources for medium-risk learners, and remedial modules with close monitoring for those at high risk. The study highlights that integrating behavioral and academic data can effectively enable early detection of struggling learners and facilitate the development of adaptive e-learning environments that provide targeted, data-informed support..

Keywords: Clickstream data, Learning analytics, Personalized learning, Predictive modeling, Student engagement.

Paper ID #452

A Hybrid Rule-Based and Natural Language Processing Framework for Real-Time TAF Verification at Tropical Airports

Evi Triandini, Putu Adi Guna Permana, Ricky Aureliuz Nurtanto Diaz, Agus Yarcana, Djoko Kuswanto, Yuri Pamungkas, Komang Yuli Santika

ABSTRACT

Accurate Terminal Aerodrome Forecasts (TAF) are crucial for aviation safety in tropical regions where weather conditions exhibit high variability. This research developed an automated TAF verification system for I Gusti Ngurah Rai International Airport using an agile Scrum methodology to ensure iterative development and continuous improvement. The system combines rule-based parsing compliant with International Civil Aviation Organization (ICAO) standards and Natural Language Processing (NLP) techniques to handle both structured and unstructured meteorological data. The development process employed Scrum framework with two-week sprints, incorporating daily stand-ups, sprint planning, and retrospectives to optimize system performance. Key features include real-time validation, discrepancy detection within ±30-minute windows, and automated report generation, implemented through a Laravel-ReactJS architecture. Operational trials demonstrated 92% forecast accuracy against Meteorological Aerodrome Reports (METAR), 60% reduction in manual verification effort, and 85% success rate in processing non-standard weather descriptions. Future work will expand the NLP training dataset for rare weather phenomena and integrate machine learning techniques. This study contributes a robust framework for tropical aviation weather verification, validated through agile development practices, offering significant improvements in forecast reliability and operational efficiency for meteorological services worldwide.

Keywords: TAF verification, scrum methodology, rule-based system, natural language processing, aviation meteorology, tropical weather.

Paper ID #454

Modelling Heart Disease Risk: A Binary Probit and Logistic Regression Approach

Felix Gasper, Margaretha Ohyver, Jurike V. Moniaga

ABSTRACT

This Cardiovascular disease remains to be the leading global cause of mortality, influenced by various related risk factors. This research analyzes binary logistic and binary probit regression models to identify and quantify primary risk factors of heart disease utilizing a publicly available dataset. Following the cleaning and management of outliers, both full and reduced datasets were evaluated. The evaluation of model performance was conducted using accuracy, apparent error rate (APER), true positive rate (TPR), McFadden's pseudo-R^2, and area under the ROC curve (AUC). The results indicate improved predictive performance across all models (accuracy = 87–89%, AUC ≈ 0.94), with the full-sample logistic model with the highest accuracy (88.9%) and the cleaned-data logistic model showing the optimal fit (pseudo-R^2 ≈ 0.57, AUC ≈ 0.945). Sex, chest pain type, number of vessels fluoroscopy, and thallium scan results appeared as the most significant predictors in all models; cholesterol and ST-segment depression displayed moderate impacts following the removal of outliers. These findings endorse a straightforward, comprehensible risk-scoring methodology for the early detection of heart disease and guide the selection between logistic and probit connections in medical predictive contexts..

Keywords: Binary Logistic Regression, Heart Disease, Probit Regression.

Paper ID #479

Emotion Classification on Customer Reviews of Drinking Water Services Using IndoBERT and Machine Learning Algorithms

I Nyoman Yoga Sumadewa, Anthony Anggrawan, Hairani Hairani, I Putu Hariyadi, Christofer Satria, Dian Syafitri Chani Saputri

