

PROGRAM BOOK

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The 2024

IC3INA

Online Conference

The 11th International Conference on Computer, Control, Informatics
and Its Applications

**Data-driven Innovation: Informatics in Predictive
Analytics and Computing**

9-10 October 2024
Bandung, Indonesia

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About

In an era of explosive volumes of data, the fusion of informatics, predictive analytics, and computing stands as a beacon of transformative potential. The innovation landscape is undergoing a paradigm shift driven by the strategic utilization of data to inform decision-making processes. Within this context, Research Center for Data and Information Sciences, BRIN, organizes the 11th International Conference on Computer, Control, Informatics and its Applications (IC3INA) 2024 with the theme:

"Data-driven Innovation: Informatics in Predictive Analytics and Computing"

The IC3INA 2024 aims to delve into the intricate intersections of informatics, predictive analytics, and computing, exploring how the symbiotic relationship among these domains propels innovation across diverse industries.

This year, the IC3INA 2024 will be held as a hybrid conference and broadcast live from Bandung, Indonesia, on 9 and 10 October 2024. This conference will be held with sponsorship from the IEEE Indonesia Section. Currently, the proceedings of IC3INA 2024 are also planned to be published by IEEE in the same year, 2024.

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Timetable

Time Zone: Western Indonesian Time (UTC+7)

KL: Keynote Lecture

IS: Invited Speaker

CT: Contributed Talk

Day 1: October 9, 2024

07:30 - 08:00	Registration	
	Main room (Auditorium Gedung 10)	
08:00 - 08:15	Program Outlining - MC: Kristanty P. Vidiarsi Tanty	
08:15 - 08:20	Welcome speech	
	Dr.Eng. Lia Sadita S.Kom., M.Eng. (Chair of IC3INA 2024)	
08:20 - 08:30	Opening remark - Dr. Esa Prakasa, S.T., M.T.	
	Head of Research Center for Data and Information Sciences - BRIN	
08:30 - 08:40	Opening remark - Dr. Eng. Budi Prawara	
	Chairman of Research Organization for Electronics and Informatics - BRIN	
08:40 - 08:45	Photo session	
	Main room (Auditorium Gedung 10)	
08:45 - 09:45	KL	<p>Amanah Ramadiah, PhD - FNA (offline) Financial Network Analytics Ltd, United Kingdom Moderator: Lindung Parningotan Manik, PDEng (offline)</p> <p>Fraud Investigation and Detection using Graph AI</p>
09:45 - 10:45	KL	<p>Woojoo Lee, PhD - SNU (online) Department of Public Health Science, Seoul National University, South Korea Moderator: Dr. Purnomo Husnul Khotimah M.T. (offline)</p> <p>Sensitivity Analysis for Unmeasured Confounding in Observational Studies</p>
10:45 - 11:00	Morning break	
	Main room (Auditorium Gedung 10)	

11:00 - 11:30	IS	On Lee - Glair.ai (offline) Moderator: Moderator: M. Teduh Uliniansyah B.Eng., M.Sc., Ph.D. (offline)	Bringing it All Together: How Software Links AI, Chips, and People
11:30 - 12:00	IS	Rizqi Ayunda Pratama, S.Kom., M.B.A (offline) Moderator: M. Teduh Uliniansyah B.Eng., M.Sc., Ph.D. (offline)	Electronic Voting and Centralized Driver License (SIM)
12:00 - 13:00	Lunch break		
Main room (Auditorium Gedung 10)			
13:00 - 14:00	KL	Prof.Rung Ching Chen - CYUT (online) Department of Information Management, Chaoyang University of Science and Technology, Taiwan Moderator: Dr. Eng. Budi Nugroho, S.Si., M.T. (offline)	Road Environment Understanding from Traffic Signs Detection and Road Conditions Using Deep Learning Methodology
Break Out Room Parallel Session 01-01			
14:00 - 14:10	Moving to parallel room		
14:10 - 15:50	Parallel Session 01-01-01 - OFFLINE		
Track: ICTs Application			
Session chair: Dr. Ekawati Marlina			
PIC: Aria Bisri M.T., Radhiyatul Fajri, M.Kom.			
Room: Main Room (Auditorium Gedung 10)			
14:10 - 14:15	Opening Parallel Session		
14:15 - 14:30	CT	Aria Bisri 1571043716 1-1-1-1	The Development of A Digital Transformation Model for Higer Education using the Object-Process Methodology
14:30 - 14:45	CT	Ekawati Marlina 1571059076 1-1-1-2	Exploring the Evolution of Data Management in E-Government: Bibliometric Analysis
14:45 - 15:00	CT	Nungki Dian Sulisty Darmayanti 1571068891 1-1-1-3	Process Mining Benefits Model: A Preliminary Study
15:00 - 15:15	CT	Isti Adilia Habibah 1571069008 1-1-1-4	SiTernak Mobile Application Development to Report Livestock's Health Data

15:15 - 15:30	CT	Aulia Salsabila 1571071854 1-1-1-5	Web-Based Software Development for Complementary Feeding Recommendation System (EasyMPASI) Using Rule-Based Reasoning
15:30 - 15:45	CT	Guntur Awaludin Saptadi 1571071872 1-1-1-6	Design of Smart Microgrid as an Integration of Electrical Systems With Android Application
14:10 - 15:50	Parallel Session 01-01-02 - OFFLINE		
	Track: Data Science & Informatics and Data Processing		
	Session chair: Dr. Yaniasih		
	PIC: Abdurrahman Prasetyadi M.P., Dian Isnaeni, M.T.I		
	Room: : Class Room (Gedung Basics 2)		
14:15 - 14:30	CT	Liew Kok Leong 1571044606 1-1-2-1	Virtual Reality Dashboard Design Ontology (VRDDO): A Theoretical View
14:30 - 14:45	CT	Irani Hoeronis 1571056506 1-1-2-2	Fine Tuning Panoptic Scene Graph Generation
14:45 - 15:00	CT	Elvira Nurfadhilah 1571068411 1-1-2-3	Comparative Analysis of Part of Speech Tagging Methods for the Bugis Language: From Statistical to Neural Approaches
15:00 - 15:15	CT	Irwin Santoso Soegiharto 1571064177 1-1-2-4	NoSQL Injection Detection Using Deep Neural Network and Principal Component Analysis of Injection Feature Vectors
15:15 - 15:30	CT	Muhammad Galih Anggara 1571068400 1-1-2-5	Fine Tuning Swin Transformer Based Pretrained Model for Microscopic Fungi Images Classification
15:30 - 15:45	CT	Dian Isnaeni Nurul Afra 1571068426 1-1-2-6	Neural Machine Translation for Low-Resource Languages: Experiments on Makassar-Indonesian
14:10 - 15:50	Parallel Session 01-01-03 - ONLINE		
	Track: Informatics and Data Processing		
	Session chair: Dr. Deden Sumirat Hidayat		
	PIC: Andre Sihombing, M.Sc.		
	Room: : 5.1.		
14:15 - 14:30	CT	Julfa Muhammad Amda 1571068385 1-1-3-1	Enhancing Lung Cancer Classification With Ensemble Deep Learning Models
14:30 - 14:45	CT	Suhardiman 1571068595 1-1-3-2	Multi-Temporal Cloud Removal of Satellite Image for Surface Water Segmentation

14:45 - 15:00	CT	M Athallah Dzikri Alhady 1571068868 1-1-3-3	Comparative Performance of Water Index for Water Segmentation Model Using U-Net Architecture
15:00 - 15:15	CT	Muhammad Adam Fahmil 'Ilmi 1571071753 1-1-3-4	Smart Home Prototype for Rain Prediction Using Artificial Neural Network Algorithm
15:15 - 15:30	CT	Neisya Holly Santoso 1571068392 1-1-3-5	Artificial Neural Network Using Weight Initialization in Customer Churn Prediction: Banking Industry
14:10 - 15:50	Parallel Session 01-01-04 - ONLINE		
	Track: ICT		
	Session chair: Dr. Tr. Lindung Parningotan Manik		
	PIC: Yulia Aris Kartika, M.Kom		
	Room: : 5.2.		
14:15 - 14:30	CT	Cahyo Trianggoro 1571068939 1-1-4-1	Evaluation of Data Interoperability Maturity Level: Case Study of the East Belitung Government
14:30 - 14:45	CT	Shidiq Al Hakim 1571067584 1-1-4-2	Developing Food Menu Recommendation System Based on Indonesian Nutritional Needs
14:45 - 15:00	CT	Marios Savvides 1571069919 1-1-4-3	PDU: A Pill Dispenser Unit for an IoT System for Monitoring and Controlling the Pharmaceutical Treatment for Patients With Psychological Mental Conditions
15:00 - 15:15	CT	Any Sayekti 1571056964 1-1-4-4	Innovation in Education: Analyzing the Dynamics of Digital Transformation, and Teaching Practices on School Performance Through Teacher Engagement
15:15 - 15:30	CT	Idrus Jamalulel 1571066869 1-1-4-5	AI and Digital Leadership: Perspectives of Leaders in the Taiwan Restaurant Industry
15:30 - 15:45	CT	Merios Guslan Putra 1571068941 1-1-4-6	Social Media Maturity Model for Indonesian Crowdfunding
14:10 - 15:50	Parallel Session 01-01-05 - ONLINE		
	Track: Data Science		
	Session chair: Dr. Eng. Yuyun		
	PIC: Siti Kania, M.Kom.		
	Room: : 5.3.		
14:15 - 14:30	CT	Hasnito Lailu Sobrian 1571068406 1-1-5-1	Optimizing Temporal Convolutional Network for Eye Movement Classification Using Tree-Structured Parzen Estimator

14:30 - 14:45	CT	Muhamad Rodhi Supriyadi 1571027024 1-1-5-2	A Systematic Review: Technology of Artificial Intelligence in Forensic Odontology
14:45 - 15:00	CT	Agung Santosa 1571044597 1-1-5-3	End-to-End Phoneme Recognition in Bahasa Indonesia with Pretrained Speech Embeddings and 1D-CNN Using CTC
15:00 - 15:15	CT	Raden Muhammad Revi Hafiyyan 1571044647 1-1-5-4	Drug Side Effect Prediction using Gravitational Search Algorithm - Support Vector Machine: Case Study of Eye Disorders
15:15 - 15:30	CT	Fiddin Yusufida A'la 1571068245 1-1-5-5	Optimizing Machine Learning Models for Predicting User Engagement in Online Learning Platforms: The Role of Feature Selection
15:30 - 15:45	CT	Tri Sampurno 1571068277 1-1-5-6	Evaluation of the Quality of ChatGPT in Translating Texts on Indonesian War of Independence From Dutch to Indonesian
15:45 - 15:50	Closing Parallel Session - Photo		
	Main room (Auditorium Gedung 10)		
15:50 - 16:00	Closing Day 1 - MC: Kristanty P. Vidiarsi Tanty		

Day 2: October 10, 2024

07:30 - 08:00	Registration		
	Main room (Auditorium Gedung 10)		
08:00 - 08:03	Program outlining - MC: Kristanty P. Vidiarsi Tanty		
08:03 - 08:05	Photo session		
	Main room (Auditorium Gedung 10)		
08:05 - 09:05	KL	Dr. Foni Agus Setiawan - BRIN (offline) Research Center for Data and Information Sciences, National Research and Innovation Agency (BRIN), Indonesia Moderator: Rio Nurtantyana S.Pd., M.Pd., M.Sc., Ph.D. (offline)	Bayesian Knowledge Graphs: Incorporating Probabilistic Information into Knowledge Graphs

09:05 - 10:05	KL	Prof. Sakriani Sakti – JAIST (online) Nara Institute of Science and Technology, Japan Moderator: Dr. Kokoy Siti Komariah S.Kom., M.T., M.Eng. (offline)	Machine Speech Chain: A Deep Learning Approach for Modeling Human Speech Perception and Production with Auditory Feedback Mechanism for Low-Resource Languages
10:05 - 10:20	Morning break		
Main room (Auditorium Gedung 10)			
10:20 - 11:20	KL	Dr. Abel Armas – UNIMELB (online) School of Computing and Information Systems, The University of Melbourne, Australia Moderator: Satrio Adi Priyambada S.Kom., M.Kom., Ph.D. (offline)	Unleashing the Power of Process Mining for Data-Informed Process Improvements
11:20 - 12:30	Lunch break		
Break Out Room Parallel Session 02-01 (n=30)			
12:30 - 14:10	Parallel Session 02-01-01 - OFFLINE		
Track: Computer, Networking, and Control, Informatics and Data Processing, & Data Science			
Session chair: Dr. Kokoy Siti Komariah			
PIC: Aria Bisri M.T., Radhiyatul Fajri, M.Kom.			
Room: Main Room (Auditorium Gedung 10)			
12:30 - 12:35	Opening Parallel Session		
12:35 - 12:50	CT	Mardhani Riasetiawan 1571024617 2-1-1-1	G-Connect NextGen: The Low Network Connectivity Architecture for Landslide Early Warning System using Internet of Things
12:50 - 13:05	CT	Kadek Dwi Wahyuadnyana 1571044001 2-1-1-2	The Influence of ISW on the AUV Control System and Stability in the Bali Deep Sea
13:05 - 13:20	CT	Yaniasih 1571068747 2-1-1-3	Assessment of Hyperparameter Optimization Techniques for Cross-Stitched Multi-Task Learning
13:20 - 13:35	CT	Siska Pebiana 1571060874 2-1-1-4	Latest Research in Data Augmentation for Low Resource Language Text Translation: A Review
13:35 - 13:50	CT	Rafi Mahmud Zain 1571068413 2-1-1-5	Revealing a Country's Government Discourse Through BERT-Based Topic Modeling in Presidential Speeches
13:50 - 14:05	CT	Khansa Aqila Noverina 1571068476 2-1-1-6	Identification of Hoya as a Medicinal Plant Using Convolutional Neural Network
12:30 - 14:10	Parallel Session 02-01-02 - OFFLINE		

Track: Data Science			
Session chair: Dr. Anne Parlina			
PIC: Abdurrahman Prasetyadi M.P., Dian Isnaeni, M.T.I			
Room: Class Room (Gedung Basics 2)			
Opening Parallel Session			
12:30 - 12:35			
12:35 - 12:50	CT	Rio Nurtantyana 1571068560 2-1-2-1	The Development of the Mobile Interactive Virtual Nuclear Educator With AR and RAG for Learning Nuclear Energy in Indonesia
12:50 - 13:05	CT	Aang Gunawan Sutyawan / Aria Bisri 1571068666 2-1-2-2	Integrating Remote Sensing and Machine Learning for Monitoring Urban Growth in Seismically Active Regions: A Case Study of the Lembang Fault Zone, West Java, Indonesia
13:05- 13:20	CT	Mutiara Auliya Khadija 1571056824 2-1-2-3	Enhancing Freelancer Project Matching With a BERT-Powered Deep Learning Indonesian Chatbot
13:20 - 13:35	CT	Yuyun 1571068703 2-1-2-4	Enhancing Bugis Language POS Tagging Using Recurrent Neural Networks and Semi-Supervised Self-Training
13:35 - 13:50	CT	Naufal Nafian Abror 1571068896 2-1-2-5	Indonesia HIV-Cases Prediction Using Statistic-Based Modeling
13:50 - 14:05	CT	Rini Wijayanti 1571068723 2-1-2-6	Can BERT Learn Evidence-Aware Representation for Low-Resource Fake News Detection?
12:30 - 14:10	Parallel Session 02-01-03 - ONLINE		
Track: Informatics and Data Processing			
Session chair: Dr. Wiwin Suwarningsih			
PIC: Siti Kania, M.Kom.			
Room: 5.1.			
12:30 - 12:35	Opening Parallel Session		
12:35 - 12:50	CT	Asep Haryono 1571028739 2-1-3-1	Enhanced Dynamic Anchor Learning for Oriented Object Detection on Satellite Images
12:50 - 13:05	CT	Marlina Pandin 1571040370 2-1-3-2	Trends and Insights in Artificial Intelligence Applications for Microgrid Management: A Bibliometric Analysis
13:05 - 13:20	CT	Putri Utami Rukmana 1571041732 2-1-3-3	Application of LSTM, RNN, and Transformer in Stock Price Prediction of Information Technology Companies: A Comparative Analysis
13:20 - 13:35	CT	Al Hafiz Akbar Maulana Siagian 1571042569 2-1-3-4	Employing SBERT for Essay Assessment

