



SENIKO

Seminar Nasional Informatika dan Komputer

PROGRAM BOOK

**Seminar Nasional
Informatika dan Komputer
2025**

AI DAN KEAMANAN SIBER

UNTUK MASA DEPAN BERKELANJUTAN:
TANTANGAN DAN PELUANG

FAKULTAS TEKNIK

Purbalingga, 23 Agustus 2025

SAMBUTAN REKTOR UNIVERSITAS JENDERAL SOEDIRMAN



Puji syukur kita panjatkan ke hadirat Tuhan Yang Maha Esa atas terselenggaranya acara SENIKO (Seminar Nasional Informatika dan Komputer) tahun 2025. Selamat datang saya ucapkan kepada seluruh peserta SENIKO 2025 yang telah hadir. Saya selaku rektor Universitas Jenderal Soedirman sangat berbahagia dapat menyambut Anda semua pada acara ini.

Terima kasih atas kehadiran Anda yang telah meluangkan waktu untuk bergabung di acara SENIKO 2025.

Saya berharap Anda dapat menikmati acara dan memperoleh manfaat dari materi yang disajikan. Saya juga berharap Anda dapat berpartisipasi aktif dalam diskusi dan memberikan kontribusi di bidang keilmuan yang sesuai dengan tema seminar kali ini, yaitu "AI dan Keamanan Siber untuk Masa Depan Berkelanjutan: Tantangan dan Peluang". Semoga acara ini dapat menjadi sarana untuk berbagi pengetahuan, pengalaman, dan ide-ide baru yang dapat membantu kita dalam menghadapi tantangan dan peluang di masa depan.

Saya juga ingin mengucapkan terima kasih kepada seluruh pihak yang telah bekerja keras dalam menyukseskan acara SENIKO 2025. Selamat berpartisipasi untuk seluruh peserta dan semoga kita dapat memperoleh hasil yang positif dari seluruh rangkaian acara di seminar kali ini. Terima kasih.

Purbalingga, 23 Agustus 2025

Rector Universitas Jenderal Soedirman,
Prof. Dr. Ir. H. Akhmad Sodik, M.Sc.Agr., IPU., ASEAN Eng.

SAMBUTAN DEKAN FAKULTAS TEKNIK UNIVERSITAS JENDERAL SOEDIRMAN



Puji syukur ke hadirat Tuhan Yang Maha Esa atas rahmat dan karunia-Nya untuk kita semua. Saya merasa bangga dapat menyaksikan jurusan Informatika Universitas Jenderal Soedirman mempersembahkan sebuah seminar bernama SENIKO (Seminar Nasional Informatika dan Komputer) tahun 2025. Tema seminar ini adalah "AI dan Keamanan Siber untuk Masa Depan Berkelanjutan: Tantangan dan Peluang", sebuah tema yang relevan dengan dinamika perkembangan ilmu pengetahuan dan teknologi saat ini.

Artificial Intelligence (AI) hadir sebagai salah satu inovasi paling revolusioner yang mampu mengubah cara kita bekerja, berkomunikasi, dan mengambil keputusan. Namun di balik berbagai peluang besar yang ditawarkan, kita juga dihadapkan pada risiko dan tantangan, khususnya terkait keamanan siber.

Melalui seminar ini, saya berharap akan lahir berbagai gagasan, solusi, dan kolaborasi dari para akademisi, peneliti, praktisi, maupun mahasiswa. Dengan demikian, kita tidak hanya mampu memahami tantangan, tetapi juga memanfaatkan peluang yang ditawarkan teknologi ini bagi kemajuan bangsa dan kesejahteraan umat manusia.

Saya ingin mengucapkan terima kasih kepada para pembicara yang telah meluangkan waktunya untuk berbagi ilmu dengan kita semua melalui materi yang sangat menginspirasi. Saya juga mengucapkan terima kasih kepada para peserta, panitia, dan semua pihak yang telah terlibat sehingga acara ini dapat terselenggara dengan sukses. Semoga seluruh rangkaian seminar ini dapat berjalan dengan lancar dan dapat memberikan manfaat besar bagi perkembangan IPTEK di Indonesia.

Purbalingga, 23 Agustus 2025

Dekan Fakultas Teknik Universitas Jenderal Soedirman,
Prof. Dr. Eng. Ir. Agus Maryoto, S.T., M.T.

SAMBUTAN KETUA SENIKO 2025



Puji syukur kita panjatkan kepada Tuhan Yang Maha Esa atas terselenggaranya acara SENIKO (Seminar Nasional Informatika dan Komputer) 2025. Saya merasa bangga dan terhormat dapat menyampaikan sambutan ini. Tema dari SENIKO 2025 adalah "AI dan Keamanan Siber untuk Masa Depan Berkelanjutan: Tantangan dan Peluang" dimana tema tersebut sangat relevan dengan perkembangan teknologi saat ini. Dunia akademik khususnya di rumpun ilmu Informatika sudah seharusnya memiliki kontribusi untuk mendorong pencapaian itu.

Keamanan data, privasi, serta potensi penyalahgunaan teknologi menjadi isu yang tidak bisa diabaikan. Apalagi dalam konteks pembangunan berkelanjutan, pemanfaatan AI dan sistem keamanan siber harus mampu mendukung terciptanya masyarakat yang aman, adil, dan inklusif, tanpa meninggalkan aspek etika dan tanggung jawab sosial.

Universitas Jenderal Soedirman, khususnya jurusan Informatika, berkomitmen untuk mendukung perkembangan IPTEK di Indonesia. SENIKO 2025 merupakan wujud dari komitmen itu, sebagai wadah bagi peneliti, akademisi, praktisi, dan mahasiswa untuk berbagi pengetahuan dan inovasi terbaru di bidang Informatika. Terkait itu, di acara SENIKO 2025 ini terdapat lebih dari 50 artikel dari 150 penulis, yang telah terpilih melalui proses *double blind review*. Menariknya, penulis-penulis tersebut berasal dari berbagai daerah di Indonesia. Sementara itu, jumlah peserta seminar yang mendaftar adalah sekitar 100 orang dengan lebih dari 20 asal institusi. Terima kasih kepada para peserta yang telah berpartisipasi, serta kepada para pembicara, panitia, sponsor, *co-host*, *media partner* dan semua pihak yang telah mendukung kesuksesan acara ini. Semoga seminar ini dapat berjalan lancar dan memberikan manfaat bagi perkembangan IPTEK di Indonesia.

Purbalingga, 23 Agustus 2025

Ketua SENIKO,

Muhammad Ihsan Fawzi, S.Kom., M.Kom.

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SPONSOR



CO-HOST



MEDIA PARTNER



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INFORMASI SEMINAR

Penyelenggara	: Jurusan Informatika, Fakultas Teknik Universitas Jenderal Soedirman
Hari/Tanggal	: Sabtu, 23 Agustus 2025
Tempat	: Luring (<i>Offline/On site</i>): Gedung F Aula Fakultas Teknik Jl. Mayor Jenderal Sungkono KM 5 Blater Purbalingga 53371 Kecamatan Kalimanah, Kabupaten Purbalingga Jawa Tengah 53371 Daring (<i>Online</i>): https://bit.ly/SesiUtamaSENIKO2025
Bahasa Resmi	: Bahasa Indonesia (untuk pidato/presentasi)
Sekretariat	: Jl. Mayor Jenderal Sungkono KM 5 Blater Purbalingga 53371
Situs Web	: https://seniko.ft.unsoed.ac.id/
Email	: seniko@unsoed.ac.id