ABSTRACT

Improving service quality has become a major focus for public service providers, including in the drinking water sector. Customer reviews reflect both satisfaction and direct experiences. This study aims to detect emotions in customer reviews using the IndoBERT model and compare its performance with other machine learning algorithms, such as Logistic Regression, Support Vector Machine (SVM), and Random Forest. The study follows an experimental method by applying different models to a dataset of customer reviews to evaluate and compare their performance in emotion classification. The dataset consists of 63521 customer reviews categorized into five emotion labels: “satisfied,” “disappointed,” “angry,” “urgent,” and “neutral.” The analysis involves data preprocessing, tokenization using IndoBERT, feature extraction through word embeddings, and classification using machine learning algorithms. Model evaluation is based on accuracy and F1-score. The results show that IndoBERT combined with Logistic Regression and SVM performs best, reaching an accuracy of 89.08%, while Random Forest achieves only 77.91%. The study concludes that IndoBERT is an effective approach for emotion detection in customer reviews and holds strong potential to support more targeted improvements in PT Air Minum Giri Menang’s service quality and response..

Keywords: Emotion Detection, IndoBERT, Customer Reviews, Machine Learning, Public Services.

Paper ID #480

Performance Testing of the Backpropagation Method in Predicting Carbon Dioxide Emissions Based on Root Mean Square Error and Mean Absolute Error Results

Christofer Satria, Lilik Widyawati. Anthony Anggrawan, Peter Wijaya Sugijanto, Aprillia Dwi Dayani, I Putu Hariyadi

ABSTRACT

Carbon dioxide (CO2) emissions are a type of gas that is highly detrimental to the environment, accounting for up to 80% of total global greenhouse gas emissions. Therefore, it is not surprising that researchers recognize the need to conduct immediate research on CO2 emissions. Besides that, making predictions without using intelligent tools often results in wrong decisions. In the meantime, Backpropagation has gained widespread use for prediction as one of the algorithms that exhibits intelligence. In turn, research on CO2 is a significant research challenge today. That is why this research aims to predict CO2 emissions using the Backpropagation method, based on the Root Mean Square Error (RMSE) and Mean Absolute Error (MAE). The findings of this study revealed that the CO2 gas emission prediction had an RMSE of 0.063 and an MAE of 0.032. These findings indicate that the proposed model in this study can predict well, with no significant signs of overfitting, and yields a prediction result with low error..

Keywords: Backpropagation, CO2, MAE, RSME, Predicting, Performance .

Paper ID #482

Comparison Analysis of Machine Learning Algorithm Performance in Detecting Diabetes Disease

Dian Syafitri Chani Saputri, Anthony Anggrawan, Hairani Hairani, Elyakim Nova Supriyedi Patty, Christofer Satria, Victoria Cynthia Rebecca

ABSTRACT

Diabetes is a chronic disease whose prevalence continues to rise globally and has become one of the leading causes of death according to the World Health Organization (WHO). It is characterized by high blood sugar levels caused by insulin production or function issues. In Indonesia, the increasing number of diabetes cases is not matched by public awareness of early detection, while limitations in medical personnel and examination time pose serious obstacles to screening. This issue encourages the use of machine learning technology as a solution to detect diabetes risk more quickly and accurately. The research aims to evaluate and identify the best algorithm and implement it into a web-based application using Streamlit, which both medical professionals and the general public can use. This study compares the performance of three machine learning algorithms—Support Vector Machine (SVM), Logistic Regression (LR), and Random Forest (RF)—in predicting diabetes risk based on clinical data. The study results show that the RF algorithm performed best with 97.03% accuracy and Area Under the Curve (AUC) 84.81%, followed by SVM and LR. The best-performing model was then integrated into the web application as an early diagnosis tool, which is expected to improve the efficiency, accuracy, and accessibility of early diabetes risk detection..

Keywords: Disease Detection, Data Classification, Machine Learning, Algorithm Comparison, Diabetes Prediction .