13:35 - 13:50	CT	Tri Widianti 1571045140 2-1-3-5	Function Point Analysis of Fuzzy Risk Priority Number Calculator
13:50 - 14:05	CT	Mohammad Tyas Pawitra 1571045178 2-1-3-6	Predicting Stock Market using CNN and BiLSTM Model
12:30 - 14:10	Parallel Session 02-01-04 - ONLINE		
	Track: ICTs Application		
	Session chair: Dr. Eng. Budi Nugroho		
	PIC: Ariani Indrawati, M.T.I		
	Room: 5.2.		
12:30 - 12:35	Opening Parallel Session		
12:35 - 12:50	CT	Leonard Sean Lee 1571029400 2-1-4-1	The Effects of Advertising, Perceived Benefit, UI/UX, IS Security Model, and Satisfaction Towards the Actual Usage of Digital Payment
12:50 - 13:05	CT	Niken Fitria Apriani 1571042610 2-1-4-2	Classification and Forecasting Air Pollution Using Naive Bayes and Prophet: A Use Case of Air Quality Index in Jakarta
13:05 - 13:20	CT	Sopian Amir 1571047937 2-1-4-3	Analysis of Fraud Attacks Using Android Package Kit in Indonesia
13:20 - 13:35	CT	Rahmi Lestari Helmi 1571068459 2-1-4-4	E-Learning Readiness Gap in Business and Manufacture Settings Amidst the Covid-19 Pandemic: The Case of Indonesian Companies
13:35 - 13:50	CT	Wawan Hendriawan / Okta Fajar Saputra 1571068572 2-1-4-5	Leveraging Machine Learning to Analyze Dynamic Land-Use Changes in Indramayu Regency to Enhance Food Security
13:50 - 14:05	CT	Marini Wulandari 1571068769 2-1-4-6	Open Government Data Ecosystem as a Strategy to Improve the Open Data Services: A Case Study of the Regency of Tangerang
12:30 - 14:10	Parallel Session 02-01-05 - ONLINE		
	Track: Data Science & ICTs Application		
	Session chair: M. Yudhi Rezaldi, Ph.D.		
	PIC: Andre Sihombing, M.Sc.		
	Room: 5.3.		
12:30 - 12:35	Opening Parallel Session		
12:35 - 12:50	CT	Farhan Reypialfarizi Moechtar 1571045028 2-1-5-1	Predicting Bioactivity of PLK1 Inhibitor as Anti-Cancer Agent using Multilayer Perceptron Optimized by Simulated Annealing
12:50 - 13:05	CT	Indra Syah Putra 1571048678 2-1-5-2	Customer Churn Prediction using Confident Learning and XGBoost

13:05 - 13:20	CT	Grace Shirley Cam 1571052614 2-1-5-3	Factor Analysis: Uncovering Factor Structure in the Indonesian Teacher Engagement Index (ITEI) Survey Results Data
13:20 - 13:35	CT	Rifani Bhakti Natari 1571062413 2-1-5-4	The Use of Administrative Data to Generate Information for Decision-Making in Healthcare: A Narrative Review
13:35 - 13:50	CT	Danu Julian Cahyadi 1571069072 2-1-5-5	BERT-Based Deep Embedded Clustering for Topic Modeling
13:50 - 14:05	CT	Mukhamad Angga Gumilang 1571071462 2-1-5-6	Development of a Mental Health Chatbot Using Large Language Models for Indonesian Undergraduates
14:05 - 14:10	Closing Parallel Session - Photo		
14:10 - 14:20	Afternoon Break		
14:20 - 16:00	Parallel Session 02-02-01 - OFFLINE		
	Track: Data Science		
	Session chair: Satrio Adi Priyambada, PhD		
	PIC: Aria Bisri M.T., Radhiyatul Fajri, M.Kom		
	Room: Main Room (Auditorium Gedung 10)		
14:20 - 14:25	Opening Parallel Session		
14:25 - 14:40	CT	I Putu Aditya Brama Putra Cakra Negara 1571068966 2-2-1-1	Bayesian Spatial Method: Binomial-Poisson With R for Zero-Inflated Data: Application to Tetanus Cases in Central Jawa
14:40 - 14:55	CT	Gading Arya Dwi Cahyo (ONLINE) 1571068976 2-2-1-2	CNN-Based Hybrid Performance Evaluation Towards Online News Sentiment Classification Task
14:55 - 15:10	CT	Devi Munandar 1571068915 2-2-1-3	Tuberculosis Spread Analysis Through the Integration of Principal Component Analysis and Vector Autoregressive Models
15:10 - 15:25	CT	Ridwan Suhud 1571068919 2-2-1-4	Development of Non-Immersive Virtual Reality for Rock Outcrops Learning
15:25 - 15:40	CT	Muhammad Zaki Nur Rahman 1571069079 2-2-1-5	Developing a Visual Dashboard to Improve Research Activity Assessment
14:20 - 16:00	Parallel Session 02-02-02 - ONLINE		
	Track: Informatics and Data Processing		
	Session chair: Dr. Arya Adhyaksa		
	PIC: Nuraisa Novia, M.Kom.		
	Room: Class Room (Gedung Basics 2))		

14:20 - 14:25	Opening Parallel Session		
14:25 - 14:40	CT	Abrar Dwi Fairuz Nadhif 1571052143 2-2-2-1	Dual-Path U-Net for Polyp Segmentation
14:40 - 14:55	CT	Bagus Dwi Santoso 1571060480 2-2-2-2	Citrus Leaf Variety Identification Based on RGB and HSV Color Features
14:55 - 15:10	CT	Romy Syaputra Wijaya 1571064498 2-2-2-3	Sleep Apnea Identification Based on EEG Signals Using Hybrid Spatio-Temporal Deep Learning
15:10 - 15:25	CT	Zakiah Aulia Rohmah 1571068360 2-2-2-4	Indonesian Sign Language (BISINDO) Alphabet Detection Using the You Only Look Once (YOLO) Algorithm Version 8
15:25 - 15:40	CT	Asril Jarin 1571068633 2-2-2-5	Using LLM to Convert Bahasa Indonesia Commands Into JSON Structures for GIS System API
14:20 - 16:00	Parallel Session 02-02-03 - ONLINE		
	Track: Computer, Networking, and Control		
	Session chair: Rio Nurtantyana, PhD		
	PIC: Wardatul Hanifah, S.Kom.		
	Room: 5.1.		
14:20 - 14:25	Opening Parallel Session		
14:25 - 14:40	CT	Iman Firmansyah 1571044274 2-2-3-1	An efficient hardware implementation of FPGA-based stereo matching using a single path SGM direction
14:40 - 14:55	CT	Armita Widayarsi 1571048943 2-2-3-2	Security Analysis of Audit Tools
14:55 - 15:10	CT	Muhammad Attamimi 1571066957 2-2-3-3	Development of Measurement Systems for Water Content in Transformer Insulating Oil
15:10 - 15:25	CT	Lakmi Makarti 1571067135 2-2-3-4	Identifying the Encryption Algorithm of SSH Session Keys
15:25 - 15:40	CT	Yanayir Rifai 1571071746 2-2-3-5	Upper Limb Rehabilitation Robot Control Based on Large Language Model
14:20 - 16:00	Parallel Session 02-02-04 - ONLINE		
	Track: Data Science		
	Session chair: M. Teduh Uliniansyah, PhD		
	PIC: Nimas Ayu Untariyanti, M.T.I		
	Room: 5.2.		
14:20 - 14:25	Opening Parallel Session		
14:25 - 14:40	CT	Arie Vatesia 1571067647 2-2-4-1	Spatio-Temporal Clustering of Forest Fire Hotspots in the Wallacea Region in 2000 - 2011 Using Chronnet

14:40 - 14:55	CT	Firhan Imam Haekal 1571064307 2-2-4-2	Optimizing Indonesian Tweet Preprocessing on Halal Domain
14:55 - 15:10	CT	Aditia Dika Putra Laksamana 1571065241 2-2-4-3	Developing a Labeled Dataset for Chili Plant Health Monitoring: A Multispectral Image Segmentation Approach With YOLOv8
15:10 - 15:25	CT	Sofiana Wudlu 1571065405 2-2-4-4	Spatio-Temporal Analysis to Inspect Infection Risk of Dengue Hemorrhagic Fever in Central Java From 2015 to 2022
15:25 - 15:40	CT	Mohammad Teduh Uliniansyah 1571063984 2-2-4-5	Enhancing OCR Accuracy for Bugis Language to Bahasa Indonesia Dictionary Conversion Through Image Pre-Processing and Scaling Techniques
14:20 - 16:00	Parallel Session 02-02-05 - ONLINE		
	Track: Data Science		
	Session chair: Dr. Eng. Yuyun		
	PIC: Ariani Indrawati, M.T.I		
	Room: 5.3.		
14:20 - 14:25	Opening Parallel Session		
14:25 - 14:40	CT	Yulia Aris Kartika 1571068701 2-2-5-1	Ontology-Based Approach for Modeling Plant Growth Experiments
14:40 - 14:55	CT	Jalaludin Shofa Mufti 1571068549 2-2-5-2	Comparative Analysis of Centroid-Based and Density-Based Clustering for Indonesian Earthquake Data
14:55 - 15:10	CT	Rahida Rihhadatul Aisy 1571068715 2-2-5-3	Functional Data Analysis for Household Appliance Energy Consumption Prediction
15:10 - 15:25	CT	Clarisa Septia Damayanti 1571068945 2-2-5-4	Infectious Disease Epidemic Forecasting Using Online News Time Series Analysis: Covid-19 Case Study
15:25 - 15:40	CT	Prana Ugiana 1571068913 2-2-5-5	LSTM-Driven Forecasting of Surface Temperature Trends in Indonesia as Insights Into Climate Change
15:40-15:45	Closing Parallel Session - Photo		
15:45-16:00	Moving to Main Room		
	Main room (Auditorium Gedung 10)		
16:00-16:15	Award Ceremony		
16:15-16:25	Closing Remark		
	Chair of IC3INA/Head of Research Center for Informatics - BRIN		
16:25-16:30	Closing IC3INA 2024 - MC: Kristanty P. Vidiarsi Tanty		
16:30-16:40	Photo Session		

General Instructions

The IC3INA 2024 will be held as a hybrid conference and broadcast live from Bandung, Indonesia, on 9 and 10 October 2024. There are three types of sessions in the 2024 IC3INA, namely: Keynote Speech, Invited Speakers, and paper presentation sessions. Each session will have a moderator or session chair, PIC, presenters, and attendees. The moderator will oversee the session and manage any questions, while a co-host will assist with technical aspects.

Keynote Speeches and Invited Speakers

The conference will feature three keynote speeches and two invited speaker sessions, both in-person. Additionally, three more keynote speeches will be given virtually through Zoom. All Sessions on Keynote Speeches and Invited Speakers will be live-streamed on YouTube for public access.

- Live streaming page URL for Day 1, 9 October 2024 : <https://youtube.com/live/Phfld9-yde0>
- Live streaming page URL for Day 2, 10 October 2024 : <https://youtube.com/live/KDL3T0xz8MQ>

Session Structure

- Ten minutes before your session starts, please check that you are in the right place. If you are attending virtually, double-check your breakout room assignment. If you're attending in person, ensure you're in the designated building and room.
- Beginning of the session: The moderator or session chair introduces the session and the presenter, verifies attendance, and takes photos.
- The presenter will deliver their live presentation, followed by a Q&A session. If necessary, due to technical issues, the presenter may request the Session Chair to play their pre-recorded video. However, the Q&A must be conducted in real time.

- Presentation duration:

Session type	Live presentation	Live Q&A
Keynote Speech	50 minutes	10 minutes
Invited Speaker	25 minutes	5 minutes
Paper presentation	10 minutes	5 minutes

- The moderator or Session Chair will summarize key points and transition participants to the Main Room for subsequent agenda.

Schedule and Time

All time in the program schedule is in Western Indonesian Time / Waktu Indonesia Barat (WIB;UTC+7). Please make adjustments to the time stated in the schedule into your local time. Current time in WIB can be found on <http://time.bmkg.go.id/>.

Instruction for Online Presenters

Presenters will receive an invitation link (<https://s.brin.go.id/l/ic3ina2024>) via email or the IC3INA 2024 WhatsApp Group. To ensure a smooth and efficient virtual conference, kindly join the designated Zoom session at least 5 minutes prior to the scheduled start of your parallel session

- Please rename your Zoom profile to "Presenter_SessionID_Name" for easy identification during the session. Session IDs can be found in the conference timetable.
- Following your live presentation, a dedicated 5-minute Q&A session will be held. Your presence during this segment is mandatory.
- Your microphone will be muted during the other presenter's talk.
- Attendees and other presenters can submit questions pertaining to your presentation through the chat panel during your talk.
- Presenters are encouraged to monitor the chat panel actively and address questions during the designated Q&A session.
- The session moderator will strive to facilitate responses to as many questions as possible within the allotted time. Unanswered questions may be addressed by presenters with attendees at a later time.
- Presenters are welcome to register as attendees for other sessions or events of interest, including keynote speeches, invited speaker presentations, and other paper presentations.

Breaks

Conferencing can be tiring, so it's important to take breaks. We've included breaks in the schedule for everyone. Please use this time to stand up, stretch, grab a snack, and come back refreshed. If you remain in the Zoom meeting during the break, please ensure your microphone is muted.

Instruction for Offline Presenters

Welcome to Bandung, esteemed IC3INA presenters. We are delighted to have you join us in person.

- Please visit our Registration Desk to confirm your attendance and receive your IC3INA souvenirs.
- Keynote speeches and invited speaker sessions will be held in the Main Room (Auditorium Gedung 10). Parallel sessions may take place in either the Main Room or the Classroom (Gedung Basics 2).
- Please ensure you are present at least five minutes before the start of parallel sessions. Following your ten-minute presentation, there will be a five-minute Q&A session.
- Following the video presentation there is a short Q&A session moderated by the session chair.
- During the presentation, attendees or fellow presenters may ask questions by raising their hands both virtually and physically. We encourage you to actively follow the questions and prepare thoughtful responses for the Q&A session.
- The moderator or session chair will endeavor to address as many questions as possible within the allotted time. If questions remain unanswered, attendees may wish to engage in further discussions with the presenter at a later time.
- When not presenting, we encourage you to remain in the session and actively participate by asking questions to other presenters. Additionally, you are welcome to register as an attendee for any other sessions or events that pique your interest, including keynote speeches, invited speakers, and additional paper presentations.

Breaks

Conferencing can be tiring, so it's important to take breaks. We've included breaks in the schedule for everyone. Please use this time to stand up, stretch, grab a snack, and come back refreshed. If you remain in the Zoom meeting during the break, please ensure your microphone is muted.

- Conferences can be tiring, whether they're online or in-person. To maintain energy and focus, it's important to take regular breaks. We've incorporated breaks into the conference schedule.
- During these breaks, please stand up, stretch, and grab a snack. Returning refreshed will help you stay engaged throughout the day.
- We have provided refreshments for you: Morning and afternoon snacks will be available in the Main Room (Auditorium Gedung 10), and a lunch buffet will be served on the first floor of Gedung Basics 2.

Instruction for Participants (Non-Speakers)

Online Participants

- Please rename your Zoom profile to: "Participants_yourName"
- Feel free to attend any sessions or events that interest you, including keynote speeches, invited speaker presentations, and parallel paper presentations.

Offline Participants

- Visit the Registration Desk to confirm your attendance and receive your IC3INA souvenirs.
- Feel free to attend any sessions or events that interest you, including keynote speeches, invited speaker presentations, and parallel paper presentations.
- Keynote speeches and invited speaker sessions will be held in the Main Room (Auditorium Gedung 10). Parallel sessions may take place in either the Main Room or the Classroom (Gedung Basics 2).
- We've provided refreshments for you: Morning and afternoon snacks will be available in the Main Room (Auditorium Gedung 10), and a lunch buffet will be served on the first floor of Gedung Basics 2.