INFORMASI TEMPAT

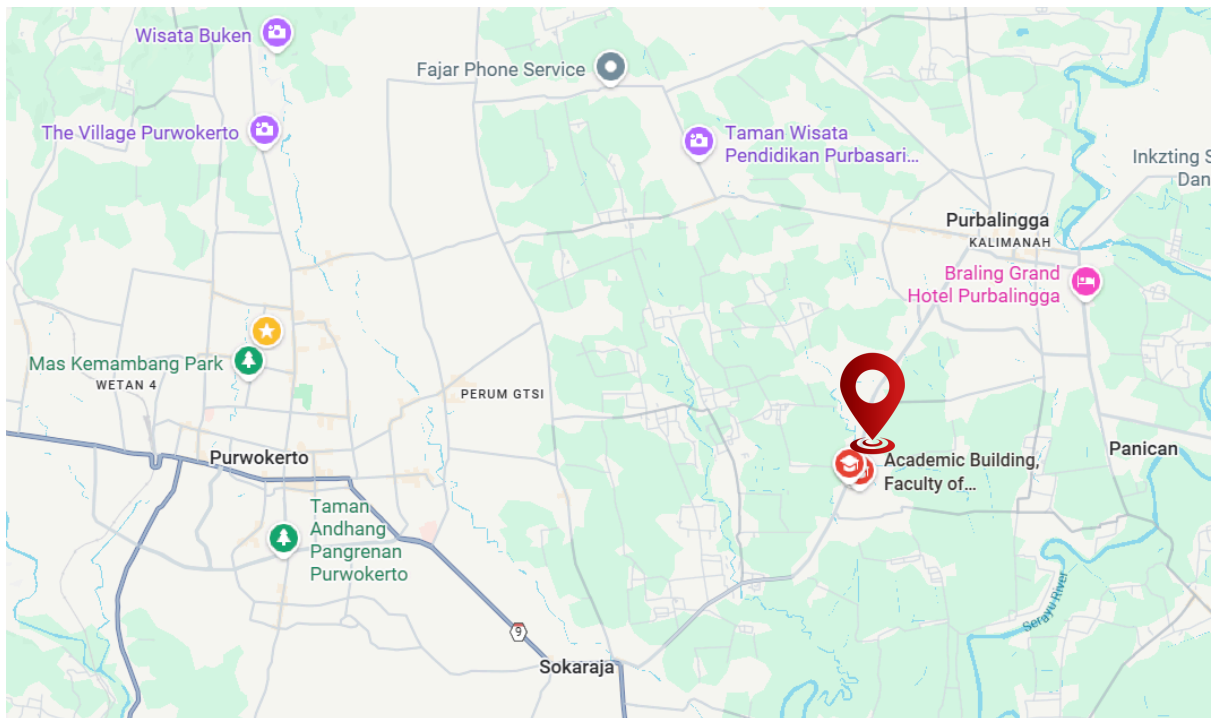
Gedung F Aula Fakultas Teknik

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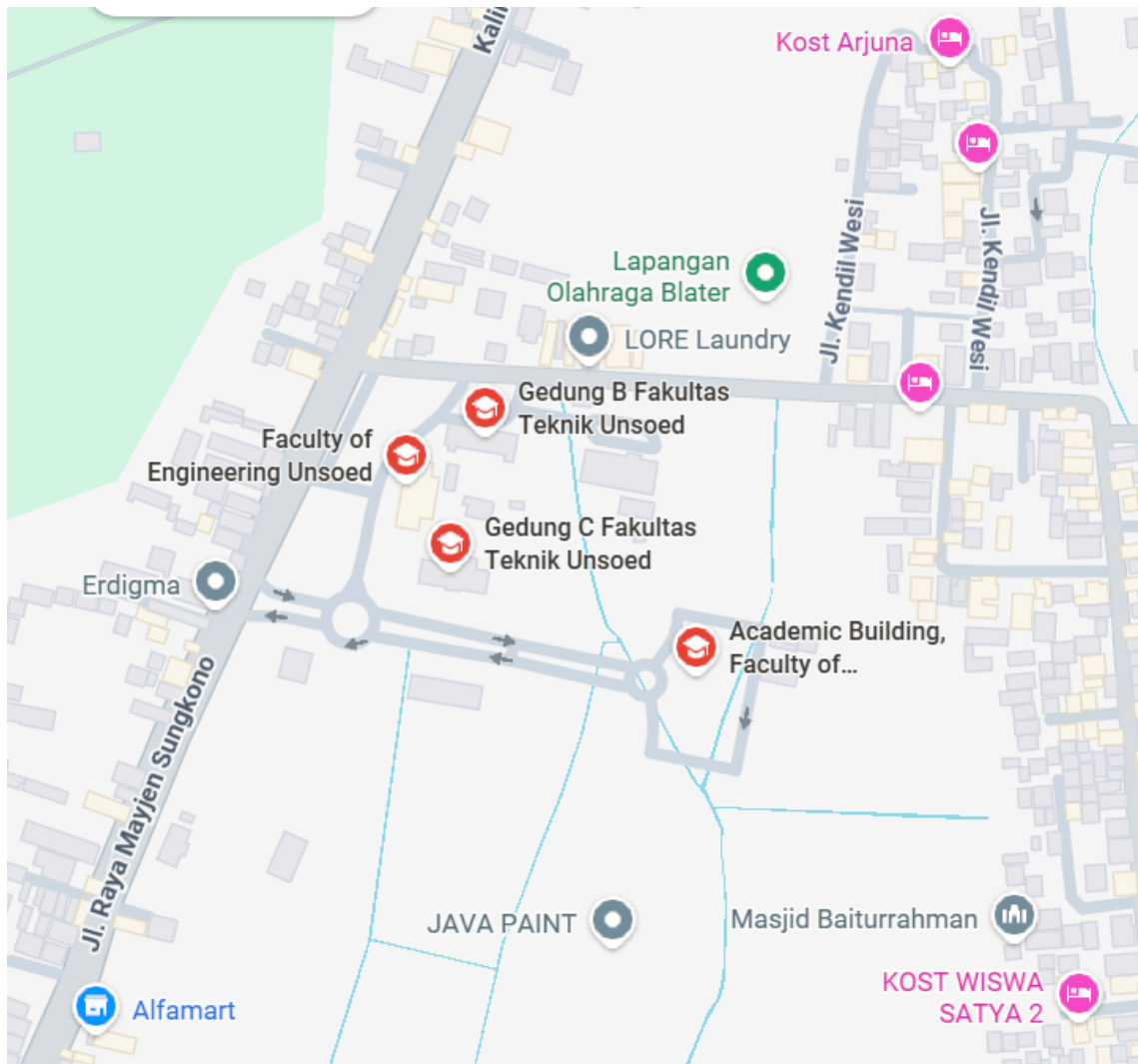
Kecamatan Kalimanah, Kabupaten Purbalingga

Jawa Tengah 53371

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Pengarah

- Dr. Ir. Nurul Hidayat, S.Pt. M.Kom.
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- Hidayatul Mangunah

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DAFTAR TAMU UNDANGAN

No.	Jabatan	Instansi
1	Rektor	Universitas Jenderal Soedirman
2	Dekan Fakultas Teknik	Universitas Jenderal Soedirman
3	Wakil Dekan Bidang Akademik Fakultas Teknik	Universitas Jenderal Soedirman
4	Wakil Dekan Bidang Umum dan Keuangan Fakultas Teknik	Universitas Jenderal Soedirman
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7	Ketua Tim Kerja Umum dan Keuangan Fakultas Teknik	Universitas Jenderal Soedirman
8	Ketua Tim Kerja Akademik dan Kemahasiswaan Fakultas Teknik	Universitas Jenderal Soedirman
9	CEO KitaCakap	KitaCakap
10	Owner Surya Security System	Surya Security System
11	CEO Ethic Ninja	Ethic Ninja
12	CEO Digi yok	PT Lumintoo Sukses Incomso
13	CEO Jenderal Software	Jenderal Software
14	CEO Oemah Website	Oemah Website

TOPIK DISKUSI

1. Kecerdasan buatan : perkembangan dan penerapannya dalam berbagai industri.
2. *Machine learning* : model, algoritma, dan implementasi nyata.
3. *Data mining* : teknik analisis data untuk pengambilan keputusan.
4. *Computer vision* : pengolahan gambar dan video berbasis AI.
5. *Expert system* : sistem berbasis pengetahuan untuk mendukung pengambilan keputusan.
6. *Natural language processing* : pengolahan bahasa alami untuk *chatbot* dan analisis teks.
7. *Sensory systems* : integrasi sensor dalam teknologi AI.
8. *Game development* : peran AI dalam pengembangan industri *game*.
9. *Information systems* : penerapan sistem informasi berbasis AI.
10. *Internet of things (IoT)* : AI dalam pengelolaan perangkat pintar.
11. *Software engineering* : metodologi pengembangan perangkat lunak berbasis AI.
12. *Semantic web* : AI dalam meningkatkan pemahaman data web.
13. Keamanan siber : strategi dan teknologi dalam melindungi sistem informasi.
14. *Cloud computing* : infrastruktur komputasi awan untuk AI dan keamanan data.
15. *Computer network* : AI dalam optimasi dan keamanan jaringan komputer.

SUSUNAN ACARA

Sabtu, 23 Agustus 2025			
Waktu (WIB)	Aktivitas	Durasi	Pengisi Acara
07.00 – 07.45	Registrasi peserta	45 menit	Peserta
08.00 – 08.05	Pembukaan MC	5 menit	MC
08.05 – 08.10	Menyanyikan Lagu Indonesia Raya	5 menit	Peserta
08.10 – 08.15	Do'a	5 menit	Panitia
08.15 – 08.35	Hiburan	20 menit	Tim Tari
08.35 – 09.15	Sambutan-sambutan: 1. Sambutan Ketua Panitia 2. Sambutan Dekan Fakultas Teknik Unsoed 3. Sambutan dan Pembukaan Acara oleh Rektor Unsoed	40 menit	1. Ketua Panitia 2. Dekan Fakultas Teknik Unsoed 3. Rektor Unsoed
09.15 - 09.20	Penandatanganan IA (<i>Implementation Agreement</i>) dengan Pradita University	5 menit	Panitia
09.20 - 09.35	<i>Coffee Break</i>	15 menit	Panitia dan peserta
09.35 - 10.35	Materi Seminar 1	60 menit	Prof. Dr. Eng. Wisnu Jatmiko, S.T., M.Kom. (Pakar AI (<i>Artificial Intelligence</i>) dan Guru Besar Universitas Indonesia)
10.35 - 10.40	Penyerahan Cendera Mata ke-1	5 menit	Panitia
10.40 - 11.40	Materi Seminar 2	60 menit	Ir. Onno Widodo Purbo, M.Eng., Ph.D.

			(Pakar <i>Cybersecurity</i> dan Rektor Institut Teknologi Tangerang Selatan)
11.40 - 12.00	1. Penyerahan Cendera Mata ke-2 2. Penyerahan Sertifikat Sponsor	20 menit	Panitia, pembicara, dan sponsor
12.00 - 13.00	Istirahat	60 menit	Panitia dan peserta
13.00 - 15.00	Presentasi Artikel Ilmiah Secara Paralel	120 menit	Peserta
15.00 - 15.30	<i>Coffee Break</i>	30 menit	Peserta
15.30 - 16.00	Presentasi Artikel Ilmiah Secara Paralel	30 menit	Peserta
16.00 - 16.30	Pengumuman <i>Best Paper</i> , <i>Best Presenter</i> , dan Penutupan	30 menit	Panitia

PIDATO UTAMA

Ruang Utama	23 Agustus 2025 09.35 - 10.35 WIB
Materi Seminar 1 Topik <i>Artificial Intelligence</i> Prof. Dr. Eng. Wisnu Jatmiko, S.T., M.Kom.	
Ruang Utama	23 Agustus 2025 10.40 - 11.40 WIB
Materi Seminar 2 Topik <i>Cybersecurity</i> Ir. Onno Widodo Purbo, M.Eng., Ph.D.	

**TAUTAN SESI PARALEL
PRESENTASI ARTIKEL SENIKO 2025**

Nama Sesi Paralel	Tautan
Sesi Utama	https://bit.ly/SesiUtamaSENIKO2025
Paralel Sesi 1 (<i>Offline</i>)	(<i>Offline</i>) F101
Paralel Sesi 2 (<i>Offline</i>)	(<i>Offline</i>) F102
Paralel Sesi 3 (<i>Offline</i>)	(<i>Offline</i>) F111
Paralel Sesi 4 (<i>Offline</i>)	(<i>Offline</i>) F112
Paralel Sesi 5 (<i>Online</i>)	(<i>Online</i>) F115 https://bit.ly/PSSENIKO2025

ATURAN PRESENTASI ARTIKEL SESI PARALEL SENIKO 2025

1. Sebelum Presentasi

- a. Setiap peserta perlu memastikan bahwa nama, ID paper, dan judul artikel sudah benar dan telah terdaftar pada pembagian pemetaan sesi paralel.
- b. Setiap peserta **WAJIB** mengunggah *file* presentasi/*link* presentasi di <https://bit.ly/PresentationSENIKO2025> pada folder yang sesuai dengan ruang sesi paralel. Format penamaan *file*-nya: SENIKO 2025_ID Paper_Nama Lengkap. **Batas unggah 23 Agustus 2025, pukul 05.00 WIB.**

2. Pelaksanaan Presentasi

a. Pemakalah *Offline*/Luring

- i. Setiap peserta telah hadir di ruangan 10 menit sebelum sesi paralel dimulai (ruang sesi paralel terlampir).
- ii. Setiap peserta perlu absen pada formulir yang disediakan di setiap ruangan.
- iii. Untuk konfirmasi nama presenter/pemakalah, pastikan nama yang melakukan presentasi sudah sesuai dengan data yang tertulis pada daftar nama presenter/pemakalah. Jika ada perubahan nama presenter, silakan mengisi perubahan nama tersebut pada formulir yang disediakan di setiap ruangan.
- iv. Presentasi dilakukan sesuai dengan urutan pada pembagian sesi paralel.
- v. Durasi presentasi tiap peserta maksimal 7 menit.
- vi. Sesi diskusi dilakukan setelah 3 peserta selesai melakukan presentasi.
- vii. Setiap ruang sesi paralel akan ada peserta yang terpilih menjadi presenter terbaik. Pengumuman presenter terbaik akan dilakukan saat penutupan SENIKO 2025.

b. Pemakalah *Online*/Daring

- i. Setiap peserta pemakalah telah siap di Zoom maksimal 10 menit sebelum presentasi dimulai.
- ii. Untuk konfirmasi nama presenter/pemakalah, pastikan nama yang melakukan presentasi sudah sesuai dengan data yang telah disampaikan kepada panitia. Jika ada perubahan nama presenter, silakan menyampaikannya kepada moderator tiap ruangan.