Paper ID #483

Detection of Hazardous Materials in Skin Care Products Based on Product Packaging Label Images Using a CNN Model

Bambang Krismono Triwijoyo, Dian Syafitri, Anthony Anggrawan, Husain, Agus Pribadi, Nurul Indriani

ABSTRACT

Advances in image processing technology have enabled automation in various aspects of life, including the safety of cosmetic products. This study aims to develop a hazardous ingredient detection system in cosmetic products through label image pattern recognition using deep learning methods. The dataset consists of 500 cosmetic label images containing ingredients, which are then processed using Optical Character Recognition (OCR) to extract text. A deep learning model based on Convolutional Neural Network (CNN) is developed to identify hazardous ingredient keywords in accordance with the regulations of the Indonesian Food and Drug Administration (BPOM) and international organizations such as the FDA and the European Union Cosmetic Regulation. Experimental results show that the proposed model has an accuracy rate of 91.2% in detecting hazardous content compared to conventional text-matching-based methods. This study provides a fast and accurate automated solution to improve consumer safety against cosmetic products containing hazardous ingredients..

Keywords: Image pattern recognition, Deep learning, cosmetic labels, Hazardous material detection, CNN, OCR..

Paper ID #484

The Effect of Hyperparameter Tuning Techniques on the Accuracy of Automated Thyroid Diagnosis

Khasnur Hidjah, Ria Rismayati, Bambang Krismono Triwijoyo, Ni Gusti Ayu Dasriani, Karina Anindita, Dicksa Ananda Christian Tue

ABSTRACT

The performance of machine learning (ML) models like the Multilayer Perceptron (MLP) is critical for medical applications such as thyroid disease diagnosis but is highly dependent on hyperparameter selection. Suboptimal configurations can degrade diagnostic accuracy and reliability, making hyperparameter tuning essential. This study evaluates the impact of the Optuna tuning framework on an MLP model for automated thyroid diagnosis. The methodology involved using a public UCI dataset, data preprocessing, training a baseline MLP, and performing extensive hyperparameter optimization with Optuna to maximize the F1-score. This research provides an empirical evaluation of Optuna's effectiveness, showing that classification accuracy increased by 11.6 percentage points (from 0.837 to 0.954) and the macro F1-score rose by 21.3 percentage points (from 0.721 to 0.933) compared to the baseline model, with a particularly noteworthy improvement in recall for the minority classes. Optuna successfully identified a more complex and effective two-hidden-layer architecture. In conclusion, hyperparameter optimization using Optuna is highly effective for enhancing the accuracy and reliability of MLP models in thyroid diagnosis. This approach overcomes the limitations of suboptimal configurations, affirming that meticulous tuning is a critical step in developing robust clinical decision-support systems..

Keywords: hyperparameter tuning, machine learning, multilayer perceptron, optuna, thyroid diagnosis..

Paper ID #486

Markerless-based Augmented Reality for Learning Sasak Language

Dian Syafitri Chani Saputri , Dyah Susilowati, Ahmat Adil, Bambang Krismono, Kartarina, Lalu Roni Arianto

ABSTRACT

Augmented reality (AR) is a technology that is increasingly used in education. However, there is no evidence of AR being developed in Sasak language learning. The use of markerless AR is a highly relevant solution as a learning medium for regional languages, especially Sasak. This study aims to develop markerless AR media for Sasak language learning in elementary schools. This study uses the Multimedia Development Life Cycle (MDLC) development method, which consists of six stages: concept, design, material collection, assembly, testing, and distribution. The testing phase uses formative tests, one-on-one evaluations by experts, small group evaluations, and field trials. Based on the results of testing by 30 students, it can be concluded that this learning media application helps and facilitates students in learning Sasak (91.6%) and increases student interest in learning Sasak (95%). Respondents also assessed the application as easy to use (95.8%) and the material is easy to understand (91.6%). Based on the results of a comparison test between two groups of classes, namely the class that uses media and the class that does not use media, a significant difference was found with a significance value of 0.000. This shows that the use of markerless AR media in learning is more effective in increasing students' learning interest and learning outcomes..

Keywords: augmented reality, markerless based AR, learning media, Sasak language.