Q&A Guideline

- During presentations, attendees can ask questions by raising their hands, either virtually or physically.
- Actively follow the questions and prepare thoughtful responses for the Q&A session.
- The moderator or session chair will select and ask the questions during the Q&A session.
- Due to time constraints, not all questions may be addressed. The Session Chair will prioritize complementary questions and aim to address them in the order they were received.
- Organizers may unmute participants if necessary to allow for further clarification of their questions.

List of Keynote Speakers

Fraud Investigation and Detection using Graph AI

Amanah Ramadiah, PhD

KL

Financial Network Analytics Ltd, United Kingdom

The introduction of instant payment systems around the world has accelerated in recent years. There are now over 80 instant payment systems globally, with more than 35 being launched in the last five years and 8 currently being built. These systems bring unprecedented speed and efficiency to payments markets, with greater convenience for consumers. However, faster payments also means faster fraud. For example, in Hong Kong, the volume of fraud cases more than doubled in the four years following the introduction of the Faster Payment Service in 2018. In this talk, I will discuss how the problem can be efficiently addressed by taking a centralized data approach and deploying technology that takes advantage of this centralized data. In particular, I will present how Graph AI (Artificial Intelligence) is useful to (1) trace and track the fund movements in real time, allowing banks to recover funds for victims and identify new mule accounts and schemes faster; and to (2) produce more accurate methods for fraud detection and risk scoring that employ graph features of the data.

Sensitivity Analysis for Unmeasured Confounding in Observational Studies

Woojoo Lee, PhD

KL

Department of Public Health Science, Seoul National University, South Korea

The results of data analysis based on observational studies can be significantly affected by unmeasured confounders. Therefore, in cases where unmeasured confounding is a concern in observational studies, researchers need to conduct sensitivity analysis to assess the extent to which the current research finding is robust. In the field of public health, various forms of unmeasured confounding issues arise as diverse as health science problems. In this presentation, we explore various sensitivity analysis methods and discuss related statistical issues.

Road Environment Understanding from Traffic Signs Detection and Road Conditions Using Deep Learning Methodology

Prof. Rung Ching Chen

KL

Department of Information Management, Chaoyang University of Science and Technology, Taiwan

Road-related environment recognition is important in various real-world applications, including autonomous driving, traffic control, driver protection, road service, and traffic accident investigations. Drivers and advanced driver assistance systems depend on road markings and traffic signs to help them better understand their environment while on the street. Deep learning and road marking identification have made significant strides in this talk. Image captioning requires recognition of the sign in an image, its qualities, and its connections. The road surface can be damaged by cracks and potholes, which endangers the drivers. In contrast, the traffic sign and road markings can be damaged by color degradation, vandalism, or structural damage, which lowers visibility. This talk also provides a simple and effective technique for image text. Deep learning techniques have been widely applied in this talk.

Bayesian Knowledge Graphs: Incorporating Probabilistic Information into Knowledge Graphs

Dr. Foni Agus Setiawan

KL

Research Center for Data and Information Sciences, National Research and Innovation Agency (BRIN), Indonesia

A knowledge graph is a structured representation of real-world entities and their relationships. It models relationships between entities as edges and nodes in a graph structure, enabling machine-readable and scalable representation and integration of large amounts of knowledge. Naturally, current knowledge graphs are logical and deterministic. They can depict logical facts very well. However, they are not equipped to describe the probabilistic world. To perform probabilistic reasoning over a knowledge graph, a system typically must use separate knowledge bases, separate processing, or third-party applications. Many studies have been developed to overcome this issue. This talk is about to discuss the representation of probabilistic information in the knowledge graphs and how to reason over it.

Machine Speech Chain: A Deep Learning Approach for Modeling Human Speech Perception and Production with Auditory Feedback Mechanism for Low-Resource Languages

Prof. Sakriani Sakti

KL

Nara Institute of Science and Technology, Japan

The development of automatic speech recognition (ASR) and text-to-speech synthesis (TTS) has enabled computers to learn how to listen or speak, imitating the capability of human speech perception and production. However, computers still cannot hear their own voice, as the learning and inference to listen and speak are made separately and independently. Consequently, the separate training of ASR and TTS in a supervised fashion requires a large amount of paired speech-text data—furthermore, there is no ability to grasp the situation and overcome the problem during inference. On the other hand, humans learn how to talk by constantly repeating their articulations and listening to the sounds produced. By simultaneously listening and speaking, the speaker can monitor her volume, articulation, and the general comprehensibility of her speech. Therefore, a closed-loop speech chain mechanism with auditory feedback from the speaker's mouth to her ear is crucial. In this talk, I will introduce a machine speech chain framework based on deep learning. First, I will describe the training mechanism that learns to listen or speak and to listen while speaking. The framework enables semi-supervised learning in which ASR and TTS can teach each other given unpaired data. Applications of multilingual and multimodal machine speech chains to support low-resource ASR and TTS will also be presented. After that, I will also describe the inference mechanism that enables TTS to dynamically adapt (“listen and speak louder”) in noisy conditions, given the auditory feedback from ASR.

Unleashing the Power of Process Mining for Data-Informed Process Improvements

Dr. Abel Armas Cervantes

KL

School of Computing and Information Systems, The University of Melbourne, Australia

Business processes directly influence customer experiences and overall revenue, making them a critical aspect of modern businesses. Therefore, it is important to ensure they are maintained and continuously improved. Process mining has emerged as a family of tools and techniques aimed at deriving insights from an event log for data-informed process improvements. Event logs (repositories of historical data recorded by information systems) capture information about activity executions within a process. In this talk, I will delve into the fundamentals of process mining and its main operations. I will present two real-life case studies to illustrate instances where process mining initiatives have been implemented.

List of Invited Speakers

Bringing It All Together: How Software Links AI, Chips, and People

On Lee

IS

Glair.ai, CEO & CTO of GDP Labs, CTO of GDP Venture

This presentation explores software's crucial role in integrating AI, semiconductor technology, and human interfaces. We will examine how software bridges AI's computational demands with semiconductor innovations, focusing on hardware abstraction, AI framework optimization, and the democratization of advanced computing. We will recommend Indonesia's strategic approach to open-source software, including its adoption of frameworks like PyTorch and TensorFlow, which ensures the global compatibility of Indonesian-made chips so that popular AI applications will run on them. The presentation will analyze Indonesia's position in this technological landscape, addressing ecosystem development, partnerships, and regional advantages. It will ultimately demonstrate how software drives the convergence of AI and semiconductor technologies in our evolving digital economy.

Electronic Voting and Centralized Driver License (SIM)

Rizqi Ayunda Pratama, S.Kom, M.B.A, M.A.B.

IS

PT Inti Konten Indonesia's Director

This presentation examines the implementation of electronic voting (e-voting) and a centralized driver's license system in Indonesia. E-voting uses digital technology for creating ballots, casting votes, counting, reporting results, and storing vote data. Designed for efficiency, it speeds up voting and improves accuracy by preventing duplicates and invalid votes. The centralized driver's license system merges the SIM Issuance Application from Satpas locations into a central Data Center. This centralizes SIM services and data storage, streamlining processes. The presentation will discuss challenges faced in implementing these technologies and demonstrate how they contribute to Indonesia's digital transformation.

List of Abstracts

G-Connect NextGen: The Low Network Connectivity Architecture for Landslide Early Warning System using Internet of Things Platform

1571024617

Mardhani Riasetiawan¹

¹Universitas Gadjah Mada

Natural disasters, such as landslides and floods, can cause significant loss of life, damage to property, and disruption of essential services. Timely and accurate early warning systems are vital for minimizing the impact of these disasters and enabling proactive emergency response. However, many regions prone to such disasters, particularly in remote areas, often suffer from limited network connectivity, which hampers the deployment and effectiveness of traditional early warning systems. In recent years, the rise of the Internet of Things (IoT) has revolutionized the way we collect, analyze, and utilize data. IoT technologies offer the potential to overcome the challenges posed by low network connectivity and provide real-time monitoring and early warning capabilities even in remote areas. By deploying a network of interconnected sensors, data can be collected and processed locally, reducing reliance on extensive network infrastructure. This paper proposes an IoT-based architecture specifically designed for landslide and flood early warning systems in regions with low network connectivity. The architecture harnesses the power of IoT devices, including wireless sensor networks, data analytics algorithms, and cloud computing, to enable the collection, analysis, and dissemination of critical data in real-time. The key contribution of this research is designing a robust and scalable IoT architecture tailored to the specific requirements of landslide and flood early warning systems. The architecture provided the efficient data collection mechanisms using wireless sensor networks to capture environmental parameters and provide real-time updates, implementing advanced data analytics algorithms to process sensor data and detect potential landslide or flood events. The architecture was designed a cloud-based infrastructure for storage, processing, and analysis of the collected data, considering the limitations of low network connectivity support by a reliable communication framework that enables timely dissemination of warnings and alerts to relevant stakeholders, including local communities and emergency response teams. The outcome of this research is expected to contribute to the advancement of early warning systems in low network connectivity regions prone to landslides and floods. By providing real-time monitoring, accurate detection, and timely warnings, the proposed IoT-based architecture can potentially save lives, minimize damages, and improve disaster response in remote and vulnerable areas.

A Systematic Review: The Utilization of Artificial Intelligence in Forensic Odontology

1571027024

Muhamad Supriyadi¹, Azurah Samah², Hairudin Abdul Majid², and Jemie Muliadi³

¹National Research and Innovation Agency of Indonesia, ²Universiti Teknologi Malaysia, ³The Agency for National Research and Innovation

The use of Artificial Intelligence (AI) in forensic odontology signifies a significant change, with the potential to improve the precision, effectiveness, and dependability of forensic investigations mostly focused on teeth and jawbones. This systematic review seeks to summarize the present state of AI applications in forensic odontology. It will analyze research conducted up to 2023 to assess the methods used, the results obtained, and the potential future developments in this field. By conducting a thorough and systematic search across well-known databases, employing specific keywords associated with artificial intelligence and forensic odontology, we successfully located pertinent papers that specifically address estimating age, determining gender, and detecting mandibular third molars. The results of our research indicate a growing interest in utilizing deep learning models, specifically convolutional neural networks, for the analysis of dental images and the automated interpretation of dental characteristics. These models surpass traditional methods by enabling quicker and more precise forensic examinations. In conclusion, AI has the ability to greatly transform forensic odontology by improving the accuracy of diagnoses and increasing operational efficiency. These models have the potential to be effective tools for identifying victims of large disasters and can provide valuable assistance in medico-legal scenarios.

Enhanced Dynamic Anchor Learning for Oriented Object Detection on Satellite Images

1571028739

Asep Haryono¹, Yuki Istianto², Rully Kusumajaya³, Sofyan Prasetyo³, Muhammad Putranto³, and Adi Nurhadiyatna³

¹National Research and Innovation Agency (BRIN), ²National Research and Innovation Agency, ³BRIN

In object detection, most of them use horizontal bounding box (HBB). This will be a problem when objects are adjacent to other objects in the oriented direction because it causes a misalignment of the bounding box. To determine the oriented bounding box (OBB), the Horizontal anchor needs to be modified to become a rotation anchor. Through a two-stage process, namely by finding HBB and then converting it to OBB, it becomes inefficient. The method that can be used to overcome this problem is Dynamic Anchor Learning based on Convolutional Neural Network (CNN). This research proposes the use of a new building block that is more effective to overcome the weaknesses of ResNet when the network becomes very deep and complex. By providing connections similar to hierarchical residues within a single residue block, the proposed method is able to represent multi-scale features at a granular level and increases the range of receptive fields for each network layer. The experiments carried out proved to produce better and faster accuracy than the baseline method with a mAP value of 92.38%.

The Effects of Advertising, Perceived Benefit, UI/UX, IS Security Model, and Satisfaction Towards the Actual Usage of Digital Payment

1571029400

Surjandy¹, Julio Putra², Leonard Lee², and Juan Tandrea³

¹Bina Nusantara University, ²Binus University, ³University Bina Nusantara

Bank Indonesia (BI) reported 993 million digital payment transactions in 2022, totaling Rp 98.45 trillion, reflecting a notable rise in both the volume and value of these transactions. Previous studies have shown that consumers' decisions to incorporate digital payment methods into their routine transactions are influenced by their perception that using these methods will benefit them during transactions, along with the security and risks that they have considered and chosen to trust. Ads and promotions are considered in separate research as factors in customer satisfaction and consequently affect the actual use of digital payment systems. The conditions serve as the basis for this study. The purpose of this study is to examine the effects of the IS security model, advertising, perceived benefit, UI/UX, and user satisfaction on the actual usage of digital payment methods among Gen Z in the Jabodetabek area. The data that involved in this study were collected from 739 respondents with ages that range between 18 to 24 (Gen Z) who use digital payment methods. Utilizing a quantitative method and the Structural Equation Model - Partial Least Square (SEM PLS) to analyze the data, this study brought light to what degree the aspects of confidentiality, integrity, availability, advertising, perceived benefit, UI/UX, and user satisfaction factor into the actual usage of digital payment method, with percentages of (3.5%), (10.4%), (8.5%), (7%), (28.6%), (15.8%), (23.4%) respectively. This research will be useful for the growth of digital payment methods

Trends and Insights in Artificial Intelligence Applications for Microgrid Management: A Bibliometric Analysis

1571040370

Marlina Pandin¹, Nurfadli Syahlani¹, Agung Utomo², Sik Sumaedi³, Mauludin Hidayat¹, HENDY Gunawan¹, Medi Yarmen¹, and Igif Prihanto¹

¹BRIN, ²National Research and Innovation Agency, ³National Research and Innovation Agency of the Republic of Indonesia

The integration of artificial intelligence (AI) into the management of microgrids plays a crucial role in advancing sustainable energy systems. This study utilizes bibliometric analysis to investigate trends, patterns, and insights regarding the application of AI in microgrid management. By analyzing 187 relevant publications from the Scopus database, this research identifies a substantial growth in AI-related research for microgrids, with India, China, and the United States leading in contributions. Key research themes include optimization algorithms and adaptive systems. This study highlights the current state of AI in microgrid management, identifies research gaps, and proposes future research directions, contributing to the development of more efficient and resilient energy systems.

Application of LSTM, RNN, and Transformer in Stock Price Prediction of Information Technology Companies: A Comparative Analysis

1571041732

Putri Rukmana¹, Asriana¹, and Hanif Fakhurroja²

¹Telkom University, ²National Research and Innovation Agency

This research evaluates the effectiveness of the Long Short-Term Memory (LSTM) and Recurrent Neural Network (RNN) algorithms in predicting the stock prices of five well-known information technology companies (Cappgemini, Infosys, IBM Consulting, NTT Data, and Cognizant). The methodology used is Knowledge Discovery in Databases (KDD). This research examines historical data related to stocks from 2018 to 2023, makes predictions for the next period, and analyzes based on the Moving Average Convergence Divergence (MACD) indicator to determine changes in stock momentum. The results show that no model is superior across companies to either the LSTM or RNN model in terms of performance. Depending on the unique characteristics of each company's data, the performance efficiency of the model varies. Future stock price predictions based on each company's best model show clear patterns. Based on MACD analysis, most companies achieved balance during the Golden Cross and Death Cross patterns recorded over the last five years. If the frequency of Golden Crosses is higher than Death Crosses, it indicates good stock performance for the company.