- iii. Pastikan peserta sudah memasang *virtual background* di Zoom sebelum presentasi dimulai.
 - iv. Presentasi dilakukan sesuai dengan urutan pada pembagian sesi paralel.
 - v. Durasi presentasi tiap peserta maksimal 7 menit.
 - vi. Sesi diskusi dilakukan setelah 3 peserta selesai melakukan presentasi.
 - vii. Setiap ruang sesi paralel akan ada peserta yang terpilih menjadi presenter terbaik. Pengumuman presenter terbaik akan dilakukan saat penutupan SENIKO 2025.
3. Segala aturan tambahan lainnya (jika ada) disampaikan oleh panitia atau moderator sesi paralel saat pelaksanaan acara.

TAUTAN *VIRTUAL BACKGROUND* SENIKO

Virtual background dapat diunduh pada tautan berikut ini: <https://bit.ly/VBSENIKO2025>

URUTAN PRESENTASI SESI PARALEL
KELOMPOK 1

Moderator : Moeng Sakmar, S.Kom., M.Kom.

Asisten : Hidayatul Mangunah

Ruang : F101

No	ID	Judul Artikel	Pemakalah
1	4811	<i>Performance Evaluation Of Backend Frameworks For Rest Api: A Comparative Study Of Spring Boot, Flask, Express.js, Laravel Frankenphp, And Gin</i>	Bangun Wijayanto
2	4915	<i>Integration Of Bert-Vad, Mfcc-Delta, And Vgg16 In Transformer-Based Fusion Architecture For Multimodal Emotion Classification</i>	Fisan Syafa Nayoma
3	4953	<i>Vgg16-Based Feature Extraction For Arabic Alphabet Sign Language Classification To Support Qur'anic Tadarus Accessibility</i>	Aris Rakhmadi
4	4955	<i>Hybrid Time-Series Approaches For Pv Power Prediction: Evaluating Sarimax And Generative Model</i>	Sunneng Sandino Berutu, S.Si, M.Kom, Ph.D.
5	4965	<i>A Comparative Analysis Of Hyperparameter-Tuned Xgboost And Lightgbm For Multiclass Rainfall Classification In Jakarta</i>	Cokorda Gde Lanang Pringandana
6	4973	<i>Sn-A Comparative Study On Forecasting Top 4 Indonesian Bank Stock Price Amongst Prophet, Xgboost, And Regression Model</i>	Tony
7	4977	<i>Validation And Evaluation Of Browser Forensics Using Digital Forensic Approach Based On The National Institute Of Standards And Technology (Nist) Framework</i>	Muhammad Syukri
8	4985	<i>Literature Study On Ai Mechanisms, Consciousness, And Emotion Integration In Chat Gpt</i>	Angelicha Putri Dewi Ivanka
9	4988	<i>Sn - A General-Purpose Web-Based Topsis Tool For Accessible Multi-Criteria Decision Making</i>	Julius Bata
10	4989	<i>Design And Evaluation Of A Hybrid Aes-Ecc Model For Secure Server Communication Using Rest Api</i>	Made Wisnu Adhi Saputra
11	4996	<i>Ai-Driven Smart Government For Smart City Development In Indonesia: A Conceptual Model And Architectures</i>	Assaf Arief

**URUTAN PRESENTASI SESI PARALEL
KELOMPOK 2**

Moderator : Ir. Bangun Wijayanto, S.T., M.Cs., IPM

Asisten : Dyah Ghaniya Putri

Ruang : F102

No	ID	Judul Artikel	Pemakalah
1	4996	<i>Ai-Driven Smart Government For Smart City Development In Indonesia: A Conceptual Model And Architectures</i>	Assaf Arief
2	4999	<i>Efficient Evidence Reduction Technique For Mobile Forensics Based On Digital Evidence Object (Deo) Model</i>	Arif Rahman Hakim
3	5000	<i>Analysis Of Polyglot Obfuscation Techniques Against Modsecurity In Preventing Cross-Site Scripting (Xss) And Sql Injection Attacks With Experimental Method</i>	Kessy Dealova
4	5001	<i>A Comparative Analysis Of Color Channel-Based Feature Extraction Using Machine Learning Versus Deep Learning For Food Recognition</i>	Yuita Arum Sari
5	5168	<i>Forecasting Bitcoin Price Prediction With Long Short-Term Memory Networks: Implementation And Applications Using Streamlit</i>	Taufik Ganesha
6	5004	<i>Improving Direct Image Regression For Blood Cell Enumeration With A Fine-Tuned Backbone</i>	Sigit Adinugroho
7	5237	<i>From Monoliths To Microservices: Designing A Scalable Super App Architecture For Academic Services At Universitas Jenderal Soedirman</i>	Bangun Wijayanto
8	5044	<i>Comparison Of Accuracy And Computation Time In Predictive Algorithms For Predicting Earthquake Magnitude In Java Island</i>	Abdul Hakim Prima Yuniarto
9	5047	<i>Systemic Integration Of Artificial Intelligence In Indonesian Television Using Soft Systems Methodology</i>	Ciptono Setyobudi
10	5071	<i>Evaluating Classification Models For Predicting Product Success In Indonesian E-Commerce</i>	Fiola Utri Aulya
11	5107	<i>Development Of A Smart Environment Maturity Model For Green Industry In North Maluku's Mining Villages, Indonesia</i>	Assaf Arief

**URUTAN PRESENTASI SESI PARALEL
 KELOMPOK 3**

Moderator : Ir. Swahesti Puspita Rahayu, S.Kom., M.T.

Asisten : Khansa Nur Khalisa

Ruang : F111

No	ID	Judul Artikel	Pemakalah
1	5154	<i>Optimizing Alternating Least Squares For Recommender Systems Using Particle Swarm Optimization[A1]</i>	Fiddin Yusufida A'la
2	5166	<i>Optimizing Type 2 Diabetes Classification With Feature Selection And Class Balancing In Machine Learning</i>	Agus Wantoro
3	5190	<i>Agrisense: Design And Deployment Of A Long-Lifetime Lora-Based Soil Monitoring Device With Multi-Sensor Integration</i>	Haryono
4	5191	<i>An Enhanced Particle Swarm Optimization With Mutation For Mean-Value-At-Risk Portfolio Optimization In The Indonesian Banking Sector</i>	Syaiful Anam
5	5199	<i>Automatic Detection Of Dysarthria Using Mel-Frequency Cepstral Coefficients (Mfcc) And Stacking Algorithm Of Svm And Mlp</i>	Ardi Pujiyanta
6	5203	<i>A Literature-Based Heat Matrix For Quantifying Inter-Domain Correlations Within The Iso/Iec 27002:2013 Framework</i>	Erick Dazki
7	5205	<i>Gwo-Enhanced Hybrid Deep Learning With Shap For Explainable Tlkm.Jk Stock Forecasting</i>	Hilmi Aziz Bukhori
8	5208	<i>User Interface Evaluation Of The Business Development Center Website At Uin Syarif Hidayatullah Jakarta: A Content, Visual, And Navigation Perspective</i>	Muhammad Faiz Mubarak
9	5225	<i>From Logs To Insights In The Pulp & Paper Industry: Generating Structured Alarm Reports Using Llms And Rag</i>	Dr. Eng. Handri Santoso, S.Si., M.Eng.
10	5002	<i>Sn-A Hybrid Approach For Recommender Systems Based On Alternating Least Squares And Catboost</i>	Fiddin Yusufida A'la

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KELOMPOK 4**

Moderator : Dr. M. Agus Syamsul Arifin, S.St., M.Kom.

Asisten : Dwita Isma Aprilia

Ruang : F112

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2	5239	<i>Identification And Classification Of Cyber Attacks On Eldiru Unsoed Using Random Forest Algorithm</i>	Justicio Caesario
3	5245	<i>Implementation Of K-Means On Packaged Coffee Sales Data For Simulating Goods Entry In Sole Proprietorship Businesses</i>	Mochammad Agri Triansyah
4	5260	<i>Designing Ai - Ioe Precision Farming To Create Sustainable Eco-Friendly Hydroponic Greenhouses</i>	Murti Wisnu Ragil Sastyawan
5	5263	<i>Classification Of Worker Productivity And Resource Allocation Optimization With Machine Learning: A Case Study In The Garment Industry</i>	Zakiyyan Zain Alkaf
6	5267	<i>Development of a Web-Based Management Information System for Student Creativity Program (PKM) Using Extreme Programming and Laravel Framework</i>	Nihayatur Rahmah
7	5268	<i>Analyzing The Effects Of Code Splitting And Server-Side Rendering On A Vue.js Pos Application's Performance And Seo</i>	Mohamad Naufal Azizi
8	5278	<i>Sistem Pendukung Keputusan Penerima Bantuan Sosial Berbasis Knn Dan Moora</i>	Linda Nur Afifa
9	5279	<i>Automated Ktp-El Data Extraction On The E-Magang Platform Using Cnn-Based Ocr</i>	Nuansa Syafrie Rahardian
10	5283	<i>Mplementation Of The K-Means Clustering Algorithm In Grouping Data On Sales Of Ready To Drink Packaged Coffee Beverages At Maeso Jenar Stores</i>	Ayu Anjar Paramestuti

**URUTAN PRESENTASI SESI PARALEL
KELOMPOK 5**

Moderator : Agus Darmawan, S.Kom., M.Cs.