Paper ID #487

Ontology Model for Lombok Tourism Knowledge System Using Apache Jena Fuseki

Helna Wardhana, Hartono Wijaya, Husain, Kartarina, Suriyati, Rini Anggriani

ABSTRACT

Lombok Island is one of Indonesia's premier tourist destinations, renowned for its natural beauty and cultural richness. However, tourism information in Lombok is still fragmented and difficult to access in a structured manner, thus hindering tourists in planning their trips. This research aims to develop a semantic web-based tourism information system to address the issue by presenting tourism data accurately, efficiently, and contextually. The method used is Methontology, which includes the stages of specification, conceptualization, formalization, implementation, and maintenance. The research results show that this system can represent Lombok's tourism knowledge in an ontology that includes tourist destinations and is capable of displaying relevant information through a semantic web interface. This system not only facilitates tourists in accessing information but also serves as a foundation for the development of a more modern and sustainable tourism information infrastructure in the future. However, challenges such as dynamic tourism data, limited structured sources, and local terminology complexity remain, requiring continuous updates to ensure system relevance and accuracy..

Keywords: Ontology, Lombok Tourism, Methontology, Knowledge System, Apache Jena Fuseki.

Paper ID #490

Implementation of A Classification Algorithm To Detect Felder-Silverman Learning Style

Muhammad Said Hasibuan, Nanda Satria Putra, Rz Abdul Aziz

ABSTRACT

Learning entails a transformation manifested through alterations in behavior, distinct from an individual's previous state, both prior to and following the execution of similar actions. These changes are a consequence of either experience or training. The acquisition of an appropriate learning style is a critical factor in a student's success during their educational journey, and it is a unique advantage for each individual. Learning scientists employ various methods to identify these learning styles, one of which is the Felder-Silverman model. According to Felder-Silverman, student learning styles are characterized by four dimensions: processing (active or reflective), input preference (visual or verbal), perception (sensitivity or intuition), and comprehension (sequential or global). This study sampled 138 students over 16 sessions, resulting in a dataset comprising 414 records. Based on the results and discussions conducted, it can be concluded that the Decision Tree and Random Forest algorithms are less effective in classifying Felder-Silverman learning styles, achieving an accuracy rate of only 67.88%. Conversely, the K-Nearest Neighbors algorithm proves reasonably effective with an accuracy rate of 85.03% for classification. Furthermore, the Naïve Bayes and Neural Network algorithms exhibit exceptional performance, with a 97.34% accuracy rate, making them highly suitable for categorizing students' Felder- Silverman learning styles. The classification results indicate that the Active-Intuitive-Visual-Sequential learning style is valid, as it was obtained with an accuracy rate of 97.35%. This style has significantly contributed to increased learning outcomes, benefiting 97.35% of the total students..

Keywords: learning style, felder silverman, classification.

Paper ID #491

Enhancing Mushroom Classification Using Feature Engineering and Naive Bayes Algorithm

Lili Tanti, Budi Triandi, Safrizal, Yan Yang Thanri, Bob Subhan Riza dan Juli Iriani

ABSTRACT

This study aims to improve the accuracy of mushroom classification by applying feature engineering techniques and the Naïve Bayes algorithm. The dataset includes various morphological attributes of mushrooms, such as gill size, stem color, and cap surface. To enrich the information available to the model, feature engineering was applied by introducing four new attributes: stalk_color_symmetry, gill_visibility, gill_visibility_score, and cap_contrast. This process was intended to simplify and numerically and semantically represent combinations of categorical features. After data preprocessing and normalization, the Naïve Bayes model was trained and evaluated using test data. The results showed that the model incorporating these additional features achieved an accuracy of 97.82%, precision of 98.10%, recall of 97.60%, F1-score of 97.85%, Matthews Correlation Coefficient (MCC) of 0.956, and Area Under the Curve (AUC) of 0.997. Compared to the baseline model, this approach significantly enhanced classification performance. These findings demonstrate that appropriate feature engineering strategies can effectively improve the performance of the Naïve Bayes model in classifying mushrooms as edible or poisonous. This approach can also be adopted for other classification problems with similar data structures, particularly in domains such as plant species identification, food quality monitoring, and medical diagnosis, where categorical morphological attributes are prevalen.

Keywords: Mushroom Classification, Feature Engineering, Naïve Bayes algorithm, Accuracy Improvement, Model Evaluation.