Employing SBERT for Essay Assessment

1571042569 Slamet Riyanto¹, Fenny Lestari², Cahyani Riyanto², Ari Ferdiansyah², Eni Irfiani³, Al Hafiz Akbar Maulana Siagian¹, Sriyadi³, Fernando Siahaan³, and Niken Fitria Apriani¹

¹National Research and Innovation Agency, ²University Bina Sarana Informatika, ³Universitas Bina Sarana Informatika

Conducting exams is important not only to evaluate the performance of students but also to analyze that of learning process. However, it is not easy and even time consuming to assess exams, especially for essays. To address such issues, it is worthwhile to have a system that can help in assessing exams. In this study, we aim to develop an automated essay scoring system to assess essay exams in Cibinong Mechanical Vocational High School, Bogor, Indonesia. We utilize semantic similarity evaluation and syntactic analysis to enhance the evaluation system of the Cibinong Mechanical Vocational High School for essay answers. Specifically, we employ Sentence Bidirectional Encoder Representation from Transformer (SBERT) as our model. Our SBERT model results show that they could perform an automatic assessment as good as the conventional one in evaluating the essay exams. Then, the SBERT model is adopted to develop the automated essay scoring system to help Cibinong Mechanical Vocational High School staff assess their students' exams.

Classification and Forecasting Air Pollution Using Naive Bayes and Prophet: A Use Case of Air Quality Index in Jakarta

1571042610 Niken Fitria Apriani¹, Jacqueline Salampessy², Sri Kusumadewi², Rafli Rizky², Al Hafiz Akbar Maulana Siagian¹, Fernando Siahaan³, Slamet Riyanto¹, Sriyadi³, and Eni Irfiani³

¹National Research and Innovation Agency, ²Bina Sarana Informatika University, ³Universitas Bina Sarana Informatika

Air pollution is a major issue in large cities generally caused by various industrial developments, power plants, vehicles, and natural disasters. Air Quality Index (AQI) that represents the level of air pollution is influenced by several pollutants such as Particulate Matter (PM10), (PM2.5), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), Ozone (O₃), and Nitrogen Oxide (NO₂) which are harmful for health. According to a report by IQAir in 2021, Indonesia has the highest air pollution level in Southeast Asia and ranks 17th globally. Therefore, it is important to pay attention to this air pollution issue to avoid health problems. To address this issue, we aim to develop a system for classifying and predicting AQI in Jakarta. To do this, we utilize Naive Bayes (NB) and Prophet algorithms to classify and predict, respectively, AQI in Jakarta. The data used in this study are obtained from the Open Data Portal of the Jakarta Provincial Government (Satu Data Jakarta). Our results show that the NB could achieve an accuracy score of 99% in classifying the AQI, while the Prophet could predict the upcoming AQI with an error percentage value of 26.88%. In particular, our developed system provides AQI information for today, last six days, and the upcoming week. The developed system also includes a simulation page for checking the level of air pollution and suggestions to act accordingly.

The Development of A Digital Transformation Model for Higher Education Using the Object-Process Methodology

1571043716

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Digital transformation (DT) is an essential need for higher education like university in the era of modern technology to improve the quality of education and operational efficiency. This research develops a DT model using Object-Process Methodology (OPM), which integrates objects and processes into a single structured framework. Systematic Literature reviews were conducted to identify key components and challenges in digital transformation. In detail, the OPM model was developed to map the interactions between technology infrastructure, business processes, human resources, and change management. Further, the model validation was conducted through three experts' judgment. Therefore, the results show that our OPM model helps the university to plan and implement DT strategies more effectively, improving the efficiency and quality of education. Hence, the author encourages to use OPM model like in this study as a strategy to implement DT.

The Influence of ISW on the AUV Control System and Stability in the Bali Deep Sea

1571044001

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This paper examines how the deep-sea current of Bali, or Internal Solitary Waves (ISW), affects the stability of an Autonomous Underwater Vehicle (AUV) controlled with Sliding Mode Control (SMC) algorithm. Since Indonesia, one of the world's largest maritime nations, has most of its marine wealth underwater, more technological development is needed to explore these resources. Developing AUV technology is a cost-effective alternative. However, AUVs must perform accurate trajectory tracking for practical exploration. This requirement depends on a well-designed control algorithm that can handle external disturbances. In this paper, numerical simulations are conducted on the BlueROV2 model controlled using the SMC algorithm with different external disturbances caused by the ISW at Bali Sea. Simulation results show that the extreme Bali Deep Sea wave can destabilize AUVs, even with only 25% of the total ISW disturbance. Increasing the thrust of each thruster, or Thruster Allocation Matrix (TAM), did not significantly improve the stability. Therefore, the SMC control algorithm is not recommended for deep-sea missions, and developing an optimal control algorithm is suggested for further research.

An efficient hardware implementation of FPGA-based stereo matching using a single path SGM direction

1571044274

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This research focuses on the implementation of FPGA-based stereo matching with minimal hardware utilization, particularly for medium- to low-end FPGAs with limited hardware resources. Due to its ability to rapidly reconstruct the distance of an object from two stereo images, stereo matching has recently been widely employed in robot navigation, advanced driver assistance systems (ADAS) in automotive, and agricultural. To achieve minimal hardware requirements for stereo matching implementation, we offer stereo matching with a tiny window buffer for cost matching computation utilizing sum of absolute difference (SAD). Furthermore, a single path semi-global matching (SGM) direction is used to boost the smoothness and discontinuity of the disparity image. According to the experimental results obtained with the Xilinx Zynq-XC7Z020 using a 4x4-pixel window size and single path SGM, the amount of required FPGA resources are 9% FF, 18% LUT, 5% BRAM, and 136 MHz working frequency. For the execution time, it takes 1.68 seconds.

End-to-End Phoneme Recognition in Bahasa Indonesia with Pretrained Speech Embeddings and 1D-CNN Using CTC

1571044597

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Phoneme recognition in low-resource languages like Bahasa Indonesia is hindered by the limited availability of annotated datasets and linguistic resources. This study proposes an end-to-end phoneme recognition system for Bahasa Indonesia using pre-trained speech embeddings from Wav2Vec2 and a one-dimensional Convolutional Neural Network (1D-CNN) with Connectionist Temporal Classification (CTC). The model is compared against a baseline employing fully connected layers. Our findings highlight the effectiveness of integrating pretrained speech embeddings and CTC in improving phoneme recognition accuracy. The proposed models utilizing a 1D-CNN kernel size of 9 achieve a phoneme error rate (PER) of 5.27 after 100 epochs and 4.89 after 200 epochs of training, using 156.1 hours of the training dataset.

Virtual Reality Dashboard Design Ontology (VRDDO): A Theoretical View

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This paper presents the Virtual Reality Dashboard Design Ontology (VRDDO) from theoretical point view on how the selected theories are grounded to the VRDDO design and development. The VRDDO proposed here as a design artefact as the result of Design Science Research (DSR) Methodology, primarily it is the outcome of the DSR Design & Development stage. In line with DSR practitioner kernel theory fundamentalist who insist on a kernel theory-based grounding of design artefact design and development as mandatory components of DSR methodology.

Drug Side Effect Prediction Using Gravitational Search Algorithm - Support Vector Machine: Case Study of Eye Disorders

1571044647

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¹Telkom University

Adverse drug events are pharmacologic impacts past the restorative reason that happens after the use of a drug. Drugs can potentially cause unwanted side effects or ADRs. Serious adverse drug events are evaluated to be the fourth driving cause of passing within the United States coming about in 100,000 passings per year. The main difficulty in finding adverse drug events through experiments is that designing clinical trials to discover side effects is typically very expensive, time-consuming, and most importantly, remains very challenging in terms of cost and efficiency. To cut down on the time-consuming and expensive process of drug discovery, machine learning about potential side effects must be used early. This study aims to develop a model that can predict drug side effects. The model will use the Gravitational Search Algorithm (GSA) method to choose the most relevant data or features, and the Support Vector Machine (SVM) method to build the prediction model. Hyperparameter tuning is performed with Linear, Polynomial, and RBF kernels to enhance the model performance. The best model is the RBF kernel with good performance having an accuracy value of 0.6391 and F1-Score value of 0.7163. Keywords-Gravitational Search Algorithm, Support Vector Machine, Machine Learning, Drug Side Effects

Predicting Bioactivity of PLK1 Inhibitor as Anti-Cancer Agent using Multilayer Perceptron Optimized by Simulated Annealing

1571045028

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¹Telkom University

Cancer, characterized by malignant cell development and uncontrolled division, resulted in 1,958,310 new cases and 609,820 deaths in the U.S. in 2023. Prostate cancer is notably rising by about 3% annually from 2014 to 2019, leading to 99,000 new cases. Common cancer treatments include chemotherapy, surgery, radiotherapy, and drugs, with chemotherapy being the most prevalent despite its lack of selectivity and toxicity to healthy cells. However Polo-like kinase 1 (PLK1) has emerged as a promising anticancer target due to its critical role in cell cycle regulation. Currently, predicting PLK1 bioactivity relies on clinical trials, which are often time-consuming, costly, and inefficient. An alternative to predict bioactivity PLK1 using in silico methods because it is faster and more efficient. This study aims to develop a predictive model for PLK1 bioactivity using a Multilayer Perceptron (MLP) architecture, with Simulated Annealing (SA) algorithm employed for optimizing the architecture. The results showed that the MLP architecture optimized using the SA algorithm gave significant results. The best model obtained from MLP consists of 5 hidden layers with relu activation function and SGD optimizer, resulting the R² value and CC value at 0.68 and 0.84, respectively.

Function Point Analysis of Fuzzy Risk Priority Number Calculator

1571045140

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Function Point Analysis (FPA) is widely used for estimating software size. Despite its popularity, it has faced various criticisms, leading to ongoing efforts to enhance its accuracy. This paper estimates function points for the Fuzzy-RPN calculator software using a modified version of the International Function Point Users Group (IFPUG) method. Our approach improves the traditional IFPUG method by incorporating fuzzy logic and the analytical hierarchy process (AHP), resulting in more precise software analysis outcomes.

Predicting Stock Market using CNN and BiLSTM Model

1571045178

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This study explores the efficacy of two advanced deep learning models, Convolutional Neural Network (CNN) and Bidirectional Long Short-Term Memory (BiLSTM), in predicting stock prices. Utilizing historical stock price data from NVIDIA spanning January 1, 2013, to December 31, 2023, the dataset was normalized and structured into sequences with a time step of 10 days. The data was then split into training and testing sets in an 80-20 ratio. The CNN model architecture included multiple convolutional layers with batch normalization and dropout to prevent overfitting, followed by dense layers. Conversely, the BiLSTM model comprised a bidirectional LSTM layer with dense layers for output. Both models were trained using the Adam optimizer with a learning rate of 0.001 and Mean Squared Error (MSE) as the loss function. Evaluation metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared (R^2) were used to assess model performance. The BiLSTM model significantly outperformed the CNN model, achieving lower MAE (1.675), RMSE (2.237), and MSE (5.008) values, and a higher R^2 value (0.963), indicating superior predictive accuracy. These findings underscore the BiLSTM model's enhanced capability in capturing temporal dependencies and intricate patterns within stock price data, suggesting its greater effectiveness for time series forecasting tasks. Future research should consider hybrid models that leverage the strengths of both CNN and BiLSTM for improved stock price prediction accuracy.

Analysis of Fraud Attacks Using Android Package Kit in Indonesia

1571047937

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The increasing prevalence of new phishing and scamming attack methodologies in Indonesia, orchestrated by threat actors, highlights significant concerns for Android users. The dynamic frequency and sophistication of cyberattacks in Indonesia, particularly through Android Package Kit (APK), presents a challenge for cybersecurity researchers and experts to protect the Indonesian public. This research carefully dissects the patterns and tactics used in these fraudulent attacks, explaining the common traits of malicious APKs and the strategies used by threat actors to exploit vulnerabilities in Android devices. A comprehensive examination of APK phishing incidents reported in Indonesia over the past few years forms the basis of this research, drawing insights from various cybersecurity reports, case studies, and digital forensic analyses. The research conducted a study of specific vulnerabilities inherent to the Android system, which included behavioural analysis and security lapses on user devices. In addition, an in-depth review was conducted to assess the efficacy of existing cybersecurity measures and policies in Indonesia, measuring their ability to thwart fraudulent APK attacks. This research underscores the importance of more robust security protocols, better user education, and strict regulatory frameworks to mitigate the risks associated with phishing APK attacks. The findings aim to provide cybersecurity professionals, policymakers, and the general public with a deeper understanding or security awareness of the nature and implications of fraudulent APK attacks in improving digital security in Indonesia.

Customer Churn Prediction using Confident Learning and XGBoost

1571048678

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Customer churn prediction is a critical task for businesses to reduce customer attrition and improve customer retention strategies. In this paper, we propose an approach to improve the accuracy and effectiveness of customer churn prediction in the banking industry using confident learning and the XGBoost algorithm. Confident learning is employed to address the challenges of uncertain or mislabeled training data, while XGBoost is utilized as a powerful classification algorithm for building an efficient prediction model. The experimental results showed a significantly improved accuracy from 76.8% to 81.2%.

Security Analysis of Audit Tools

1571048943

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BRIN has built an SPBE application and infrastructure audit tool in accordance with the mandate of Presidential Regulation No. 95/2018 on Electronic-Based Government Systems. However, it is necessary to ensure that the web-based audit tool that has been built is guaranteed security. This research was conducted to measure the vulnerability of the audit tool with a blackbox testing method that utilizes the Burpsuite and OWASP ZAP applications. The results obtained state that the audit tool has vulnerabilities. Although the results are still at a medium level such as Content Security Policy, Cross Domain Misconfiguration and Vulnerability JS library by OWASP ZAP and TLS cookies without secure flag set, all of them need attention to improve system security. Recommendations are also given focusing on improving Content Security Policy, Cross Domain Misconfiguration, patches on javascript components such as jQuery, and handling Cookies and Cache.

Dual-Path U-Net for Polyp Segmentation

1571052143

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Polyp segmentation is a useful task to detect polyp which is the cause of colorectal cancer. Polyp detection with high accuracy can help increase the survival rate of colorectal cancer. Polyp segmentation is widely performed using deep learning such as U-Net and DoubleU-Net which produce a good performance. To perform polyp segmentation with better accuracy than these methods, Dual-Path U-Net is proposed. The Dual-Path U-Net uses two U-Net that are made into a Dual-Path Architecture by combining shortcut connections from both encoders to each decoder. Dilated convolution is used to learn feature maps with larger receptive fields. To improve the quality of feature maps from dilated convolution, Squeeze-and-Excitation is used. Furthermore, the Dual-Path U-Net produces better mean F1-Score and mean IoU than the DoubleU-Net method by 92.47% and 87.43%, respectively.

Factor Analysis: Uncovering Factor Structure in the Indonesian Teacher Engagement Index (ITEI) Survey Results Data

1571052614

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This study aims to explore the latent structure of the Indonesian Teacher Engagement Index (ITEI) from national survey data. The main objective of this study is to identify the main factors underlying the dimensions of the ITEI. Exploratory factor analysis (EFA) method was used with Principal Component Analysis (PCA) extraction method and varimax rotation. The analyzed data came from 10,365 respondents covering 44 items from 6 ITEI dimensions. The analysis results show that the factorial structure of ITEI can be reduced to 4 main factors that explain the variation of 28 items. The four new factors found were summarized into the dimensions of Values and Ethic in Education, Personal and Social Development in Education, Character and Leadership in Education, and Social Competence and Justice in Education. The findings provide a deeper understanding of the main components that make up the teacher engagement index in Indonesia. The implications of these findings can be used to improve understanding and development of more effective education policies in the future.

Fine Tuning Panoptic Scene Graph Generation

1571056506

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The understanding of scene graph generation has evolved from bounding box approaches to segmentation techniques. The initial development in scene graph generation benchmarks aimed to enhance the understanding of contextual information in visual images. Subsequent advancements using panoptic scene graph generation have improved the precision of contextual information in visual scenes, facilitated by segmentation that minimizes information loss through masking processes. To comprehend and advance understanding of visual scenes, it is crucial to grasp the rationale and architecture of panoptic scene graph generation. Therefore, this study analyzes the panoptic scene graph generation process by fine-tuning hyperparameters, specifically the learning rate using cosine annealing and Nesterov momentum. Additionally, the integration of cosine annealing and Nesterov momentum has shown effectiveness in accelerating the process and reducing the loss function, resulting in higher mean Recall (mR). In this study, the highest mR value was observed at epoch 7, with a training loss of 7.37, test loss of 18.23, and mR of 17.40.