Asisten : Essay Bina

Ruang : F115

Link Zoom : <https://bit.ly/PSSENIKO2025>

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2	4993	<i>Sentiment Analysis Of Indihome Service Based On Geo Location Using The Bert Model On Platform X</i>	Robiatul Adawiyah Siregar
3	5198	<i>Control Of Pest Repellents Using Led Light And Ultrasonic Sensors Based On Esp32</i>	Albert Gifson Hutajulu
4	5200	<i>Comparison Of Information Technology Governance Maturity Levels Based On Cobit 2019 At Pt Kereta Commuter Indonesia In 2023 And 2024</i>	Purwadi
5	5201	<i>It Governance Through Mathematical Modeling: A Quantitative Assessment Of Maturity Using Factor Analysis And Structural Equation Modeling</i>	Prof. Eko Indrajit
6	5204	<i>Geographically Weighted Random Forests For Human Development Index Of Central Java Prediction</i>	Shaifudin Zuhdi
7	5248	<i>Sentiment Analysis Of Getcontact Application Reviews On Google Play Store Using Naive Bayes Algorithm</i>	Rido Dwi Kurniawan
8	5257	<i>Modernizing Village Public Governance Through An Artificial Intelligence-Based Information System</i>	Arafat
9	5280	<i>Deep Convolutional Neural Networks For Wetland Area Identification With Satellite Imagery</i>	As`Ary Ramadhan
10	5242	<i>Performance Comparison And Seo Optimization Between Laravel Blade And Laravel Inertia In The Development Of The Muncak.Id Website In Indagri trionesia</i>	Maulana Hafez Ahyatara Tempariyawan
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3	4953	Vgg16-Based Feature Extraction For Arabic Alphabet Sign Language Classification To Support Qur'anic Tadarus Accessibility Aris Rakhmadi, Anton Yudhana, Sunardi
4	4955	Hybrid Time-Series Approaches For Pv Power Prediction: Evaluating Sarimax And Generative Model Sunneng Sandino Berutu, Immanuel Richie De Harjo Zakaria, Anita Yuan, Mosiur Rahman
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6	4973	Sn-A Comparative Study On Forecasting Top 4 Indonesian Bank Stock Price Amongst Prophet, Xgboost, And Regression Model Tony, Manlika Ratchagit, Lely Hiryanto
7	4977	Validation And Evaluation Of Browser Forensics Using Digital Forensic Approach Based On The National Institute Of Standards And Technology (Nist) Framework Muhammad Syukri, Imam Riadi, Tole Sutikno

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9	4985	Literature Study On Ai Mechanisms, Consciousness, And Emotion Integration In Chat Gpt Angelicha Putri Dewi Ivanka, Jenar Mahesa Ayu, Sarah Surya Rabbani, Muhammad Darwis
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DAFTAR ABSTRAK

Performance Evaluation of Backend Frameworks for REST API: A Comparative Study of Spring Boot, Flask, Express.js, Laravel FrankenPHP, and Gin

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Abstract

One major impact of this development is the shift in application development, particularly in data integration across different platforms. Web services have emerged as a solution for system integration and multi-platform application development. One implementation of Web services is Representational State Transfer. The choice of programming language and framework is also crucial in web application development, directly affecting performance and efficiency. Research on framework performance is necessary to support the development of an Academic Information System. This study will use parameters such as response time, throughput, and resource usage, employing a performance testing method modified by the author. The method includes problem identification, data collection, backend development, performance testing, and conclusion. The test results show that Spring Boot outperforms others in all parameters with stable and efficient performance. Gin is suitable for medium-scale data, Flask excels in scalability but lacks stability, Express.js is efficient CPU usage, and Laravel with FrankenPHP is Memory-efficient. These results serve as a reference for selecting frameworks according to REST API development needs. This research supports developers in selecting appropriate backend frameworks for high-performance REST API systems.

Keyword: API, Backend, Framework, K6, Performance Testing.

Integration of BERT-VAD, MFCC-Delta, and VGG16 in Transformer-Based Fusion Architecture for Multimodal Emotion Classification

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Abstract

Emotion is a condition that plays an important role in human interaction and is the main focus of intelligence research in utilizing multimodal. Previous studies have classified multimodal emotions but are still less than optimal because they do not consider the complexity of human emotions as a whole. Although using multimodal data, the selection of feature extraction and the merging process are still less relevant to improving accuracy. This study attempts to categorize emotions and improve precision through a multimodal methodology that utilizes Transformer-based Fusion. The data used consists of a synthesis of three modalities: text (extracted through BERT and assessed through the affective dimensions of NRC Valence, Arousal, and Dominance), audio (extracted through MFCC and delta-delta² from the RAVDESS and TESS datasets), and images (extracted through VGG16 on the FER-2013 dataset). The model is built by mapping each feature into an identical dimensional representation and processed through a Transformer block to simulate the interaction between modalities, known as feature-level interactions. The classification procedure is run through a dense layer with softmax activation. Model evaluation was performed using Stratified K-Fold Cross Validation with k=10. The evaluation results showed that the model achieved 95% accuracy in the ninth fold. This result shows a significant improvement from previous research at the feature level (73.55%), and underlines the effectiveness of the combination of feature extraction and Transformer-based Fusion. This study contributes to the field of emotion-aware systems in informatics, facilitating more adaptive, empathetic, and intelligent interactions between humans and computers in practical applications.

Keywords: BERT, MFCC, Multimodal Emotion, NRC-VAD, Transformer-Based Fusion, VGG16.

VGG16-Based Feature Extraction for Arabic Alphabet Sign Language Classification to Support Qur'anic Tadarus Accessibility

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Abstract

This study addresses the limited availability of automated recognition systems for Arabic Alphabet Sign Language (ArSL), particularly in facilitating Qur'anic Tadarus for the deaf and hard-of-hearing community. While research on American and Indonesian sign languages has advanced significantly, ArSL studies, especially for static alphabet gestures, remain underrepresented. The aim of this research is to develop an accurate and efficient ArSL classifier using the VGG16 convolutional neural network with transfer learning. The study employs the publicly available RGB Arabic Alphabets Sign Language Dataset, comprising 7,856 annotated images across 31 Hijaiyah letters, collected under varied backgrounds and lighting conditions. The proposed model integrates pretrained ImageNet weights with a customized classification head, trained through a two-stage fine-tuning process with data augmentation. The model achieves 97.07% test accuracy, performing competitively against a ResNet-18 baseline (98.0%) while offering a simpler architecture suitable for resource-constrained deployments. Evaluation using precision, recall, F1-score, and confusion matrix shows consistently high performance, with minor misclassifications among visually similar letters. This work demonstrates a novel application of VGG16-based deep learning for ArSL recognition, contributing to inclusive religious education and accessibility technologies.

Keywords: Arabic Sign Language, Deep Learning, Qur'anic Accessibility, Transfer Learning, VGG16.

Hybrid Time-Series Approaches for PV Power Prediction: Evaluating SARIMAX and Generative Model

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Abstract

Forecasting the output power of photovoltaic (PV) systems is crucial in managing renewable energy efficiently and sustainably. The availability of historical data and environmental variables, such as temperature and humidity, greatly influences prediction accuracy. However, in practice, historical data is often incomplete due to technical constraints or limited monitoring infrastructure, which results in decreased prediction quality and system efficiency. To overcome these challenges, this study proposed a comparative approach between two predictive models, namely SARIMAX (Seasonal AutoRegressive Integrated Moving Average with eXogenous variables) as a classical statistical model, and WGAN-GP (Wasserstein Generative Adversarial Network with Gradient Penalty) as a generative deep learning model designed to handle incomplete data and capture nonlinear relationships. The datasets included PV power output from the monitoring system at Universitas Kristen Immanuel (UKRIM) Yogyakarta, along with temperature and humidity data from the Kalitirto weather station in Sleman, Yogyakarta. The research was conducted through several stages, namely: data collection, pre-processing, model training, and evaluation using MAE, MSE, RMSE, and MAPE metrics. The results show that the SARIMAX model using the Time-Series Cross-Validation (TSCV) achieves the best numerical performance (MAE = 0.085; RMSE = 0.145). However, this model fails to represent daily patterns realistically. In contrast, both the standard SARIMAX and WGAN-GP models are more consistent in representing seasonal patterns and daily fluctuations, even though their prediction errors were slightly higher in terms of numerical metrics. The findings advance scientific understanding of hybrid forecasting models and offer practical implications for improving energy reliability and decision-making in data-constrained environments.

Keywords: Missing data, SARIMAX, Solar energy forecasting, Time-series cross validation, WGAN-GP.

A Comparative Analysis of Hyperparameter-Tuned XGBoost and LightGBM for Multiclass Rainfall Classification in Jakarta

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Abstract

The increasing frequency of extreme weather events in Jakarta has disrupted daily life and critical infrastructure, highlighting the urgent need for accurate rainfall prediction models to support disaster mitigation and early warning systems. This study aims to evaluate and compare the performance of two machine learning algorithms Extreme Gradient Boosting (XGBoost) and Light Gradient Boosting Machine (LightGBM) for multiclass rainfall classification using historical meteorological data. The dataset, which includes features such as temperature, humidity, wind speed, and rainfall, was preprocessed through mean imputation, oversampling to address class imbalance, one-hot encoding, and feature engineering. Both models were trained and tuned using RandomizedSearchCV and assessed through cross-validation and independent testing. The results show that XGBoost consistently outperformed LightGBM, achieving 94% accuracy compared to 91%. Furthermore, XGBoost demonstrated higher precision, recall, F1-score, and specificity across all rainfall categories, resulting in fewer misclassifications and more stable predictions. Confusion matrices confirmed its superior ability to distinguish between similar weather conditions such as cloudy and rainy classes. These findings indicate that XGBoost is more effective in capturing nonlinear interactions between weather features and is therefore better suited for use in complex tropical climates. The study concludes that XGBoost is the more reliable model and recommends its integration into real-time early warning systems to improve climate resilience and disaster preparedness in urban areas like Jakarta that are increasingly affected by climate variability.

Keywords: Classification, Hyperparameter Tuning, LightGBM, Machine Learning, Rainfall Prediction, XGBoost.