Paper ID #493

An Integrated BWM–MARCOS Framework for Objective Assessment-Based Optimisation of Church Congregation Leader Selection

Tangka, George Morris William and Watopa, James Jonah

ABSTRACT

Selecting elders in church congregations entails balancing measurable service records and intangible spiritual attributes while satisfying denominational guidelines. Existing studies rely on ad-hoc voting or single-method MCDM tools, leaving transparency and doctrinal alignment unresolved. This paper proposes an objective-assessment hybrid framework that couples the Best–Worst Method (BWM) with the MARCOS ranking model to optimise elder selection in a Seventh-day Adventist (SDA) congregation. Nine criteria were distilled from the SDA Church Manual (20th ed., 2022) and validated by a panel of clergy and senior laity. BWM elicited criterion weights with a global consistency ratio of 0.12, assigning the highest importance to Spiritual Leadership (0.17) and Moral Integrity (0.14) while still allocating >30 % of total weight to objective indicators such as Years of Service and Community Engagement. Applying these weights to normalised candidate data, MARCOS produced utility scores that ranked Candidate A5 first ($f = 1.82$), with the ordering remaining invariant under ±10 % weight perturbations and 1 000 Monte-Carlo resamplings. The integrated approach thus delivers a transparent, numerically traceable audit trail that mirrors doctrinal priorities and mitigates subjective bias. Empirically, it outperforms AHP–TOPSIS and MOORA baselines in rank stability (Spearman $\rho > 0.94$). The framework offers congregations a replicable decision aid and extends hybrid BWM–MARCOS applications to a socially sensitive, multi-stakeholder domain. Future work should test fuzzy extensions and cross-denominational generalisability..

Keywords: BWM, MARCOS, church governance, multi-criteria decision-making.

Paper ID #495

Optimizing Academic Information Systems: Linking Interface Design with User Loyalty and Institutional Performance

Khairul Imtihan, Muhamad Rodi, Mardi

ABSTRACT

Academic Information Systems (AIS) are integral to streamlining educational and administrative operations in higher education. However, challenges related to low user satisfaction and limited system engagement persist, often due to suboptimal interface design and responsiveness. This study integrates the Technology Acceptance Model (TAM) with experiential service quality dimensions Visual Quality (VQ) and User Interface Responsiveness (UIR) to examine their effects on Perceived Ease of Use (PEOU), Perceived Usefulness (PU), User Satisfaction (US), and User Loyalty (UL). Data were gathered from 432 active users, including students, faculty, and administrative staff across 12 Indonesian universities. A quantitative method using Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to test the hypothesized relationships. The findings reveal that PEOU and UIR are the most influential predictors of user loyalty, underscoring the importance of usability and system responsiveness in sustaining user engagement. The Importance-Performance Map Analysis (IPMA) further identifies key improvement areas, particularly in system navigation and feedback mechanisms. Unlike general MIS platforms, AIS supports academic specific tasks such as registration, grading, and reporting. This study excludes non-active users and external stakeholders to maintain analytical precision. Ethical protocols were observed through informed consent and data confidentiality. By extending TAM with experiential quality factors, this research provides a comprehensive framework for evaluating AIS effectiveness and offers actionable insights for system developers and higher education policymakers seeking to foster sustainable digital transformation.

Keywords: Academic Information System, User Satisfaction, User Loyalty, Interface Design, PLS-SEM.

Paper ID #496

Optimizing Higher Education Data Governance In The Digital Era: Leveraging Cobit 2019 For Strategic It Alignment And Effectiveness.

Khairul Imtihan, Muhamad Rodi, Mardi, Wire Bagye, Mohammad Taufan Asri Zaen.