Enhancing Freelancer Project Matching With a BERT-Powered Deep Learning Indonesian Chatbot

1571056824 Abdul Aziz¹, Mutiara Khadija¹, Wahyu Nurharjadmo¹, Dany Candra Febrianto², Muhammad Firmansyah², and Rohmawan Pratama¹

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The rapid expansion of the freelancing sector has underscored the necessity for more efficient project matching systems. Traditional methods, which largely depend on keyword searches and manual reviews, are often slow and error-prone. This paper presents an innovative solution: an Indonesian chatbot powered by Bidirectional Encoder Representations from Transformers (BERT), aimed at enhancing freelancer project matching. The proposed chatbot utilizes advanced natural language processing (NLP) techniques to deliver personalized project recommendations based on users' skills and experiences. It leverages BERT's bidirectional training approach for better context understanding and integrates Long Short-Term Memory (LSTM) networks to maintain context over extended interactions. The system's adaptability allows for continuous learning and updating, accommodating new fields and trends. Data was collected using ChatGPT 4.0 and was processed to create a dataset focused on Information Technology, Business Management, and Graphic Design. The models, including Recurrent Neural Networks (RNN) and LSTM, demonstrated impressive performance with LSTM showing superior results in accuracy and context retention. This research highlights the advantages of using BERT with deep learning models for accurate and efficient project matching, providing a scalable solution for the evolving freelancing landscape. Future work will explore expanding the system to other languages and domains to further enhance its applicability.

Innovation in Education: Analyzing the Dynamics of Digital Transformation, and Teaching Practices on School Performance Through Teacher Engagement

1571056964

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Digital transformation has become an important phenomenon in modern education, rapidly changing the learning landscape. This study aims to investigate the impact of digital transformation, teaching practices, and teacher engagement on school performance. Through comprehensive analysis, this research aims to explore how the adoption of technology influences the way teachers teach and how this influences the level of teacher involvement thereby impacting school performance. The research was conducted using quantitative research methods through surveys with Likert scale questionnaires. Samples were taken from 324 respondents consisting of teachers and school leaders. The reliability and validity of the instrument were tested using Cronbach's Alpha, Average Variance Extracted (Pvc) and Composite Reliability (Pc). Data analysis using Smartpls 3.0. The research results show that the relationship between digital transformation variables, teaching practices, and teacher involvement and school performance is positive and significant. From the Path Coefficient value obtained, it means that the higher the digital transformation, teaching practices and teacher involvement, the higher the school performance

Exploring the Evolution of Data Management in E-Government: Bibliometric Analysis

1571059076

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This paper uses bibliometric analysis to investigate how data management research has changed over time regarding electronic government or e-government. Information and communication technology (ICT) is used by e-government to increase government services' effectiveness, accountability, and openness while reducing the distance between the people and the government. Technological advancements, particularly in big data, have caused the focus of ICT usage from offering only government services to optimizing resource utilization to address issues and enhance public welfare. The effectiveness of e-government depends on efficient data management, including developing, applying, and overseeing procedures and guidelines. This study tracks the evolution of e-government themes related to data management from 2003 to 2023 by bibliometric analysis of Scopus and Web of Science datasets. There are four distinct eras in the central theme identification and evolution analysis. According to the study's findings, several themes, including big data, open government data, data security, and smart cities, are immature and have the potential to develop. These subjects could be the subject of future investigation. Through thorough observation, scholars and practitioners better understand the existing state and potential future orientations of data management in e-government.

Citrus Leaf Variety Identification Based on RGB and HSV Color Features

1571060480

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Indonesia has a large variety of agricultural production. One type of agricultural production is citrus fruit. Several studies have developed ways to identify types of citrus from the leaves. One of them is classifying types of orange leaves from LBP (Local Binary Pattern) and moment invariance features. Based on previous research, the classification process only calculates the closest distance to the orange leaf feature. The results of measuring similarity based on distance have a high level of accuracy. Based on this, we propose a classification of orange leaf types from RGB and HSV colors using the Machine Learning method (k-NN (k-Nearest Neighbor), SVM (Support Vector Machine), and Decision Tree). The aim of this research is to determine the accuracy results of the features and methods for classifying types of orange leaves. We collected data by photographing orange leaves in the garden. The dataset used is 120 leaf images, consisting of 60 lemon and 60 nipis. Features taken from RGB (Red, Green, Blue) and HSV (Hue, Saturation, Value) image leaves are mean, standard deviation, skewness, entropy, variance and kurtosis. The methods for classifying citrus leaf types are k-NN, SVM and Decision Tree. The best accuracy result is the k-NN method, with an accuracy of 0.975.

Latest Research in Data Augmentation for Low Resource Language Text Translation: A Review

1571060874

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The translation of low-resource languages remains a significant challenge in Natural Language Processing (NLP) due to the scarcity of high-quality parallel data for training machine translation models. Data augmentation techniques, which artificially expand the size and diversity of datasets, offer a promising solution to this problem. This study comprehensively reviews data augmentation techniques in low-resource language text translation. Sixteen recent articles met the specified eligibility criteria employing the systematic literature review protocol. The review categorized the various data augmentation methods into eight groups: translation-based augmentation, synthetic data generation, sentence manipulation, grammar and error correction, multi-task and advanced transformations, miscellaneous transformations, consistency and self-training, and embedding and contextual methods. The findings highlight the significant impact of data augmentation on improving translation quality, addressing data scarcity, and enhancing model robustness. Despite these advancements, challenges such as grammatical errors, semantic inconsistencies, and the quality of synthetic data remain. This review also provides insights into the effectiveness of different language pairs and dataset sizes, emphasizing the need for further research to refine these methods and address challenges in low-resource languages.

The Use of Administrative Data to Generate Information for Decision-Making in Healthcare: A Narrative Review

1571062413

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Information technology has recently led to vast data generation, including in healthcare services. This data can be used to generate evidence for decision-making and has been widely used in high-income countries (HICs) to inform their decision-making process. However, the use of data in low- and middle-income countries (LMICs) is lacking. The burden of diseases between HICs and LMICs differs, with LMICs still struggling to battle infectious diseases. Thus, we aim to review the available literature on the status of using administrative data in generating evidence and how to use this data for decision-making on infectious diseases. We found disparities in research between HICs and LMICs, with most studies conducted in Taiwan, the United States, South Korea, France, and Japan. Research in LMICs is scarce, highlighting inadequate information on prevalent diseases in LMICs, but not in HICs, such as neglected tropical diseases. HICs' research utilized data from insurance claims, electronic medical records, and linkage from various databases. Administrative data are used for five main purposes, as follow 1.) to describe the epidemiology of diseases, 2.) to identify risk factors or associations among diseases, 3.) to evaluate healthcare services or policies, 4.) to identify any temporal changes in diseases, and 5.) to improve the validity of studies. The methodological approaches are diverse, ranging from regression analysis to advanced analysis such as machine learning. Yet, machine learning's potential in this domain remains underutilized since the applied analyses are mostly limited to data visualization, and conventional machine learning such as XGBoost, and decision tree analysis. An important highlight is that there are still gaps and opportunities for LMICs to further explore insights for infectious disease management, due to the current lack of data science research from LMICs in this area.

Enhancing OCR Accuracy for Bugis Language to Bahasa Indonesia Dictionary Conversion Through Image Pre-Processing and Scaling Techniques

1571063984

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This research evaluates the performance of various Optical Character Recognition (OCR) methods by analyzing Character Error Rate (CER) and Word Error Rate (WER) metrics on a scanned version of the dictionary titled Kamus Bahasa Bugis - Indonesia. The study compares the baseline performance of Tesseract-Vanilla with advanced approaches including Tesseract-ImageMagick, Tesseract-Python (PIL Library), and ChatGPT. The results demonstrate that Tesseract with ImageMagick preprocessing consistently delivers superior performance, with significantly lower error rates and variability, as confirmed by standard deviation and p-value analyses. The application of post-processing techniques further enhances accuracy, emphasizing the importance of image preprocessing and post-processing in OCR tasks. Additionally, the research highlights the potential of AI-driven methods like ChatGPT, particularly in handling complex or non-standard text recognition scenarios present in the dictionary. These findings provide critical insights for selecting OCR tools based on project-specific requirements, emphasizing the need for both accuracy and consistency in applications ranging from document digitization to automated text processing.

NoSQL Injection Detection Using Deep Neural Network and Principal Component Analysis of Injection Feature Vectors

1571064177

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NoSQL database have gained popularity in Big Data and other various applications for its simplicity and flexibility. The non-relational nature of NoSQL database such as MongoDB prove to improve development lifecycles and resources efficiency. However, security challenges rise along with increasing usage of NoSQL database, and NoSQL database is no exception to injection attacks. Machine learning proved to be an efficient method, as many has researched. However, in the future there may be an increasing complexity of features that may prove costly to the model's performance. Therefore, this research aims to utilize principal component analysis as dimensionality reduction and deep neural network as the classification method, to improve the security of NoSQL database. The text query is converted to feature vectors then further processed to reduce the input dimension of the deep neural network using PCA. The features used are based on previous research and various sources, and some are added after analyzing the dataset. 10-fold cross validation is also applied to ensure that the model does not overfit the data, attempting to reduce bias to the result. The 10-fold cross validation model accuracy result is in average 97.44% with a standard deviation of 1.7%, and the testing results are 97.5% in accuracy, 95.65% in precision, 91.67% in recall, and 93.61% in F1 score. Thus, it can be concluded that the usage of PCA on injection feature vectors can reduce complexity of the model.

Optimizing Indonesian Tweet Preprocessing on Halal Domain

1571064307

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Indonesians' adoption of the halal lifestyle significantly influences the country's digital landscape, creating opportunities for data analysis and natural language-based solutions. However, the presence of unstructured and informal Indonesian text poses challenges that standard preprocessing techniques may be inadequate. This study introduces an extended preprocessing method for Indonesian tweets using the *idtext_nnormalizer* function. This method includes techniques such as string cleaning, exaggerated letter removal, laughter expression removal, substring separation, duplicate removal based on sequence similarity, and corpus-based filtering. The results show that these extended preprocessing steps effectively improve the performance of the tested models and reduce the training time, underscoring the effectiveness of the proposed preprocessing technique in managing unstructured and informal Indonesian text to optimize model performance.

Sleep Apnea Identification Based on EEG Signals Using Hybrid Spatio-Temporal Deep Learning

1571064498

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Sleep Apnea is a serious sleep disorder in which breathing stops for more than 10 seconds during sleep. It increases the risk of heart disease, high blood pressure, and stroke. This paper proposes methods to detect Sleep Apnea based on electroencephalogram (EEG) signals. EEG signals are recorded from multiple channels. Before detection, a filtered signal (0,5-30 Hz) needs to be extracted spacially first. It uses Convolutional Neural Networks (CNN). Then, the sequence of feature extraction signals was classified using Recurrent Neural Networks (RNN). So, it is called spatio-temporal. The experiment used the PhysioNet 2018 Challenge dataset every 30 seconds. Testing of the proposed method showed an accuracy of 98.96-99.59% or an average of 99,304%. The CNN extraction effectively captures spatial features from EEG signals across different channels, while the RNN is suitable for sequence data. Experiments also show that using GRU in a memory setting is better than LSTM in terms of accuracy and time performance, with only 40 minutes to achieve convergence. Extracting the appropriate frequency spectrum using the Wavelet transform effectively improves learning performance for Sleep Apnea detection. EEG signals capture the electrical characteristics of the brain and have a certain frequency that indicates Sleep Apnea.

Developing a Labeled Dataset for Chili Plant Health Monitoring: A Multispectral Image Segmentation Approach With YOLOv8

1571065241

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This research explores a new method for assessing chili plant health using multispectral camera imagery and deep learning-based image segmentation. Data from Bale Tatanen UNPAD chili farms were used to create a labeled dataset with four health categories. Initial image processing involved FastSAM inference to generate binary masks, followed by training a YOLOv8 model for improved segmentation accuracy. This model enabled NDVI calculation and automatic health labeling in unseen images, contributing to automated chili plant health monitoring systems. Evaluation showed an average Dice Coefficient of 63.80%, indicating moderate overlap between predicted and true masks. High precision and robust segmentation across various conditions were observed, though improvements are needed in fine detail segmentation. This approach enhances understanding of chili plant health and supports further studies in the field.

Spatio-Temporal Analysis to Inspect Infection Risk of Dengue Hemorrhagic Fever in Central Java From 2015 to 2022

1571065405

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Dengue hemorrhagic fever (DHF) is a serious public health issue worldwide, including Central Java, Indonesia. Several analyses need to be conducted to serve as a reference for the government take action to reduce the number of DHF cases. In this study, the data used was the quantity of Central Java and DI Yogyakarta provinces DHF cases from 2015 to 2022 due to the release of Wolbachia-infected *Aedes aegypti* mosquitoes in some areas in Yogyakarta province, and Central Java province as the surrounding area. The data was analyzed using spatial analysis with Moran's I measure to see if the proximity between areas affects the number of DHF cases. The Standardized Incidence Ratio (SIR) method was used to see areas most at risk of dengue cases. Further, the Pearson correlation coefficient method was also utilized, to see which climate variables have important influence on the number of DHF cases. This study found that the number of DHF cases in Central Java and DI Yogyakarta province did not have spatial dependence on regions within districts or towns in 2015-2022. However, for the analysis of cases only in DI Yogyakarta Province, there was spatial dependence between regions in districts/cities for the number of DHF cases in 2015, 2018, 2020, and 2022. In addition, by calculating the risk level of each district/city in the provinces of Central Java and DI Yogyakarta from 2015 to 2022, it was found that the most at-risk area was Magelang City, Central Java, with the SIR value is 15.611 in 2017. Among the three climatic variables (mean temperature, mean humidity, and total precipitation), the mean temperature and total precipitation significantly impacted the number of DHF cases with p-value are 0.085 and 0.008, respectively.

AI and Digital Leadership: Perspectives of Leaders in the Taiwan Restaurant Industry

1571066869

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One of the most dynamic industries in the world is the restaurant business, continuously evolving to meet changing consumer preferences and market demands. However, recent technological (AI) advancements have introduced new paradigms in how restaurants operate. Technology has become integral to the restaurant experience. Furthermore, this study will bridge the gap between AI and leadership style in the restaurant industry. This study adopts the qualitative method. Moreover, this study involves the perspective of leadership and digital leadership within AI and the impact of AI implementation by adopting focus group interviews with 17 top leaders in the restaurant to identify emerging innovations of this study. This study contributes researcher to a better understanding of AI innovation. This innovation is valuable for leadership and affects customer satisfaction in the restaurant industry. Moreover, this study offers helpful implications for researchers and stakeholders in the restaurant industry to understand digital leadership styles.

Development of Measurement Systems for Water Content in Transformer Insulating Oil

1571066957

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Transformers are crucial devices for adjusting voltage levels to meet everyday requirements. However, transformers that operate continuously over extended periods are susceptible to significant failures and damage. A key factor contributing to these issues is the deterioration of insulation, often caused by contaminants in the insulating oil, with water being a primary culprit. The presence of water compromises the dielectric properties of the oil, leading to dielectric breakdown and potential transformer damage. One effective method for detecting water content in the oil is through the use of a capacitive sensor. This sensor functions by detecting changes in electrical charge that occur due to variations in the distance, cross-sectional area, and volume of the dielectric material. The sensor's output is a capacitance value, which is then converted to a voltage reading. Experimental results have demonstrated that the MK33-W capacitive sensor is highly sensitive in measuring water content in transformer oil. The findings show an inverse relationship between capacitance and voltage, where an increase in capacitance corresponds to a decrease in measured voltage. The developed system performs reliably, with the humidity sensor exhibiting an error margin of 2.43% and the temperature sensor achieving an accuracy of 99.8%.