SN-A Comparative Study on Forecasting Top 4 Indonesian Bank Stock Price Amongst Prophet, XGBoost, and Regression Model

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Abstract

This study investigates the efficacy of Prophet, XGBoost, and Ridge Regression in forecasting stock prices of four major Indonesian banks – Bank Central Asia (BBCA.JK), Bank Negara Indonesia (BBNI.JK), Bank Rakyat Indonesia (BBRI.JK), and Bank Mandiri (BMRI.JK) – using daily historical data from January 2020 to March 2025, sourced from Yahoo Finance. The banking sector's volatility, evidenced by year-to-date declines ranging from 7.59% (BBCA) to 22.69% (BMRI) as of May 1, 2025, underscores the need for accurate predictive models. Performance was evaluated using Mean Absolute Error (MAE) and Root Mean Square Error (RMSE), revealing Ridge Regression as the superior method, consistently achieving the lowest errors (i.e., MAE of 23.81 for BBNI.JK and RMSE of 55.75 for BBCA.JK). Prophet exhibited the highest errors, suggesting its seasonal focus is less suited to stock price unpredictability, while XGBoost performed moderately better but lagged behind Ridge Regression. The results highlight Ridge Regression's effectiveness in handling multicollinearity and noise in financial data. Our discussions emphasize the importance of model selection based on data characteristics, with implications for investment decision-making in the Indonesian market. Future research could explore hybrid models to enhance accuracy across varied market conditions, addressing the study's 60-day forecasting horizon limitation.

Keywords: stock price forecasting, Indonesian banks, ridge regression, mean absolute error, root mean square error.

***Validation and Evaluation of Browser Forensics Using Digital Forensic Approach
Based on the National Institute of Standards and Technology (NIST) Framework***

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Abstract

Browsers have become essential applications in digital life alongside the advancement of internet technology. However, users' low awareness of privacy security during web browsing can lead to the risk of data theft by malicious parties. This study analyzes digital traces in Google Chrome and Mozilla Firefox using a digital forensic approach based on the standards of the National Institute of Standards and Technology (NIST). The method involves four testing scenarios to compare digital traces in storage media (hard drive) and RAM between normal and private/incognito browsing modes. The objective of this research is to validate and evaluate previous findings conducted on the Linux operating system, using a different approach within a Windows environment. The experiment uses the same digital forensic tools to ensure data accuracy. This study contributes to the advancement of browser forensics by presenting a validated and reproducible framework for memory-based privacy evaluation, thereby supporting more accurate and systematic analysis of digital traces.

Keywords: browser privacy, digital forensics, Google Chrome, Mozilla Firefox, NIST

Database-Based Gui System To Increase The Effectiveness Of Student Data Management In The Fkip Uhamka Dormitory

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Abstract

The rapid growth of the congregation at HKBP Sola gratia Kayu Mas Church in Jakarta has posed challenges in managing member data efficiently and effectively. The previous data management system, which relied on Microsoft Excel, showed significant limitations in data retrieval, family grouping, and presenting birthday or elderly member information. This study aims to develop a web-based church congregation management information system using the Scrum methodology as an iterative and flexible software development approach. The research methodology includes observation, interviews, literature review, and black box testing. The results indicate that the developed system successfully meets user needs, simplifies congregation data management, and enhances the effectiveness of church administrative services. The implementation of Scrum has proven to be effective in accelerating development processes, accommodating changing requirements, and increasing user involvement through continuous evaluation. This system is expected to be replicable in other churches with similar needs as an integrated digital solution for congregation management.

Keywords: Congregation Data Management, Hkbp Sola Gratia Information System, Scrum On Congregation System Development.

Literature Study on AI Mechanisms, Consciousness, and Emotion Integration in Chat GPT

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Abstract

The development of artificial intelligence (AI), particularly ChatGPT, demonstrates the ability to generate responses that resemble human emotional understanding and raises questions about the integration of consciousness, emotions, and algorithms in the context of singularity. This study aims to analyze how AI builds the illusion of consciousness and emotional closeness through computational mechanisms and its impact on human-AI interactions across various sectors. The method used is a structured literature review, examining academic journals, official reports, and the latest technical documentation classified by technical domain, including model architecture, emotion simulation, ethical implications, and publication year to assess its developmental dynamics. The results show that ChatGPT is capable of simulating empathy through affective computing and language prediction patterns, but it does not possess subjective emotional experiences like humans. This illusion of emotional closeness has proven beneficial in enhancing the effectiveness of interactions in education, public services, and healthcare, although it also poses risks such as emotional manipulation, data bias, and unrealistic empathy standards. The discussion emphasizes that the term "empathy" in AI should be understood technically as a data-driven adaptive response, not authentic emotional experience, and thus must be distinguished from human empathy. Critical analysis also reveals contradictions between AI's effectiveness in mimicking human behavior and its limitations in achieving genuine emotional connection. The discussion emphasizes that the term "empathy" in AI should be understood technically as a data-driven adaptive response, not an authentic emotional experience, and therefore needs to be distinguished from human empathy. Critical analysis also reveals a contradiction between AI's effectiveness in mimicking emotional behavior and its limitations in understanding meaning and consciousness at a deeper level. Therefore, this research contributes to the field of Computer Science by presenting a conceptual synthesis that clarifies both the limitations and potential of AI, while offering a foundation for designing more ethical interaction systems and developing risk assessment models in vulnerable sectors.

Keywords: Artificial Intelligence, ChatGPT, Artificial Consciousness, Emotion Simulation, Human-AI Interaction, Predictive Algorithms.

SN - A General-Purpose Web-based TOPSIS tool for Accessible Multi-Criteria Decision Making

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Abstract

Multi-criteria decision-making (MCDM) is essential in contexts where alternatives must be evaluated against diverse, often conflicting, criteria. However, most MCDM tools require technical proficiency or software installation, posing accessibility challenges for non-technical users. This study presents the development of Topsisku, a web-based decision support system implementing the TOPSIS method, aimed at improving the accessibility and practical application of multi-criteria analysis. Topsisku enables users to upload datasets, set weights and cost-benefit types for each criterion, compute rankings, and view results directly in a user-friendly web interface. System evaluation was conducted using three real-world case studies from previous literature, each representing different domains and data structures. Results demonstrate that Topsisku produces alternative rankings identical to manual TOPSIS calculations, validating its computational accuracy. The system's intuitive design eliminates the need for programming skills or complex configurations, thus broadening the usability of MCDM for non-technical users. These results highlight the potential of accessible, web-based decision support systems such as Topsisku to broaden the adoption of robust decision-making methodologies across a wide range of practical applications.

Keywords: Decision support, Multi-Criteria Decision Making, TOPSIS, Web-based.

Design and Evaluation of a Hybrid AES-ECC Model for Secure Server Communication using REST API

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Abstract

Security in server-to-server communication is essential, especially in open networks vulnerable to data breaches and service disruptions. However, many existing solutions rely on a single cryptographic algorithm, limiting their ability to address diverse threats. This study aims to develop and evaluate a hybrid security model by combining the Advanced Encryption Standard (AES) and Elliptic Curve Cryptography (ECC) to ensure confidentiality, integrity, and authenticity of transmitted data. An experimental approach is applied through direct implementation in server communication. The model uses AES for symmetric encryption, ECC for dynamic session key exchange, and JSON Web Token (JWT) reinforced by nonce, timestamp, and HMAC-SHA256 for authentication and integrity verification. Test results show the model detects payload modification, replay attacks, JWT manipulation, and passive interception, with processing time still within an acceptable range. Communication efficiency is maintained with negligible payload overhead. The novelty of this research lies in integrating hybrid encryption with stateless authentication and integrity validation into a unified architecture. This integration allows security elements to be delivered systematically via REST API, making the model easy to adopt in existing architectures. The results of this study contribute to the advancement of secure API-based communication frameworks in the field of informatics, providing a practical, adaptable, and scalable solution for protecting data in distributed information systems.

Keywords: *Advanced Encryption Standard, Cryptography, Data Security, Elliptic Curve Cryptography, JSON Web Token.*

Sentiment Analysis Of Indihome Service Based On Geo Location Using The Bert Model On Platform X

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Abstract

The rapid growth of internet usage in Indonesia has led more people to express their feelings, whether positive or negative, about online services, including IndiHome, through social media platforms such as X (formerly Twitter). This study aims to analyze public sentiment toward IndiHome services based on geographic location using the IndoBERT natural language processing model. The data consists of 3.307 Indonesian tweets that are geo-tagged and categorized into three sentiment groups: good, okay, and bad. The research process involves collecting the data, cleaning it (organizing and splitting words), and testing the IndoBERT model with a confusion matrix and classification scores. The findings reveal that negative feelings are more prevalent in most locations, especially in Java. The IndoBERT model achieved its highest accuracy of 80% in detecting negative sentiment. However, there is still room for improvement in distinguishing between positive and neutral sentiments, possibly due to data imbalance. The study demonstrates the value of combining sentiment analysis with geo-location to provide strategic insights to service providers, helping them improve based on what people consider important in different areas regions.

Keywords: Sentiment Analysis, IndoBERT, Geo Location, IndiHome, Platform X.

***AI-driven Smart Government for Smart City Development in Indonesia:
A Conceptual Model and Architectures***

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Abstract

Smart city development is a national priority for Indonesia to enhance its global competitiveness, with artificial intelligence (AI) driven smart government as a key enabler. However, its implementation is often hindered by significant challenges, such as the unmeasured maturity and readiness of organizations, a lack of public service innovation, fragmented governance without integrated collaboration among stakeholders, and minimal citizen engagement. These factors contribute to the failure of government institutions in achieving their smart city vision. This study aims to address these issues by developing a conceptual model to identify critical success factors and evaluate processes that can integrate and collaborate on public services, thereby fostering innovation and AI-driven smart government at a strategic level. This research employs a mixed-methods approach, combining qualitative and quantitative techniques. The model was constructed using Factor Analysis (CSF), Thematic Analysis, TOGAF, and a Multidimensional View. Data validation was conducted through triangulation, expert judgment, Focus Group Discussions (FGD) and statistical analysis. The research successfully identifies a comprehensive model consisting of 6 dimensions, 17 key components, and a 5-layer smart architecture for an AI-driven smart government in Indonesia. This framework serves as a benchmark for measuring the maturity and readiness of local government institutions in Indonesia.

Keywords: Smart Government, AI-driven, Smart City, A Conceptual Model, An Architectures.

Efficient Evidence Reduction Technique for Mobile Forensics based on Digital Evidence Object (DEO) Model

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Abstract

The Android operating system (OS) is currently the most widely used platform on smartphones, making it a critical source of digital evidence in cybercrime investigations. With its vast array of applications and features, Android OS generates and stores a significant amount of data, much of which may be relevant to criminal activities. Mobile forensics plays a crucial role in identifying and analyzing this information to produce scientifically valid evidence. However, the process of acquiring and examining data from a smartphone's internal storage typically results in large and complex datasets that can hinder timely forensic analysis. To address this challenge, this paper proposes the implementation of the DEO Model using Python to reduce the volume of digital evidence obtained from Android-based smartphones. The DEO Model employs a structured filtering approach, narrowing the dataset to only those objects relevant to a predefined scenario. This is achieved by applying DEO parameters based on the 5W category theory (Why, When, Where, What, Who), resulting in an optimal and focused dataset. The findings demonstrate that the Python-based DEO Model significantly accelerates the mobile forensic process, and effectively reduces dataset size while both maintaining the evidence integrity and the scenario relevance. The model achieves a very low False Positive Rate (FPR) of 0,00072, indicating a minimal risk of mismatches during the object reduction process. Therefore, the findings confirm the validity and accuracy of the digital evidence obtained. This research highlights the potential of the Python-based DEO Model to enhance the efficiency of forensic investigations on Android smartphones.