ABSTRACT

Effective IT governance is essential for higher education institutions to align technological capabilities with strategic objectives and ensure sustainable digital transformation. This study evaluates the IT governance maturity of a private university (Campus X) in Indonesia using the COBIT 2019 framework. Employing a mixed-methods approach that integrates interviews, surveys, and document analysis, the research identifies both strengths and deficiencies across governance domains. Results reveal that while operational domains such as Service Delivery (DSS03) and Project Governance (APO11) are relatively mature, critical gaps exist in Strategic IT Planning (APO12) and Performance Monitoring (MEA03). These weaknesses are linked to insufficient leadership engagement, lack of formal documentation, and absence of real-time audit mechanisms. To address these challenges, the study proposes a phased action plan aligned with COBIT 2019, involving short, medium, and long term initiatives such as strategic leadership workshops, implementation of monitoring dashboards, and development of change management frameworks. This research contributes to the theoretical discourse on IT governance maturity in higher education and offers practical recommendations for institutions aiming to improve accountability, strategic alignment, and resilience through data-driven governance reform.

Keywords: COBIT 2019; IT Governance, Higher Education, Data Governance, Strategic IT Alignment.

Paper ID #497

IoT-Enabled Continuous Passive Motion Device for Knee Rehabilitation

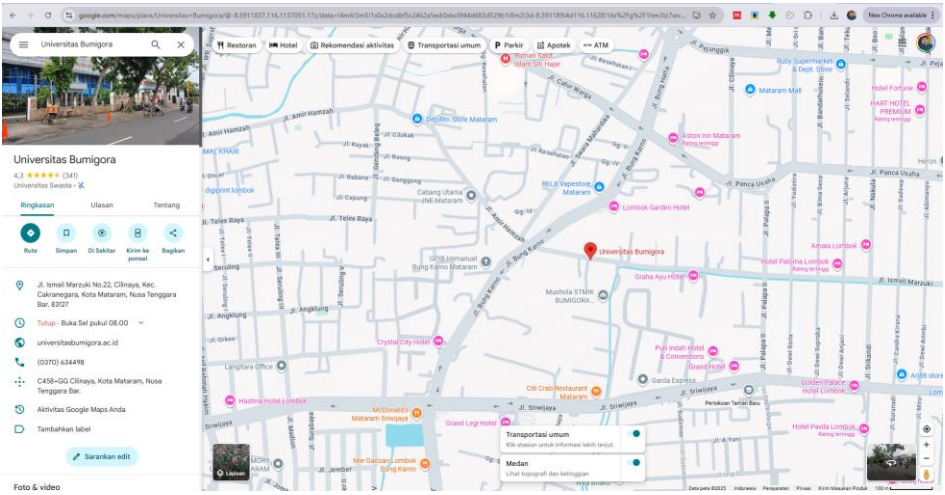
Ploypailin Rakthum, Dechrit Maneetham, Evi Triandini

ABSTRACT

Continuous Passive Motion (CPM) devices are extensively utilized in postoperative knee rehabilitation to regain joint mobility. However, traditional systems frequently lack real-time monitoring, adaptive control, and network-level validation, hence constraining their efficacy in both clinical and home environments. This study introduces an IoT-enabled Continuous Passive Motion device that incorporates an ESP32-based controller, a motorized knee flexion-extension mechanism, and a web-based interface for configuration and monitoring. The system employs dual operating modes (manual and automatic), high-resolution encoder feedback for precise motion tracking, and MQTT-based communication for data exchange. A preliminary evaluation was conducted under with load conditions on one participant at target angles of 45°, 65°, and 90° in manual mode, and under default parameter settings in automatic mode. Performance assessment included range of motion (ROM) accuracy, root mean square error (RMSE), motion speed, and network latency/jitter. Results demonstrate sub-0.1° RMSE across all target angles, stable automatic motion with a maximum speed of 3.31°/s, and median round-trip latency of about 461 ms (95% < 500 ms), verifying both positional accuracy and reliable real-time responsiveness. Compared to conventional CPM devices, the proposed system introduces novelty by integrating precise encoder-based motion validation with network performance evaluation, signifying a substantial progression towards adaptive, data-driven, and remotely supervised knee rehabilitation..

Keywords: Internet of Things, knee rehabilitation, continuous passive motion, microcontroller, position sensors.

SITEMAP



Picture 1. Universitas Bumigora