Identifying the Encryption Algorithm of SSH Session Keys

1571067135

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Identifying the encryption algorithm is a crucial part in extracting the SSH session keys. The knowledge of the encryption algorithm is required since it involves the decryption attempt of the ciphertext. Memory heap dumps contain valuable information such as cryptographic keys that could be obtained through memory forensics. This study proposes SSH session keys extraction tool to assist digital forensics investigator. The first step is determining the SSH encryption algorithm by inspecting SSH communication in the network capture. Second, the SSH session keys on the memory heap dump are localized using SmartKex model. Finally, the tool will made an attempt to decrypt the SSH session keys. The test results demonstrate that the proposed tool successfully identifies nearly all the keys in the test dataset while delivering efficient performance.

Developing Food Menu Recommendation System Based on Indonesian Nutritional Needs

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Food is an essential part of our life. However, consuming food recklessly affects health problems. Therefore, controlling or monitoring food consumption carefully is crucial for maintaining health. This study focuses on recommending food menus for people corresponding to their nutritional needs. In particular, the study employs users' age, gender, weight, height, and activity to determine their daily required nutrition. The study includes coefficient values calculated from the nutritional needs provided by the Indonesia Ministry of Health. Then, the daily required nutrition and the calculated coefficient values are utilized to recommend food menus accordingly. Our obtained results show that our system could appropriately recommend the food menu corresponding to users' nutritional needs. In particular, our food menu recommendation system provides three menu options, in which each menu option consists of staple foods (grains), animal proteins, plant proteins, vegetables, and fruits. Since each menu option contains the same number of calories corresponding to the users' nutritional needs, users can select any combination option menu without having worries.

Spatio-Temporal Clustering of Forest Fire Hotspots in the Wallacea Region in 2012 - 2022 Using Chronnet

1571067647

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Data from the Ministry of Environment and Forestry of Indonesia show that up to 3,776,009 hectares were burned by fires in Indonesia, with 2014 being the greatest incidence. Therefore, a research is required to examine the distribution pattern of hotspots for forest fires. This study used Chronnet to display the clustering of forest fire hotspot data in the Wallacea Region (North Maluku) between 2000 and 2011. The NASA FIRMS provided the MODIS data used in the study. Several findings have been made from the implemented Chronnet method. The degree of connectivity map shows a medium degree which suggests that the North Maluku frequently experiences forest and land fires of a moderate intensity. The strength map shows a complex pattern of fire activity, with high-intensity flames creating major concerns in some, particularly in West Halmahera Regency and low to moderate fire events occurring in most other places. The cluster results from Chronnet emphasize the necessity for focused fire management by showing a considerable concentration of fire activity, especially in locations like Ternate City, West Halmahera Regency, and East Halmahera Regency. These findings have a major influence on policy and fire management, guiding the allocation of resources and creating long-term plans for fire risk reduction in North Maluku.

Optimizing Machine Learning Models for Predicting User Engagement in Online Learning Platforms: The Role of Feature Selection

1571068245

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¹Universitas Sebelas Maret

Online education has emerged as a popular alternative to traditional learning environments, driven by its flexibility in terms of time, location, and pace. Understanding the factors that influence user engagement and course completion is essential for designing effective online learning experiences. This study explores how features such as time spent on courses, number of videos watched, quizzes taken, quiz scores, and device type impact engagement and course completion. Using a dataset incorporating these features, the Random Forest algorithm was employed to identify feature importance, highlighting its effectiveness in handling high-dimensional data. Additionally, the performance of five machine learning algorithms-Logistic Regression, Decision Trees, Random Forests, Support Vector Machines (SVM), and Gradient Boosting Machines (XGBoost)-was compared. Results indicate that Random Forests and XGBoost consistently achieve high accuracy, demonstrating robustness to feature reduction. In contrast, Logistic Regression showed sensitivity to reduced feature sets, while Decision Trees and SVM exhibited moderate performance drops. The findings provide valuable insights into optimizing online learning platforms, enhancing student engagement, and reducing dropout rates by identifying key behavioral predictors and selecting suitable algorithms for predictive modeling.

Evaluation of the Quality of ChatGPT in Translating Texts on Indonesian War of Independence From Dutch to Indonesian

1571068277

Tri Sampurno¹, Topan Harmanda², Mohammad Teduh Uliniansyah², and Dian Afra³

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ChatGPT has been proven to have good translation capabilities. However, for texts in certain specific domains, the quality of the ChatGPT translation results still needs to be verified. In this paper, we evaluate the quality of ChatGPT in translating texts on Indonesian war of independence, from Dutch to Indonesian. This study compares the ChatGPT translation quality against the Google Translate, which is the most use machine translation tool today. Using Bilingual Evaluation Understudy (BLEU) and Semantic Text Similarity (STS), the scores between provided set of human translation references and both machine translation outputs have been calculated. ChatGPT has an average BLEU score of 0.24 and an average STS score of 0.80, meanwhile Google Translate has scores of 0.25 and 0.79 respectively. This result shows that ChatGPT and Google Translate have comparable abilities in translating the text under study.

Indonesian Sign Language (BISINDO) Alphabet Detection Using the You Only Look Once (YOLO) Algorithm Version 8

1571068360

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¹National Research and Innovation Agency, ²Universitas Ibn Khaldun, ³Ibn Khaldun University

People with disabilities have increased over the past few years in Indonesia. Data from the Central Bureau of Statistics, Republic of Indonesia shows that the number of people with disabilities reached 212,240 in 2022 and specifically deaf people reached 19,392. This shows the need for attention to people with disabilities, especially the deaf and hard of hearing. This research aims to develop an Indonesian Sign Language (BISINDO) alphabet detection model using the You Only Look Once (YOLO) v8 algorithm. The resulting model is expected to help people in understanding sign language, thus expanding accessibility for people with disabilities. The model was trained using 2.759 images and 30 videos. The results show that the model can identify 26 letters in BISINDO alphabet including letters with motion (G, J and R) with an accuracy rate of 99%, a precision value of 99.4%, recall 98.4% and F1-score reached 98.9%. These values indicated that the model works well in predicting the BISINDO alphabet. The model built using this YOLOv8 produces sign language gesture conversion output into text, which can then be assembled into words, thus facilitating communication with deaf and hard of hearing people.

Enhancing Lung Cancer Classification With Ensemble Deep Learning Models

1571068385

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This study creates ensemble models from several pretrained models to classify 3 classes of lung cancer, including benign, malignant, and normal. The pretrained models that we use are EfficientNetV2B0, ResNet50V2, and DenseNet121, which were trained separately and then integrated using the average ensemble technique to improve prediction accuracy. The model training process is carried out by utilizing transfer learning, where the basic layers of the previously trained model on the ImageNet dataset are frozen to maintain previously acquired knowledge. New fully connected layers are then added and trained to adapt the model to the specific classification task of lung cancer. In addition, the fine-tuning process is carried out by reopening some of the frozen layers to further refine the model's performance on the lung cancer dataset that we use. The results of the study show that the developed ensemble models produces higher accuracy compared to individual models. With the ensemble models that have been built, it is hoped that it can be an effective tool in helping to classify lung cancer quickly, accurately, and can contribute to increasing the chances of patient recovery.

Artificial Neural Network Using Weight Initialization in Customer Churn Prediction: Banking Industry

1571068392

Neisya Santoso¹, Michael¹, Henry Lucky¹, and Meiliana¹

¹Bina Nusantara University

Predicting customer churn is crucial but ANN hasn't emerged as a powerful tool in the competitive banking industry. This study focuses on enhancing an Artificial Neural Network (ANN) model by exploring the effects of various weight initialization techniques, batch normalization, and dropout layers. Our findings indicate that the LeCun Normal initializer, when combined with batch normalization and dropout, achieved the highest validation accuracy of 84.17%, representing a significant improvement over the default Glorot Uniform as the default Keras initializer. We also found Glorot Normal and He Uniform also showed strong and consistent result with accuracies up to 83.94% and 83.87%. On the other hand, the Zero initializer consistently underperformed. These findings highlight the importance of choosing the right initializers and regularization techniques to improve ANN performance in churn prediction.

Fine Tuning Swin Transformer Based Pretrained Model for Microscopic Fungi Images Classification

1571068400

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An accurate recognition of infectious fungi is an important task that should be conducted by a mycologist. A classification of infectious microscopic scale size images from 5 types of infectious fungi has been conducted based on swin transformer that was proposed to assist a mycologist. It produces a relatively high accuracy of around 95%. This achievement of accuracy has increased by around 10% based on the latest and highest achievement obtained ever. This can be achieved by adapting a pre-trained Swin Transformer model for ImageNET to a 5 folds training-testing image data scheme. Therefore, the best performance fold was optimized by using AdamW optimizer, StepLR scheduler, 0.00005 of learning rate, 32 of batch size and 100 epochs.

Optimizing Temporal Convolutional Network for Eye Movement Classification Using Tree-Structured Parzen Estimator

1571068406

Hasnito Lailu Sobrian¹, Syukron Abu Ishaq Alfarozi¹, Adhistya Permanasari¹, and Sunu Wibirama¹

¹Universitas Gadjah Mada

Touchless technology has become increasingly vital for enhancing various aspects of human-computer interaction. One of these technologies is eye tracking. Eye tracking data processing comprises three phases: object selection, signal denoising, and event detection. In the event detection phase, eye movement is classified into three main classes: fixation, saccades, and smooth pursuit. Several studies have been conducted to improve the accuracy of eye movement classification. The latest research implemented the Temporal Convolutional Network that was optimized using Grid Search. However, the improvement in smooth pursuit accuracy is still lower than fixation and saccades. In this case, an accurate classification of smooth pursuit eye movement is vital to enhance spontaneous interaction in gaze-based touchless technology. To solve this research gap, we propose the Tree-structured Parzen Estimator (TPE) to optimize the Temporal Convolutional Network (TCN) for eye movement classification. Based on the experimental result, we achieved F1- scores of 94.50%, 89.83%, and 76.20% for fixation, saccades, and smooth pursuit eye movement, respectively. Comparative analysis with the state-of-the-art method shows that our method achieved higher improvement in smooth pursuit eye movement (0.40%) than fixation (0.11%) and saccades (0.22%). These results implies that the Tree-structured Parzen Estimator is promising to optimize time series deep learning for eye movement classification.

Comparative Analysis of Part of Speech Tagging Methods for the Bugis Language: From Statistical to Deep Neural Approaches

1571068411 Elvira Nurfadhilah¹, Yuyun², Agung Santosa³, Andi Latief¹, Dian Afra², Gusnawaty⁴, Pammuda⁴, Mutahharah Nemin Kaharuddin⁴, Ita Rosvita⁵, Nurfaedah Jufri⁶, and Hazriani⁷

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Part-of-speech (POS) tagging is essential in natural language processing (NLP) that facilitates various downstream applications. However, POS tagging for low-resource languages such as Buginese remains challenging due to the scarcity of annotated data. This paper explores several POS tagging methods, including Unigram, Hidden Markov Model (HMM), Conditional Random Fields (CRF), Long Short-Term Memory (LSTM), Bidirectional LSTM (Bi-LSTM), and Gated Recurrent Unit (GRU), integrated with word embedding techniques. We present a comparative analysis of these methods based on their performance on a newly collected and annotated Bugis language dataset. Our results demonstrate that advanced neural models outperform traditional statistical methods, highlighting the potential of deep learning techniques for low-resource language processing, especially RNN, which gets a higher and significant average F1 Score of 97.54%.

Revealing a Country's Government Discourse Through BERT-Based Topic Modeling in Presidential Speeches

1571068413

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In this paper, the speeches delivered by the US President were analyzed by using BERT-based topic modeling. This is motivated by the fact that America is one of the largest countries in the world and the president's speech is interesting for other organizations and countries to develop appropriate policies. Our simulation from the US presidential speeches during the era of Joe Biden until April 3, 2024 was conducted on several options, from embedding, clustering, dimension reduction and topics number combination. The best options obtained from the experiment is the use of DistilBERT embedding, HDBSCAN clustering, UMAP dimension reduction indicated by the UMAP metric. The combination shows consistent results for different variations in the number of topics.

Neural Machine Translation for Low-Resource Languages: Experiments on Makassar-Indonesian

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In today's globalized world, many indigenous languages are at risk of extinction due to the dominance of widely spoken languages and their declining use. Neural machine translation (NMT) offers a promising approach to documenting and preserving low-resource languages by using advanced technology to support their continued use and development. This study aims to develop an NMT-based translation system for the Indonesian and Makassar languages and assess its performance. Experiments were conducted using two base models, Transformer and LSTM, with various training steps through OpenNMT tools. The dataset comprised a parallel corpus of 9,165 sentence pairs. Results presented that the Transformer-based model outperformed the LSTM-based model, achieving BLEU scores of 56.45 for Indonesian to Makassar translation and 34.78 for Makassar to Indonesian.

E-Learning Readiness Gap in Business and Manufacture Settings Amidst the Covid-19 Pandemic: The Case of Indonesian Companies

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The COVID-19 epidemic has imposed limitations on employee learning activities due to mobility restrictions and policies discouraging physical gatherings. Nevertheless, it is imperative to acknowledge the continued importance of addressing the learning needs of employees during this challenging period. The primary objective of this research is to seek an understanding of the e-learning readiness gaps in business and manufacturing settings within the Covid-19 epidemic. This study focuses on four dimensions of readiness including people, organization, technology, and innovation in identifying readiness gaps and the fundamental factors behind these gaps. Primary data was obtained by employing a purposive sampling technique to select middle managers from a total of eight distinct industry clusters since the middle manager's role in mediating information transfer, innovation initiatives, and acting as e-learning champions among subordinates greatly influences this competence. The e-learning readiness gap was represented on the Cartesian matrix as a result of the importance-performance analysis. The findings confirmed the HR department's competence to handle e-learning, investment in e-learning equipment, budget allocation, and technology proficiency in e-learning are identified as the four major gaps. Interestingly, the middle management positions who have accumulated 11-15 years of work experience tend to have the lowest level of readiness when it comes to e-learning while an employee's level of formal education might impact the company's readiness for e-learning.

Identification of Hoya as a Medicinal Plant Using Convolutional Neural Network

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Medicinal plants have been utilized since ancient times as a treatment and prevention of disease. Some of Hoya species possess medicinal properties and has been used traditionally by some tribes of Indonesia and other South East Asian as well as in Asia Pacific region. Extraction from Hoya leaves provides therapeutic properties and a healing effects. However, there are some similarities in leaf shape between Hoya species which used as medicinal plants. The purpose of this research is to design a Hoya identification system as a medicinal plant using a Convolutional Neural Network (CNN) to facilitate the recognition of Hoya species based on leaf images and assist in the development of a Hoya database as a medicinal resource. This study aims to build a CNN model by comparing the VGG16 (Visual Geometry Group 16) and MobileNetV2 architectures. Hoya plant images were obtained from the RIN Dataverse, BRIN, comprising five different types of Hoya, including Hoya diversifolia, Hoya finlaysonii, Hoya imbricata, Hoya latifolia, and Hoya verticillata. The total number of images from these five species is 71. The designed model can able to identify the medicinal Hoya plants based on leaf images, with the highest accuracy results 80.00% by MobileNetV2 and 53.33% by VGG16.