Keywords: *Android, DEO Model, Digital Evidence, Digital Investigation, Mobile Forensics.*

Analysis of Polyglot Obfuscation Techniques against ModSecurity in Preventing Cross-Site Scripting (XSS) and SQL Injection Attacks with Experimental Method

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Abstract

Internet use has increased every year, as shown by the percentage of internet users in Indonesia reaching 79.50% in 2024. However, security is something that cannot be ignored, especially with the growing number of Cross-Site Scripting (XSS) and SQL Injection Attacks in web platforms. According to OWASP Top 10 report, these two attacks were listed in 2017 and appeared again in the 2021 version, showing that they are still relevant today. In fact, in June 2024, XSS and SQL Injection vulnerabilities were found in a company, PT. XYZ. One way to mitigate these attacks is by using a Web Application Firewall (WAF) such as ModSecurity, which can protect websites from exploitation. However, previous research found that older versions of ModSecurity had weaknesses that could be bypassed with simple obfuscation techniques. This study aims to analyze the effectiveness of the built-in rules in ModSecurity Core Rule Set (CRS) version 4.7 in handling XSS and SQL Injection payloads with polyglot obfuscation, a method that uses complex character encoding to avoid WAF detection. The research was conducted using an experimental method. This study contributes to improve WAF security by testing against modern obfuscation-based attacks, so that security does not rely solely on the default WAF configuration. The results show that all payloads were detected and blocked by ModSecurity with an HTTP 403 response, proving that the CRS 4.7 built-in rules can effectively protect against XSS and SQL Injection threats.

Keywords: Core Rule Set (CRS), Cross-Site Scripting, ModSecurity, Polyglot obfuscation, SQL Injection, Web Application Firewall (WAF).

A Comparative Analysis of Color Channel-Based Feature Extraction using Machine Learning versus Deep Learning for Food Recognition

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Abstract

Automated Dietary Assessment Accurate food recognition is a big challenge in computer vision which is critical for developing Automated Dietary assessment and health monitoring systems. The key question it answered was whether traditional machine learning with feature engineering by hand can beat modern deep learning approaches? In this Context, this study serves as a comparative analysis of these two paradigms. The baseline method worked by extracting texture (LBP, GLCM) and color information from different channels of five colors spaces (RGB, HSV, LAB, YUV, YCbCr) followed by feeding these features into multiple classifiers such as Nearest Neighbor (NN), Decision Tree and Naïve Bayes. These were then compared to deep learning models (MobileNet_v2, ResNet18, ResNet50, EfficientNet_B0). The best traditional one can reach an accuracy of 93.33%, using texture features extracted from the UV channel and classified with a NN. Nevertheless, the deep learning models consistently presented higher performance and MobileNet_v2 reached up to 94.9% accuracy without requiring manual feature selection. In this paper, we show that end-to-end deep learning models are more powerful and error robust for food recognition. These results highlight their promise for constructing more effective and scalable real-world applications with less need for intricate, domain-specific feature engineering.

Keywords: Color Channel Based Feature Extraction, Color Space, Deep Learning, Machine Learning, Food recognition, Texture Extraction.

SN-A Hybrid Approach for Recommender Systems Based on Alternating Least Squares and CatBoost

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Abstract

This study aims to improve the accuracy of movie rating predictions by applying and combining collaborative filtering and machine learning techniques in a hybrid recommender system. The research utilizes the MovieLens dataset to implement two distinct approaches: the Alternating Least Squares (ALS) matrix factorization model and the CatBoost gradient boosting model. The ALS model is trained to capture latent user-item interactions, while CatBoost leverages nonlinear relationships using user and item features. A simple hybrid strategy averages the predictions from both models to evaluate potential performance gains. Experimental results show that the hybrid approach achieves lower error metrics compared to either model individually, with Root Mean Squared Error (RMSE) and Mean Absolute Error (MAE) values of 0.857 and 0.689, respectively. This demonstrates that combining latent factor models with tree-based learning can effectively reduce prediction errors by exploiting complementary strengths. The novelty of this research lies in its straightforward yet effective hybridization strategy that improves recommendation quality without complex ensembling techniques. The findings suggest that even simple model fusion can significantly enhance predictive accuracy in recommender systems and may be adapted for other domains where combining linear and nonlinear modeling is beneficial.

Keywords: ALS, CatBoost, collaborative filtering, hybrid model, MovieLens, recommender system.

Improving Direct Image Regression for Blood Cell Enumeration with a Fine-Tuned Backbone

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Abstract

Complete blood count (CBC) examination provides an important insight for diagnosis or disease treatment. Currently, CBC examination requires complex and expensive devices that limit their deployment in remote area. The development of computer vision based method offers simplification to the process. However, its implementation is limited to the availability of large size labelled dataset. This research aims to develop a direct image regressor that is able to regress directly from image. There are two stages in estimation process. First, the backbone is trained using large dataset available for blood cell classification problem. Then the trained backbone is plugged into the final model by adding a fully connected neural network that acts as regressor. The whole model is then trained using limited whole blood cell count dataset. The evaluation process shows that training the backbone using large size related dataset improve the performance by 50%. This study can be used to create a low-cost blood component evaluation tool, particularly in rural areas where access to advanced laboratory equipment is limited.

Keywords: Blood Cells Components, Complete Blood Count, Deep Neural Regressor.

From Monoliths to Microservices: Designing a Scalable Super App Architecture for Academic Services at Universitas Jenderal Soedirman

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Abstract

Jenderal Soedirman (Unsoed) currently operates more than 30 monolithic information systems built with heterogeneous technology stacks, resulting in duplicate functionality, inconsistent user experience, and high maintenance costs. This study designs a modular, microservices-based Super App architecture that integrates core academic services (KRS/KHS, transcript, student & lecturer attendance, lecturer activity log) and a parent/guardian monitoring feature. Using the Design Science Research (DSR) method, we (1) identified problems via a technology audit and problem-objective matrix; (2) designed the artifact with Domain-Driven Design, C4 modelling, and API-first contracts; (3) demonstrated a working prototype with API Gateway, SSO, and event-driven notifications; (4) evaluated performance (<300 ms latency for 500–1000 concurrent users) and stakeholder impact; and (5) communicated results through this paper. The proposed architecture reduces integration complexity, supports zero-downtime deployment, and enhances transparency for parents without violating consent and privacy. The validated blueprint provides a roadmap for transforming legacy campus systems into a scalable, observable, and governable Super App.

Keywords: API governance, arsitektur microservices, C4 modeling, Design Science Research, IT pendidikan tinggi, Super App.

Comparison of Accuracy and Computation Time in Predictive Algorithms for Predicting Earthquake Magnitude in Java Island

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Abstract

Java Island has many active faults that have the potential to cause earthquakes with very destructive impacts. Given the significant potential of these active faults, earthquake magnitude prediction is crucial for practical mitigation efforts. This study aims to compare the Random Forest, Neural Network, Linear Regression, and Support Vector Machine algorithms in terms of two primary aspects: prediction accuracy and computation time. This study began by preprocessing the earthquake dataset. Then, after that, the dataset was split to obtain training data and test data. Furthermore, a predictive model was created on the training data. Then evaluate the model with test data. Based on the study's results, Random Forest is the most accurate algorithm, with the lowest RMSE value, although it requires a slightly longer execution time than Linear Regression. The neural network shows quite good results with a relatively fast time and acceptable accuracy. Meanwhile, Linear Regression is the quickest, but its error rate is relatively high. The Support Vector Machine yields the most inefficient results, both in terms of accuracy and computational time. It can be concluded that Random Forest is recommended for cases that require high precision. At the same time, Linear Regression can be used when speed is the primary concern and the error rate is still tolerable.

Keywords: Earthquake, Linear Regression, Neural Network, Random Forest, Support Vector Machine.

Systemic Integration of Artificial Intelligence in Indonesian Television Using Soft Systems Methodology

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Abstract

The television industry faces significant challenges due to digital disruption, particularly the increasingly widespread penetration of artificial intelligence (AI) technology. AI has the potential to optimize production, distribution, and audience preference analysis, but its implementation faces the complexities of unstructured social systems. This study aims to explore the systemic application of AI using a Soft Systems Methodology (SSM) approach to identify, analyze, and optimize its use in the television industry. The research method used was qualitative with a case study design at a national television station. The SSM process was carried out through seven stages, starting from exploring the problem situation, compiling rich pictures, analyzing CATWOE, and formulating and evaluating corrective actions. Data were collected through literature review, participant observation, and internal document analysis. The results show that SSM is effective in identifying strategic areas for AI optimization, particularly in audience segmentation, content automation, and broadcast management. The resulting framework is flexible, participatory, and responsive to the social dynamics of media organizations. The impact of this research is a contribution to the development of media information systems and technology, as well as expanding the scope of soft methodologies in responding to the challenges of digital transformation in an adaptive and sustainable manner.

Keywords: *Soft System Methodology, Artificial Intelligence for media, Digital Transformation, Television Industry.*

Evaluating Classification Models for Predicting Product Success in Indonesian E-Commerce

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Abstract

The intense competition within the Indonesian e-commerce landscape presents a significant challenge for sellers in forecasting product performance. This study offers a unique contribution by systematically comparing seven machine learning classification algorithms to predict product success across Indonesia's three largest platforms: Shopee, Tokopedia, and Lazada. The primary objective is to identify the most effective algorithm for predicting whether a product's sales will surpass the market median. The methodology involved aggregating and preprocessing a dataset of 3,673 product listings. Product success was defined as a binary variable based on sales volume exceeding the dataset's median. Seven models, including Logistic Regression, KNN, SVM, and tree-based ensembles like Random Forest, XGBoost, and LightGBM, were trained and optimized using a 5-fold cross-validated GridSearchCV. Evaluation was based on accuracy, ROC AUC, and F1-score. The results demonstrate a clear performance hierarchy, with tree-based ensemble models achieving superior results. Random Forest emerged as the premier model, attaining an accuracy of 83.2% and an AUC of 0.907. A subsequent feature importance analysis revealed that shop_followers and price were the most significant predictors of success. This finding has crucial practical implications, particularly for Micro, Small, and Medium Enterprises (MSMEs), by providing a data-driven framework for decision-making. The model enables them to focus resources on actionable strategies – building seller reputation and optimizing pricing – to enhance their competitiveness effectively.

Keywords: *Classification, Comparative Analysis, E-commerce, Machine Learning, Product Success Prediction, Random Forest.*

Development of a Smart Environment Maturity Model for Green Industry in North Maluku's Mining Villages, Indonesia

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Abstract

The smart environment maturity model for sustainable mining village areas in North Maluku Province has become a primary demand for the transformation towards sustainable green smart villages. North Maluku, one of Indonesia's largest mining industry provinces, includes the Halmahera and Obi archipelagos as sources of nickel, iron ore/sand, gold, and silver mines. This study aims to develop a maturity model that integrates Indonesian regulations to support green industry implementation in mining villages. The methodology employs Systematic Literature Review to identify Critical Success Factors (CSFs), validated through expert judgment using 5-point Likert scale assessment. The research results yield eight key dimensions, 25 sub-dimensions, and five maturity levels: underdeveloped, developing, self-reliant, advanced, and smart villages. Expert validation achieved an overall average score of 3.65/5.0, indicating moderate acceptance with improvement areas identified in local culture and technology dimensions. The developed framework provides a foundation for environmental informatics applications and decision support systems in rural development contexts. The model addresses national regulations concerning green industry while providing an adaptive framework for archipelago regions, serving as a reference for policy formulation and village fund allocation based on environmental indicators.

Keywords: CSFs, Green Industry, Maturity Model, North Maluku, Smart Environment.

Optimizing Alternating Least Squares for Recommender Systems Using Particle Swarm Optimization

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Abstract

Recommender systems play a crucial role in various digital platforms by assisting users in discovering relevant items. The research problem addressed in this study is the limited predictive accuracy of ALS-based recommender systems due to suboptimal parameter selection. This study explores how Particle Swarm Optimization (PSO) can be leveraged for parameter optimization to address this limitation. The dataset used is MovieLens 1M, which contains over one million user ratings for thousands of movies. The research process includes data preprocessing, data splitting, model training, and evaluation using Root Mean Squared Error (RMSE) and Mean Absolute Error (MAE) as the primary metrics. The evaluation results indicate a significant improvement in model performance after optimization, with RMSE decreasing from 0.895 to 0.860 and MAE from 0.704 to 0.680. These findings demonstrate that optimization algorithms can effectively improve the prediction accuracy of recommendation systems. This research contributes to the application of swarm-based optimization techniques in enhancing matrix factorization-based recommender systems.

Keywords: *recommender system, ALS, PSO, MovieLens, RMSE, MAE*

Optimizing Type 2 Diabetes Classification with Feature Selection and Class Balancing in Machine Learning

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Abstract

Type 2 Diabetes (T2DM) is a crucial factor in patient survival and treatment effectiveness. Errors in diabetes detection lead to disease severity, high costs, prolonged healing time, and a decline in service quality. Additionally, a major challenge in developing Machine Learning (ML)-based detection decision support systems is the class imbalance in medical data as well as the high feature dimensionality that can affect the accuracy and efficiency of the model. This research proposes an approach based on feature selection (FS) and handling class imbalance to improve performance in type 2 diabetes. Several feature selection techniques such as Information Gain (IG), Gain Ratio (GR), Gini Decrease (GD), Chi-Square (CS), Relief-F, and FCBF can perform feature selection based on weighting ranking. Furthermore, to address the imbalanced class distribution, we utilize the Synthetic Minority Over-Sampling Technique (SMOTE). ML classification models such as Support Vector Machine (SVM), Gradient Boosting (GB), Tree, Neural Network (NN), Random Forest (RF), and AdaBoost were tested and evaluated based on the confusion matrix including accuracy, precision, recall, and time. The experimental results show that the combination of strategies for handling imbalanced classes significantly improves the predictive performance of ML algorithms. In addition, we found that the combination of feature selection techniques IG+AdaBoost consistently demonstrates optimal performance. This study emphasizes the importance of data preprocessing and the selection of the right algorithms in the development of machine learning-based T2DM detection systems. Accurate detection can reduce the severity of disease, lower treatment costs, speed up the healing process, and improve healthcare services.

Keywords: Diabetes, Feature selection, Imbalance class, Machine Learning

***Forecasting Bitcoin Price Prediction with Long Short-Term Memory Networks:
Implementation and Applications Using Streamlit***

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Abstract

The rapid growth of cryptocurrency markets, particularly Bitcoin, has highlighted the need for accurate price prediction models to support informed decision-making. While existing studies primarily evaluate machine learning models for price forecasting, few have implemented these models in real-world applications. This paper addresses this gap by developing a Bitcoin price prediction system using Long Short-Term Memory (LSTM) networks, integrated into a user-friendly web-based application powered by Streamlit. The model forecasts Bitcoin prices at 5-minute, 1-hour, and 1-day intervals, demonstrating strong predictive performance. For the 5-minute interval, the model achieved a Mean Squared Error (MSE) of 53,479.86, Mean Absolute Error (MAE) of 150.58, Root Mean Squared Error (RMSE) of 231.26, and Mean Absolute Percentage Error (MAPE) of 0.144%. At the 1-hour interval, errors increased moderately with an MSE of 423,198.24, MAE of 499.93, RMSE of 650.54, and MAPE of 0.505%. For the 1-day interval, the model faced greater variability, reflected in an MSE of 3,089,699.07, MAE of 1,058.88, RMSE of 1,757.75, and MAPE of 2.027%. These results indicate that while predictive precision decreases over longer horizons, the model maintains strong performance across all timeframes. By embedding LSTM predictions into an interactive, real-time forecasting platform, this study demonstrates the practical integration of deep learning into complex financial systems. Beyond cryptocurrency, the approach highlights the potential of intelligent computational models to enhance decision-making processes in data-intensive domains, reinforcing the role of informatics in bridging advanced algorithms with usable technological solutions.

Keywords: Bitcoin, Price Prediction, Long Short-Term Memory (LSTM), Machine Learning, Cryptocurrency, Web Application, Streamlit.

AgriSense: Design and Deployment of a Long-Lifetime LoRa-Based Soil Monitoring Device with Multi-Sensor Integration

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Abstract

Soil monitoring plays a crucial role in achieving precision agriculture, particularly in remote areas where frequent manual observation is not feasible. This paper presents AgriSense, a long-life, ultra-low power soil monitoring system utilizing LoRa communication to enable reliable data transmission over long distances with minimal energy consumption. The system employs the STM32WLE5CCU6 microcontroller and a 6-in-1 RS485 Modbus soil sensor (T-H-EC-NPK) to measure environmental parameters such as battery voltage, soil humidity, temperature, electrical conductivity (EC), and macronutrient levels of nitrogen (N), phosphorus (P), and potassium (K). The data acquisition cycle operates with high energy efficiency, consuming only 1 μ A during sleep mode and 50 mA during a 600 ms data sensing and transmission period. Acquired data is sent via a RAK7245 LoRa gateway to a ChirpStack server hosted on a virtual private server (VPS), which forwards it to an application server developed in .NET via MQTT. This application server stores and manages the data in a MySQL database, supporting scalable and centralized soil condition monitoring. With a 4000 mAh battery and data transmission scheduled every 2 hours, the system is projected to operate for over five years without battery replacement. These results demonstrate that AgriSense is a viable solution for long-term, autonomous soil monitoring in precision agriculture, contributing to sustainable farming practices through efficient environmental data management.

Keywords: Agriculture, Battery Life, IoT, LoRa, Precision Farming, Soil Monitoring.

***An Enhanced Particle Swarm Optimization with Mutation for Mean-Value-at-Risk
Portfolio Optimization in the Indonesian Banking Sector***

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Abstract

Portfolio optimization in emerging markets is challenging because high volatility and non-normal return distributions reduce the effectiveness of traditional mean-variance models, which tend to underestimate downside risk. This study aims to develop and evaluate an Enhanced Particle Swarm Optimization with Mutation (PSO with Mutation) for portfolio optimization under the Mean-Value-at-Risk (Mean-VaR) framework in the Indonesian banking sector. The novelty of this approach lies in integrating a mutation operator into standard PSO to maintain population diversity, prevent premature convergence, and improve exploration of the solution space. To evaluate the method, daily adjusted closing prices of 31 Indonesian bank stocks from January 2020 to July 2025 were collected. Preprocessing included removing tickers with incomplete data and computing daily returns. The optimization problem was formulated using Mean-VaR as the risk measure, with portfolio weight constraints. The proposed PSO with Mutation was benchmarked against standard PSO, Genetic Algorithm (GA), Bat Algorithm (BA), BA with Mutation, and classical models (Markowitz and Monte Carlo-based VaR). Performance was assessed using expected return, Mean-VaR, risk-adjusted return, Sharpe ratio, execution time, and stability across 25 independent runs. The results show that PSO with Mutation achieved a competitive expected return (0.0020), the lowest Mean-VaR (0.0311), the highest risk-adjusted return (0.0650), and the lowest variability across runs, while maintaining acceptable execution time. These findings confirm that mutation-enhanced PSO provides a robust, balanced, and efficient solution for portfolio optimization, making it highly relevant for investors in volatile emerging markets and advancing research on hybrid metaheuristics in financial optimization.

Keywords: Indonesian Banking Sector, Mean Value-at-Risk, Mutation Operator, Particle Swarm Optimization, Portfolio Optimization.

Control of Pest Repellents Using LED Light and Ultrasonic Sensors Based on ESP32

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Abstract

Shallots are an agricultural commodity of high economic value that often experiences pest attacks, causing a decrease in crop yields. Commonly used pest control methods, such as pesticides and manual expulsions, are often less effective and can have a negative impact on the environment. Therefore, this research aims to design and develop a pest repellent based on the ESP32 microcontroller that can be operated in automatic or manual mode and utilize the resources of the Solar Power Plant (PLTS) supported by ultrasonic loads and LED lights. The research methods used include device design using PCB, load testing, and system performance analysis based on the voltage and current generated. The test results show that the system has high stability during the day with an average voltage of 12.54V and an average current of 0.07A for ultrasonic loads. However, at night, the system degrades, because the solar cells do not produce energy. The stability of the system is also more optimal at the use of ultrasonic loads compared to LED loads which exhibit higher voltage fluctuations. Thus, this tool can be an effective and environmentally friendly solution for shallot farmers in reducing pest attacks.

Keywords: ESP32 Microcontroller, PCB, Pest Repellent, Shallots, Solar Power.