Comparative Analysis of Centroid-Based and Density-Based Clustering for Indonesian Earthquake Data

1571068549

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This study examines earthquake data in Indonesia from 2004 to 2023, employing two clustering methods: K-Means and DBSCAN. The research focuses on earthquake magnitude and depth, utilizing a dataset of 41,416 seismic events from the United States Geological Survey, encompassing the entire Indonesian archipelago. Both clustering approaches reveal distinct patterns in seismic activity. K-Means identifies 3 clusters, with one characterized by deep earthquakes in the northern Sulawesi and Banda Sea areas. DBSCAN produces 2 main clusters and a noise, which the noise notably corresponds to the deep earthquake cluster identified by K-Means. While earthquake magnitudes remain relatively consistent across clusters, the significant difference is in depth variable. Performance evaluation using silhouette coefficients indicates that K-Means (0.632) slightly outperforms DBSCAN (0.575). The Davies-Bouldin index further supports this finding, with K-Means scoring 0.491 compared to DBSCAN's 0.964. The study provides insights that align with previous research, indicating no single clustering method is universally superior, as the best approach depends on the specific research scope. This study suggests exploring additional machine learning-based clustering methods, such as neural networks and ensemble techniques, to further enhance earthquake data analysis in future research

The Development of the Mobile Interactive Virtual Nuclear Educator With AR and RAG for Learning Nuclear Energy in Indonesia

1571068560

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The conventional way to search the information on internet usually uses search engines, however, the results only provide textual information. There has been a noticeable gap in student engagement, particularly among young generations like elementary to high school students, who prefer interactive learning methods. Specifically, there is a need to focus on disseminating information about nuclear energy, particularly its application in nuclear power plants in accordance with Indonesia's master plan as it is essential for the younger generation to be informed. Therefore, we developed an Android mobile app namely AR-Deni with Augmented Reality (AR) technology that provides the information in an interactive way through interacting using touch and voice chat with an animated 3D virtual educator. To answer the question, it utilizes retrieval-augmented generation (RAG) technology with verified documents that could elevate students' curiosity and understanding about nuclear energy information while ensuring the accuracy and reliability of the information provided. Further, we used extreme programming (XP) as a development methodology to plan and test the app. We test the app with user acceptance testing (UAT) and performance testing with 24 scenarios to interact and ask questions in the app. The results showed that the AR-Deni could be developed with the XP method, and it passed the 100% scenario in UAT. Regarding the performance to answer the questions, the RAG needed more response time to find the answers. Hence, the AR-Deni could be used as an interactive virtual nuclear educator for learning media.

Leveraging Machine Learning and Spatial Analysis to Analyze Dynamic Land-Use Changes in Indramayu Regency to Enhance Food Security

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Indramayu Regency, a national food barn, has established Sustainable Agricultural Land to bolster national food security by prohibiting land-use conversion. Nonetheless, population growth, climate change, and regional development have led to the conversion of agricultural land, posing a threat to food security. This study aims to analyze the changes in rice field land cover in the Indramayu Regency using Machine Learning algorithms. The Support Vector Machine (SVM) and Random Forest algorithms were utilized for land cover classification, and spatial analysis was carried out to identify land cover change trends. The study was conducted on Sentinel-2A satellite imagery from 2019 to 2023 using the Google Earth Engine. The results indicate that Random Forest achieved a higher accuracy than SVM, with the highest kappa value of 0.9 and an overall accuracy (OA) of 93%. Spatial analysis revealed that the most significant land cover change occurred in rice fields converted to bare land, covering an area of 4301.33 ha or 860 ha per year. In addition, rice fields were converted into residential areas, encompassing 1810.35 ha, or 362 ha per year. The use of Machine Learning algorithms, particularly Random Forest, proved to be effective in analyzing land cover changes in Indramayu Regency and can contribute to policy-making aimed at enhancing food security.

Multi-Temporal Cloud Removal of Satellite Image for Surface Water Segmentation

1571068595

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Satellite imagery utilization for water surface monitoring faces challenges in the presence of clouds that interfere with the segmentation process. This study aims to overcome the problem by implementing and developing the Multi-temporal Cloud Removal MCR method at the pre-processing stage. This research uses (MCR) approach to produce cloud-free satellite images. The difference from the current MCR method comes from using a red band in the cloud detection step, adding a dilation process on the cloud masking result and the pixel mapping process. In addition, this research compares the accuracy of the U-net water segmentation model between the original satellite image and the resulting MCR data. The model evaluation process uses Binary cross-entropy loss and dice coefficient to check the model performance. The model achieved a Dice coefficient of 0,8425 and a binary cross-entropy loss of 0,1375 for MCR images. For images with less than 20% cloud cover, the dice coefficient slightly decreased to 0,8188 with a binary-cross-entropy loss of 0,1563. As cloud cover increased to 20-40%, the dice coefficient dropped to 0,6875 with a loss of 0,25, and for image with 40-60% cloud cover, the dice coefficient further decreased to 0,5469 with a binary cross-entropy loss of 0,2656. The result demonstrates that the percentage of cloud cover in satellite images greatly influenced the accuracy of surface water segmentation.

Using LLM to Convert Bahasa Indonesia Commands Into JSON Structures for GIS System API

1571068633

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Geographic Information Systems (GIS) often require complex API interactions that are not easily accessible to non-technical users. This research proposes a proof-of-concept system that uses large language models (LLMs) to convert Bahasa Indonesia user commands into JSON structures for GIS system APIs. A dataset was generated by creating pairs of Bahasa Indonesia commands and corresponding JSON structures using ChatGPT based on a predefined template. The dataset was split into 90% for fine-tuning and 10% for testing, utilizing two open pre-trained LLMs: Llama 3.1 and Gemma 2. Performance was evaluated across four scenarios: non-fine-tuning and fine-tuning for 5, 10, and 20 epochs. Results show that fine-tuning significantly improves accuracy, with Llama 3.1 achieving the highest accuracy of 90.8% after 20 epochs, consistently outperforming Gemma 2. This proof-of-concept demonstrates the potential of LLMs to simplify natural language command processing for GIS systems.

Integrating Remote Sensing and Machine Learning for Monitoring Urban Growth in Seismically Active Regions: A Case Study of the Lembang Fault Zone, West Java, Indonesia

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Urban growth monitoring is crucial for understanding the dynamics of land use changes, particularly in regions prone to geological hazards such as the Lembang fault zone in West Java, Indonesia. This study employs an integrated approach using remote sensing data and Geographic Information System (GIS) techniques to analyze the spatiotemporal changes in land use and land cover (LULC) from 2017 to 2023. Utilizing the ArcGIS Living Atlas of the World, high-resolution LULC data were extracted and analyzed to quantify the expansion of built-up areas, cropland, and tree cover over the specified period. Additionally, machine learning techniques were explored using Google Earth Engine, applying a Random Forest classifier to assess the potential for automated LULC classification in this region. The analysis reveals a consistent increase in urban areas, indicating significant development activities within the fault zone. The findings underscore the effectiveness of integrating GIS and remote sensing approaches and machine learning for monitoring urban growth in seismically active areas, providing essential insights for urban planning and disaster mitigation efforts.

Ontology-Based Approach for Modeling Plant Growth Experiments

1571068701

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Understanding the complexities of plant growth is crucial for advancements in agriculture and environmental science. However, the lack of standardized methods for documenting and analyzing plant growth experiments often hinders the reproducibility and comparability of research findings. To address this, we developed a specialized ontology that provides a structured framework for capturing key elements of plant growth studies. Our approach began with a thorough literature review to identify core components such as plant species, environmental conditions, treatments, and observations. These components were then aligned with existing ontologies within the Open Biological and Biomedical Ontologies (OBO) framework to ensure consistency with current standards. The developed ontology was implemented using experimental data from *Vigna* species, demonstrating its practical utility in organizing and interpreting complex experimental data. Validation of the ontology confirmed its effectiveness in enhancing the clarity, reproducibility, and comparability of plant growth experiments. This research offers a valuable tool for researchers, contributing to more standardized and reliable plant science studies.

Enhancing Bugis Language POS Tagging Using Recurrent Neural Networks and Semi-Supervised Self-Training

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This research employed a semi-supervised learning approach to increase the dataset size for the part-of-speech (POS) tagging task in Bugis, a low-resource language. One of the main challenges in performing NLP tasks for low-resource languages is the scarcity of data. To address this, we used self-training, a method in which the model iteratively labeled its predictions on unlabeled data, combined with a Recurrent Neural Network (RNN) model. The RNN model was trained using word embeddings generated by a FastText model specifically for the Bugis language and was then applied to predict POS tags on unlabeled data. We utilized the cosine similarity method to improve prediction accuracy, which helped the model identify the most similar tags when encountering uncertainty. We separated prediction data based on confidence levels using a threshold value of 0.5, enabling us to distinguish between high-confidence and low-confidence predictions. The evaluation results indicate that the RNN model achieved an accuracy of 97.93%. Additionally, we conducted experiments by applying the model to predict various POS tags across different sizes of unlabeled data. The findings reveal that this approach effectively expanded the dataset size, improved the model's accuracy, and enhanced predictive performance on previously unlabeled data.

Functional Data Analysis for Household Appliance Energy Consumption Prediction

1571068715

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Over time, the increasing use of home appliances, driven by the industrial revolution, has significantly contributed to overall household energy consumption. The number of appliances and various environmental indicators can also impact energy usage. Therefore, it is important to understand how to optimize energy utilization and improve efficiency. Analyzing energy consumption presents statistical challenges due to the large size, high frequency, complexity, and noise in the data. We investigate the use of Functional Data Analysis (FDA) approaches to address these challenges. Unlike traditional methods that treat each observation as an individual variable contributing to the overall dimension, FDA considers the entire trajectory as a single data curve. In this paper, we provide a step-by-step analysis of functional regression models to quantify the relationship between household energy consumption and several environmental indicators. Our dataset consists of energy consumption recorded in real-time at 10-minute intervals from an observation house. We compare the model performance of our FDA models with linear regression, support vector machine, and random forest. Our empirical results show that functional regression effectively captures the dynamic effects of environmental conditions that vary over time and have the lowest root mean square error and mean absolute percentage error.

Can BERT Learn Evidence-Aware Representation for Low-Resource Fake News Detection?

1571068723

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Detecting fake news is a challenging task in today's digital age, highlighting the increasing need for automated solutions. Research on fake news detection often relies on the content (claim) without considering related facts to determine its classification. This study explores the impact of fact-aware approaches on fake news detection by comparing BERT and DeClare. We conducted experiments on both high-resource and low-resource languages to evaluate the effectiveness of integrating factual information into the detection process. The results indicate that incorporating evidence significantly improves the performance of the models, with some differences between languages of varying resource levels. BERT demonstrated strong performance in low-resource settings, while DeClare performs well in high-resource languages. These findings highlight the importance of fact-awareness in enhancing the accuracy of fake news detection across different linguistic contexts.

Assessment of Hyperparameter Optimization Techniques for Cross-Stitched Multi-Task Learning

1571068747

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Hyperparameter optimization is critical to successful machine learning model development. Conducting experiments to evaluate various hyperparameter optimization techniques across different models and datasets is essential for advancing knowledge and providing practical guidance. This study aims to compare state-of-the-art hyperparameter optimization algorithms in the developing cross-stitched multi-task deep learning models, focusing on a dataset encompassing three citation meanings in text: function, role source, and sentiment. The hyperparameters examined include embedding output dimensions, convolutional filters and kernel size, dense layer configurations, dropout rates, learning rates, and batch sizes. The techniques evaluated are (1) Grid Search, (2) Random Search, (3) Tree-structured Parzen Estimator (TPE), (4) Gaussian Process (GP)-based algorithm, (5) Covariance Matrix Adaptation - Evolution Strategy (CMA-ES) based algorithm, (6) Nondominated Sorting Genetic Algorithm II, (7) a method enabling partially fixed parameters (PF), and (8) Quasi-Monte Carlo (QMC) sampling algorithm. The findings indicate that the TPE and CMA-ES techniques are particularly effective in selecting hyperparameters that obtained the optimal performance, with the learning rate emerging as the most important hyperparameter. These results contribute to the literature on hyperparameter optimization, specifically within the case of cross-stitched multi-task learning.

An Analysis of the Open Government Data Ecosystem in Tangerang Regency to Promote Data Sharing Initiatives

1571068769

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Data sharing initiatives are being actively promoted by the Indonesian government with the objective of strengthening inter-organizational collaboration, foster transparency, supporting informed decision-making, and facilitating research and innovation. Open Government Data (OGD) which is freely available to the public for reuse and redistribution, consider to be one of the most essential public services. A comprehensive analysis of the Indonesian context is essential to determine the most effective ecosystem for fostering data sharing initiatives through OGD. This qualitative case study investigates the OGD ecosystem in Tangerang Regency, aiming to identify its constituent elements and assess its implementation. Data was gathered through observation, in-depth interviews with government officials, and a thorough analysis of relevant OGD-related documents. The findings reveal that the OGD ecosystem in Tangerang Regency is primarily influenced by policy frameworks, key actors and their roles, relationships between actors, data availability and quality, and the utilization of OGD platforms. While the implementation of this ecosystem demonstrates significant potential for enhancing transparency, accountability, and public engagement, further efforts are necessary to fortify inter-stakeholder collaboration, and foster data literacy within the community.

Comparative Performance of Water Index for Water Segmentation Model Using U-Net Architecture

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Water segmentation has many benefits, such as for the hydrological cycle research, monitoring flood dynamics, and managing water resources. The U-Net is a famous segmentation architecture for water body segmentation. Water masks, used as labels in the U-Net architecture training process, are generated from water index classification. Since some water indices have been developed that claim beneficial performance, the comparative performance of each method has not yet been discovered. This study aims to compare the performance of several water index methods, including the Normalized Difference Water Index (NDWI), Modified NDWI (MNDWI), Automated Water Extraction Index (AWEI), and Sentinel-2 Water Index (SWI). The study showed MNDWI obtained the best segmentation results and performance scores in urban areas with an IoU score of 0.97706. Meanwhile, SWI obtained the best segmentation results and performance scores in turbid water bodies with an IoU score of 0.96075. This indicates that the water index is reliable in building a dataset for training the U-Net model. This study provides novelty for practitioners and research on selecting the appropriate water index that meets the characteristics of the water body to be segmented.

Process Mining Benefits Model: A Preliminary Study

1571068891

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Process mining is a family of tools and techniques that analyzes business process data, collected by information systems, through a process lens. This technology can be used by organizations to discover valuable insights, identify bottlenecks, and improve business processes. However, despite the growing popularity of process mining in the industry, there is limited understanding of its benefits and success factors. This study aims to fill the gap by providing a set of guidelines to understand the benefits and success factors of process mining, as well as potential inhibitors that may hinder such benefits. As the study remains ongoing, this paper provides a preliminary assessment of the benefits and success factors of process mining through a literature review to identify the benefits, success factors, and inhibitors or process mining before we construct a PMBM framework. Our findings will help organizations making an informed decision when adopting process mining to maximize the success factors and remain conscious of the barriers that can hinder the benefits of this technology.

Prediction of HIV Cases in Indonesia Using Statistical Models

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The study was conducted to identify the most effective model for predicting the spread of Human Immunodeficiency Virus (HIV) cases using statistical models such as the Error Trend Seasonal (ETS) model, Exponential Growth Model (EGM), and Autoregressive Integrated Moving Average (ARIMA). The prediction of total HIV cases serves as a crucial benchmark for assessing the spread of the disease. The research utilized data from Indonesia's social health insurance program, BPJS, covering the last eight years to project HIV cases for the next five years. The initial analysis involved confirming the stationarity of the BPJS data using the Augmented Dickey-Fuller test. Upon establishing that the data was stationary, the ARIMA models were selected to find the best model for further evaluation based on the Corrected Akaike Information Criterion (AICc). The ARIMA(1,0,1) was determined as the best model and then compared with ETS and EGM models. The best models were subsequently assessed using Root Mean Square Error (RMSE) and Mean Absolute Error (MAE), as well as AICc criteria. The findings revealed that the ARIMA model was superior, achieving an RMSE score of 0.506, an MAE score of 0.324, and an AICc score of -12.238, making it the most accurate model for predicting the number of HIV cases. This research provides a robust scientific foundation for estimating future infectious disease cases and underscores the importance of employing advanced statistical models in public health planning. The study also highlights the value of leveraging health insurance data, like that of BPJS, for long-term disease forecasting, which can significantly contribute to the development of effective public health policies and interventions.

LSTM-Driven Forecasting of Surface Temperature Trends in Indonesia as Insights Into Climate Change

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One of Indonesia's Sustainable Development Goals (SDGs) is to combat climate change. The rising surface temperature is one of the primary signs of climate change. The average world temperature has increased significantly since the 19th century, and it is crucial to comprehend this increase to comprehend how the plan to reach the 13th SGD can help manage future climate change. To compare the three approaches-Long Short-Term Memory (LSTM) Vanilla, Bi-directional LSTM (Bi-LSTM), and 2-Stacked LSTM-for surface temperature forecasting in Indonesia. With the smallest evaluation metric value from RMSE of 34.385, MAE of 27.84%, and MAPE of 1.11001%, the 2-Stacked LSTM model is the best, according to the results. The forecasting results show that in the next 2 years there is no significant change in the improvement of weather changes.

Tuberculosis Spread Analysis Through the Integration of Principal Component Analysis and Vector Autoregressive Models

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Tuberculosis (TB) remains a critical health issue in developing countries, including Indonesia. In West Java, climatic conditions such as temperature, humidity, and precipitation influence TB incidence. This study integrates Principal Component Analysis (PCA) and Vector Autoregressive (VAR) models to assess how climatic variables affect TB spread. We analyzed weekly TB incidence, precipitation, relative humidity, and air temperature data from 27 locations in West Java over 52 weeks. PCA reduced the dimensionality of climatic data to identify key components affecting TB. The VAR model then examined the temporal relationships between these components and TB incidence. PCA highlighted precipitation and temperature as primary factors affecting TB, with relative humidity having a secondary effect. VAR analysis revealed significant lagged effects of climatic variables on TB incidence, indicating that changes in climate influence TB spread with a delay. The integrated PCA-VAR approach effectively captured the interaction between climate and TB dynamics. Combining PCA and VAR models provides valuable insights into how climatic conditions impact TB incidence in West Java. These findings can inform more targeted public health strategies. Future research should expand this model to other regions and include socio-economic factors for improved TB forecasting.

Development of Non-Immersive Virtual Reality for Rock Outcrops Learning

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This study develops a non-immersive Virtual Reality (VR) web-based application for learning rock exposure as a teaching aid in geology education. The main objective of this development is to improve user understanding of rock exposure through interactive visualization that is more interesting and realistic than conventional methods. This application is designed with an easy-to-use interface, allowing users to interact with a 3600 natural panorama in the field where the rock exposure is in the Karangsambung area, Kebumen, Central Java, equipped with information in the form of messages and videos explaining the rock exposure. This virtual field visit to the rock exposure area was created to provide users with access to locations and areas that are difficult to access to the rock exposure area due to factors such as funding, remote user locations, and saving travel costs and time compared to physical visits. The shooting uses a 360 camera and drone to take a 360 panorama from above. The application development in this study uses the Multimedia Development Life Cycle (MDLC) methodology which consists of 6 stages, namely concept, design, material collection, assembly, testing, and distribution. The study results are expected to significantly increase users' understanding of geology. They can be an effective alternative in learning to reveal rocks, providing a more in-depth learning experience without the need for expensive VR devices.

Evaluation of Data Interoperability Maturity Level: Case Study of the East Belitung Government

1571068939

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¹National Research and Innovation Agency, ²Dinas Komunikasi dan Informatika Kab Belitung Timur

Presidential regulation 39 of 2019 mandates the implementation of one data in order to obtain accurate, up-to-date, integrated and accountable data in government sector. Data interoperability is key aspect in ensuring the integration of data collected in the one data portal. This research aims to evaluate data interoperability maturity in regional apparatus organizations of East Belitung district. The measurements were carried out using the Government Interoperability Maturity Matrix model which measures three dimensions of interoperability, namely organizational, semantic and technical interoperability. Data collection was carried out through a survey of key actors in regional apparatus organizations which play important role in handle data management on a daily basis. The results show the highest score in semantic interoperability, then technical interoperability and organizational interoperability respectively. These results indicate that organizational interoperability needs to receive attention through strengthening coordination between organizations.

Social Media Maturity Model for Indonesian Crowdfunding

1571068941

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In the digital era, social media has become a crucial tool for companies to engage with customers and promote their offerings. In Indonesia, the use of social media, particularly Instagram, has surged, especially in crowdfunding campaigns. Crowdfunding, a fundraising method involving numerous individuals via online platforms, heavily relies on effective communication and promotion through social media. This study aims to develop a Social Media Maturity Model tailored for Indonesian crowdfunding companies to enhance campaign effectiveness. By analyzing user captions on Instagram through sentiment analysis, the model assesses maturity levels across variables such as strategy, promotion, price, content, and posting schedule. The findings provide actionable recommendations for companies to optimize their social media usage, thereby improving campaign performance. This research not only contributes academically to digital marketing and crowdfunding literature but also offers practical benefits for companies seeking to maximize social media potential in their campaigns.

Infectious Disease Epidemic Forecasting Using Online News Time Series Analysis: COVID-19 Case Study

1571068945

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The COVID-19 pandemic has become an important warning for preparedness against the possibility of new infectious diseases emerging in the future. This study aims to investigate the potential of online news to predict infectious disease trends. We used daily online news data in Indonesia related to the COVID-19 pandemic to conduct time series analysis using various machine learning methods, such as Convolutional Neural Network (CNN), Multi-Layer Perceptron (MLP), Recurrent Neural Network (RNN), Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), AutoRegressive Integrated Moving Average (ARIMA), Error Trend Seasonal (ETS), and Logistic Regression. The findings showed that MLP and CNN models attained the best performance, with an RMSE of 0.15 and MAPE of 24%. We also highlight that the RNN model achieved the best performance in smaller data, with an RMSE of 0.24 and MAPE of 37%. These results reveal the potential of RNN usage in a special case of limited data.

Application of Bayesian Spatial Method in Analyzing Tetanus Cases in Central Java Using Binomial-Poisson Model With R

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This study investigates the spatial distribution of tetanus cases in Central Java, Indonesia, using a Bayesian spatial method with a Binomial-Poisson model. The analysis addresses the challenge of excess zeros in the data, common in rare diseases like tetanus, by incorporating a zero-inflated Poisson distribution. The Bayesian framework utilizes the Besag-York-Mollié (BYM2) model to account for spatial autocorrelation and employs complexity-penalized priors for the latent level process. The study leverages the Integrated Nested Laplace Approximation (INLA) for efficient and accurate inference. Results provide insights into the spatial patterns of tetanus cases in Central Java, potentially informing targeted interventions and public health strategies. The suggested Bayesian mixed models for Tetanus cases in 2022 across 36 districts/cities in Central Java, Indonesia, incorporating explanatory variables from various dimensions, including health, demographics, industry, and education. Significant dimensions with Tetanus cases are predominantly found in demographic and industrial aspects. Through the Deviance Information Criterion (DIC), the Binomial-Poisson mixture distribution is identified as the most suitable for the data, with an excess of zero values at approximately 62.8% and significant extreme observations in specific regions.

CNN-Based Hybrid Performance Evaluation Towards Online News Sentiment Classification Task

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CNN is a deep learning model that is effective in extracting features in text data. However, CNN has shortcomings in understanding long-term context and lacks sensitivity to word order. In this study, a CNN model was hybridized with a machine learning model to improve the model's performance. The LSTM model and BiLSTM model were chosen because they have long-term memory features and sensitivity to word order. Apart from that, other machine learning models such as TF-IDF, Word2Vec, and BERT are used to add features that are useful in extracting text data. In model testing, the accuracy, precision, recall, F1-score, and AUC-ROC matrices are used. The evaluation results of all models are compared to determine the influence of vector dimensions and obtain the best model. From the evaluation results, it was found that the RoBERTa-CNN-BiLSTM model had the best performance with a matrix accuracy of 98.18%, precision 98.19%, recall 98.18%, F1-score 98.18%, and AUC-ROC 99.86%. Apart from that, it is known that the vector 38 dimension provides the most superior performance. These results indicate that hybridized deep learning models, especially CNNs, are effective in improving model performance.

SiTernak Mobile Application Development to Report Livestock Health Data

1571069008 | Isti Habibah¹, Lailan Hasibuan¹, Endang Giri¹, and Hari Adrianto¹

¹IPB University

Digital information service can be a way to improve the livestock condition monitoring to anticipate the possibility of decreased production and quality of livestock. However, the information system services for livestock in many regions have not been implemented efficiently yet. In some regions we can find in Indonesia, the livestock condition's monitoring process is still carried out manually by the government, causing a long process of cases reporting until it can be heard by those who take responsibility of doing the follow-ups toward livestock's problems. This shows that improvisation is needed in the process of acquiring disease data on livestock so that the data obtained is more actual and centralized. This research has succeeded in designing a mobile application as a tool for acquiring livestock's health data through health reporting feature as the main feature. Using Kotlin for the client side and JavaScript for the server side, this application utilizes REST API to forward requests from the user side to the database. This development resulted in 9 API endpoints and had going through 18 case scenarios with expected outputs.

BERT-Based Deep Embedded Clustering for Topic Modeling

1571069072

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¹Universitas Indonesia, ²University of Indonesia

Topic detection is a powerful method that emerges as a solution to uncover the latent structures in a document. A general framework of clustering-based topic detection consists of two steps: representation learning and topic detection with clustering. In this study, bidirectional encoder representations from transformers (BERT) is utilized for the representation learning because of its ability to learn text, allowing BERT to capture the context of each word's context based on its surrounding. Text representations obtained from BERT are used for topic detection with clustering. Deep embedded clustering (DEC) and improved deep embedded clustering (IDEC) are the clustering models used in this study for topic detection with clustering. DEC and IDEC are deep learning-based clustering techniques that can simultaneously transform data into lower dimensional space and optimize the clusters. The combination of BERT as the text representation model with DEC and IDEC becomes a deep learning structure model for topic detection. After obtaining the word sets that represent the topics, evaluations are carried out by examining the sensitivity of hyperparameters and the topic coherence value. The simulations showed that DEC and IDEC are robust to hyperparameter changes. DEC and IDEC also outperformed uniform manifold approximation and projection (UMAP)-based K-means and eigenspace-based fuzzy c-means (EFCM) by using topic coherence Word2Vec (TC-W2V).

Developing a Visual Dashboard to Improve Research Activity Assessment

1571069079

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In research institutions, the ability to monitor and analyze publication output is crucial for assessing productivity and achieving strategic goals. This paper presents a dashboard designed to visualize and analyze publication data from a research center of the Indonesian public institution. The dashboard addresses several key questions: (1) whether the current number of publications is on track to meet the institution's targets, (2) the comparison between journal and proceeding publications, (3) individual researcher productivity, (4) research group productivity, and (5) the extent of collaborative efforts among researchers and groups. By leveraging this tool, stakeholders can gain insights into publication trends and identify areas for improvement. The findings reveal significant trends in publication types and collaboration patterns, offering a comprehensive overview of the institution's research output. This study contributes to the understanding of research productivity metrics and their implications for strategic planning in academic research.

PDU: A Pill Dispenser Unit for an IoT System for Monitoring and Controlling the Pharmaceutical Treatment for Patients With Psychological Mental Conditions

1571069919

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Non-adherence to medication is a major problem in the treatment of schizophrenia and other related mental disorders, as it leads to relapses that require re-hospitalisation and in extreme cases can lead to suicide or violent crimes. In this paper, we present the Pill Dispenser Unit (PDU), an IoT system that monitors and controls the medication treatment of patients with psychological mental conditions. A variety of pill dispensing units are available on the market, ranging from simple pill organizers to more complex internet-enabled pill dispensing systems. These units are intended to be used as automatic pill dispensers for elderly people suffering from diseases such as Alzheimer's. The proposed pill dispensing unit provides additional functions necessary for medication of patients with psychological mental conditions. With the PDU, all of the patient's medication activity is recorded and uploaded to a web server that allows the doctor to monitor and evaluate the patient's medication compliance. Dose omissions and overdose attempts by the patient are recorded by the PDU. Repeated dose misses, overdose attempts and changes in the patient's medication adherence profile provide real-time alerts to the patient's doctor, allowing the doctor to intervene. To prevent overdose, the PDU has a locking mechanism to ensure that the patient receives the prescribed medication only at the designated times. A prototype of the PDU has been developed using off-the-shelf electronic components. The prototype consists of two distinct units, the basic pill dispensing unit and the portable pill dispensing unit.

Development of a Mental Health Chatbot Using Large Language Models for Indonesian Undergraduates

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Mental health challenges among university students are a growing concern globally, and Indonesia is no exception. This paper presents the development of a mental health chatbot designed specifically for Indonesian undergraduates, leveraging the capabilities of large language models (LLMs). The chatbot aims to provide accessible, immediate, and confidential mental health support to students, helping them manage stress, anxiety, and other mental health issues. The development process involved fine-tuning the LLM on a dataset tailored to the cultural and linguistic context of Indonesian students. The chatbot's effectiveness was evaluated through user feedback and a series of pilot tests, showing promising results in user satisfaction and engagement. This study highlights the potential of AI-driven solutions in addressing mental health challenges in educational settings.

Upper Limb Rehabilitation Robot Control Based on Large Language Model

1571071746

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Stroke is a life-threatening condition and its survivors often face significant disabilities that reduce their quality of life, making effective rehabilitation systems essential. Automation technology, such as robotics, offers a promising solution to improve rehabilitation quality. However, the implementation of this technology can be challenging for users due to interface complexity. To ensure easier adoption, the user interface of these systems must be both comfortable and easy to use. Large Language Models (LLMs) currently offer a promising solution to this challenge. This study explores the use of an LLM as a control interface for an upper limb rehabilitation robot. By combining high-level task execution based on LLM and low-level forward kinematics, we exploit the intuitiveness of LLM and the accuracy of model-based control to perform various rehabilitation tasks more easily. The findings demonstrate that the LLM-based control interface significantly outperforms traditional keypad-based controls in rehabilitation robot usability tests, achieving a high success rate in the trials.

Smart Home Prototype for Rain Prediction Using Artificial Neural Network Algorithm

1571071753

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Unpredictable weather changes, such as sudden rain, can disrupt daily activities, particularly tasks like drying clothes. To address this challenge, this study presents a smart home system that forecasts rain using a trained Artificial Neural Network (ANN) algorithm. The system employs IoT sensors to collect five critical weather parameters-temperature, humidity, air pressure, wind speed, and light intensity. Data from these sensors are used to train the Backpropagation ANN model. The practical application of this model is demonstrated through a prototype that integrates a smart house roof and a servo-driven clothesline system. When rain is predicted, the servo moves the clothesline under the roof; otherwise, it positions the clothesline outside. The system achieved an accuracy of 0.86334, validating its effectiveness in mitigating the impact of sudden weather changes on clothes drying.

Web-Based Software Development for Complementary Feeding Recommendation System (EasyMPASI) Using Rule-Based Reasoning

1571071854

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¹Universitas Gadjah Mada

Babies aged 0-24 months are in a period of very rapid growth and development so they are often referred to as the golden age and critical period so that food and drink are the key to the growth and development process. Fulfilling the right nutritional needs in babies can prevent stunting where Indonesia is ranked fourth in Asia with the most cases. Stunting is a disease caused by a lack of protein and is characterized by a child's height that is below standard. One way to prevent stunting is by providing complementary foods (MP-ASI). Parental knowledge of the right MP-ASI nutritional needs can reduce the risk of stunting in babies. A website-based service system that accommodates MP-ASI information is designed so that it can be easily accessed by parents. The MP-ASI recommendation method is built using the Rule-Based Reasoning method, namely by calculating the number of daily calorie needs from the amount or frequency of MP-ASI given in a day. Through this website-based application, parents can easily obtain information about the right MP-ASI for babies.

Design of Smart Microgrid as an Integration of Electrical Systems With Android Application

1571071872

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The increasing demand for electrical energy, coupled with the need for sustainability, has led to the development of smart microgrids that integrate renewable energy sources and traditional grid systems. This paper presents the design and implementation of a smart microgrid system that integrates solar and wind power plants with the national grid (PLN), using an Automatic Transfer Switch (ATS) and a mobile application for real-time monitoring and control. The system optimizes energy distribution between renewable sources and PLN, ensuring a seamless transition in case of power supply interruptions. The mobile application, developed using Flutter and integrated with Firebase and Node.js, enables users to monitor energy consumption, control energy distribution, and manage financial costs. The results demonstrate the system's reliability in energy management, promoting renewable energy use while ensuring system resilience. This solution contributes to Indonesia's goal of achieving Net Zero Emissions (NZE) by 2060.

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