Automatic Detection of Dysarthria Using Mel-Frequency Cepstral Coefficients (MFCC) and Stacking Algorithm of SVM and MLP

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Abstract

Articulation disorders (commonly referred to as "dysarthria") represent a condition that can significantly impact an individual's communication abilities and necessitate accurate diagnosis for appropriate intervention. However, the traditional manual diagnostic processes currently in use are time-consuming and require specialized expertise. This study proposes an automated classification method to identify articulation disorders using Mel-Frequency Cepstral Coefficients (MFCC) features and machine learning algorithms, specifically Support Vector Machine (SVM) and Multilayer Perceptron (MLP), along with a stacking technique that combines both models. The dataset utilized comprises 240 audio samples, divided into 80% for training and 20% for testing. Evaluation results indicate that the SVM model achieved an accuracy of 95.83%, precision of 96.15%, recall of 95.83%, and an F1-score of 95.83% on the test data. The MLP model yielded an accuracy of 93.75%, precision of 93.83%, recall of 93.75%, and an F1-score of 93.75%. Meanwhile, the stacking model, which integrates SVM and MLP, demonstrated the best performance, achieving an accuracy of 97.92%, precision of 98.00%, recall of 97.92%, and an F1-score of 97.92%. Analysis of the confusion matrix revealed that the majority of the data was classified correctly, although a few misclassifications were observed, providing valuable insights for further development. This research highlights the significant potential of voice-based identification of articulation disorders, which can offer practical benefits in diagnosis and vocal therapy.

Keywords: *Dysarthria, Mel-Frequency Cepstral Coefficients (MFCC), Multilayer Perceptron (MLP), Stacking, Support Vector Machine (SVM), Voice Classification.*

***Comparison of Information Technology Governance Maturity Levels Based on COBIT 2019
at PT Kereta Commuter Indonesia in 2023 and 2024***

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Abstract

This study aims to analyze and compare in-depth the maturity level of Information Technology (IT) governance at PT Kereta Commuter Indonesia (KCI) between 2023 and 2024, implementing the COBIT 2019 framework. This research is crucial given that KCI faces complex operational challenges with high daily passenger volumes, making information systems the backbone of its smooth transportation services. Using a descriptive-comparative case study with a mixed-methods approach, data was collected comprehensively through interviews, Likert-scale questionnaires, and a review of internal documentation such as IT audit reports and government regulations.

The analysis results show significant and consistent improvement, with maturity levels generally rising from levels 2 (Managed) and 3 (Defined) in 2023 to levels 3 and 4 (Quantitatively Managed) in 2024. This improvement reflects KCI's success in strengthening IT governance strategically and operationally on an ongoing basis, supported by top management commitment and regular internal evaluations. The most prominent progress is seen in strategic domains such as EDM01 (Ensure Governance Framework Setting) and operational domains such as DSS01 (Manage Operations) which successfully reached level 4. Such annual evaluations have proven to serve as a vital reference and objective benchmark for identifying governance gaps, guiding digital strategy development, and providing a basis for strategic decisions regarding future IT investment priorities. Ultimately, the study confirms that regular assessments can enhance the effectiveness of data-driven IT transformations across an organization and ensure that IT implementations align with the company's business objectives.

Keywords: IT Governance, COBIT 2019, Maturity Level, Annual Evaluation, KCI.

***IT Governance through Mathematical Modeling: A Quantitative Assessment of Maturity
Using Factor Analysis and Structural Equation Modeling***

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Abstract

IT Governance (ITG) ensures an organization's technological capabilities align with its business strategy. Although frameworks like COBIT 2019 offer structured guidelines, many assessment techniques rely on qualitative measures, which can compromise objectivity. This paper proposes a novel quantitative approach that integrates Factor Analysis (FA) and Structural Equation Modeling (SEM) to measure IT Governance maturity. By mapping each COBIT 2019 domain – EDM, APO, BAI, DSS, and MEA – onto a latent construct, organizations gain empirical insights into their governance status. Exploratory and confirmatory factor analyses validate these domains, while SEM reveals the magnitude and significance of each domain's impact on overall IT Governance maturity. A real-world example from a financial services company, "FinServEU," demonstrates how this framework can prioritize improvements, enhance regulatory compliance, and promote continuous monitoring. The results highlight that quantitative ITG modeling provides a reliable basis for informed decision-making and optimal resource allocation, bridging the gap between broad qualitative assessments and actionable strategies. This approach is crucial for the field of informatics and computer science, as it offers a robust, reproducible, and objective framework for evaluating a key aspect of digital transformation, ensuring that technological progress is guided by sound, data-driven principles.

Keywords: COBIT 2019, Factor Analysis, Financial Services, IT Governance, Maturity Assessment, Quantitative Framework, Structural Equation Modeling.

DA Literature-Based Heat Matrix for Quantifying Inter-Domain Correlations within the ISO/IEC 27002:2013 Framework

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Abstract

The problem of managing information security controls is complex because the domains outlined in standards like ISO/IEC 27002 rarely operate in isolation; they have intricate interdependencies that are often overlooked. This oversight can lead to fragmented security controls, inefficient resource allocation, and weaknesses in overall security governance. To address this issue, this paper proposes a literature-based heat matrix methodology, building on ISO/IEC 27002:2013 while referencing the updated 2022 guidance, NIST SP 800-53 Revision 5, and COBIT 2019. The primary goal is to assign numerical correlation values to the fourteen domains of ISO/IEC 27002:2013, providing a structured approach to visualize and understand their interrelationships. The methodology involves a comprehensive literature review and is complemented by expert validation from experienced practitioners to refine the correlation scores. The result is an illustrative 14x14 matrix that demonstrates how numeric inter-domain correlations can reveal critical overlaps and guide strategic decision-making. A new five-tier correlation scale is introduced to aid interpretation, clarifying whether two domains have very low, low, moderate, high, or very high levels of interdependency. This approach offers a significant impact on the field of informatics and computer science by enabling organizations to move beyond siloed security management. By recognizing these correlations, organizations can allocate resources more effectively, enhance holistic risk management, and strengthen security governance. The heat matrix serves as a practical tool for practitioners and managers to identify domain pairs that require close coordination, ultimately leading to more coherent policy frameworks and a more robust security posture.

Keywords: Compliance, Heat Matrix, Information Security, InterDomain Correlation, ISO/IEC 27002, Risk Management.

Geographically Weighted Random Forests for Human Development Index of Central Java Prediction

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Abstract

The geographically weighted regression (GWR) model has been widely used in various types of predictions, including human development index predictions. Similarly, the random forests (RF) model has also been widely used in various value predictions. The GWR model always assumes a local linear relationship between dependent and independent variables. The RF model only produces one global model that cannot represent conditions at each location. The GWR model is susceptible to multicollinearity in each independent variable, which can lead to overfitting if multicollinearity in the model is high. To address the vulnerability of the GWR model to multicollinearity, the RF model and the GWR model can be combined. Since the RF model is not vulnerable to multicollinearity in the independent variables, the modification becomes the geographically weighted random forests (GWRF) model to improve the shortcomings of the GWR and RF models. The GWR and GWRF models were constructed using data from districts and cities in Central Java Province, which was selected as the study area due to evident disparities in human development index achievements. These disparities highlight the presence of spatial heterogeneity that conventional models fail to adequately capture. To rigorously evaluate model performance, data from 2023 were employed as training data, while data from 2024 served as testing data. This research introduces a novel integration of spatial econometric and machine learning approaches, providing a more robust framework for addressing complex spatial variations in human development outcomes. The GWRF model is capable of producing a model that does not overfit when there is multicollinearity among independent variables. The GWRF model offers a novel integration of machine learning and spatial modelling, outperforming both GWR and RF by not only delivering high predictive accuracy under complex variable relationships but also capturing nuanced local spatial heterogeneity that conventional approaches fail to address.

Keywords: GWR, Human Development Index, Random Forests, Spatial Analysis

GWO-Enhanced Hybrid Deep Learning with SHAP for Explainable TLKM.JK Stock Forecasting

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Abstract

This study presents an innovative Grey Wolf Optimization (GWO)-enhanced hybrid deep learning model integrating Convolutional Neural Networks (CNN), Bidirectional Long Short-Term Memory (BiLSTM), and Transformer, combined with SHAP for interpretable stock price forecasting of TLKM.JK from July 29, 2024, to July 29, 2025. Addressing non-linear market dynamics, the model evaluates seven experimental cases, with the GWO-optimized configuration (Case 2) achieving superior performance, with a Root Mean Squared Error (RMSE) of 75.23, Mean Absolute Error (MAE) of 58.14, and Directional Accuracy (DA) of 76.2%, surpassing the baseline by 17.4% in RMSE and 8.1% in DA. Notably, Case 2 excels during the April 2025 surge (11.8% increase, MAE 53, DA 82%) and the high-volume day of May 28, 2025 (531,309,500 shares, MAE 48), leveraging Volume (SHAP 0.45) and RSI (0.28) as key predictors. With a 4-hour convergence time on an NVIDIA RTX 3060 GPU, the model ensures computational efficiency and interpretability, making it a robust tool for traders. Despite limitations in single-stock focus and GPU dependency, this framework advances AI-driven financial forecasting by offering transparent, high-accuracy predictions, paving the way for multi-stock applications and real-time SHAP updates.

Keywords: Hybrid Deep Learning, Grey Wolf Optimization, SHAP, Stock Price Forecasting, TLKM.JK.

User Interface Evaluation of the Business Development Center Website at UIN Syarif Hidayatullah Jakarta: A Content, Visual, and Navigation Perspective

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Abstract

The business development center State Islamic University Syarif Hidayatullah Jakarta (UIN Jakarta) as the main manager of the campus's business lines that functions to manage, develop, generate funding sources, underpin the development of business ideas and implement business ideas that have been designed and agreed upon by the UIN Jakarta Leadership and other stakeholders. This study aims to evaluate the business development center website UIN Jakarta from a user interface perspective. This study uses a questionnaire containing to evaluate the user interface in terms of content, visuals and navigation. Based on the questionnaire data that has been filled out by respondents, the most significant findings from each aspect. The content aspect, valued at 76.3% for information regarding the vision, mission, work programs, and the foreword of the head of the center are presented completely and easily accessible, but 63.2% complained that some parts of the service are not detailed enough. The visual aspect, valued at 63.2% for the consistent campus color identity on the background and title, but 60.5% complained that the contrast of white text on the dark gray background area is less user-friendly. While the navigation aspect, valued at 71.1% for the about, services, and gallery features are clearly visible, but 63.2% complained that there is no visual highlight for the menu being accessed. This study contributes to the development of the business development center website UIN Jakarta based on responses from participants completed the questionnaire to be more optimal and provide all information regarding the business units at UIN Jakarta as a form of promotion to be known and serve the wider community. In addition, this study presents innovations for developing a user interface evaluation framework for institution websites, particularly those related to business development center in state islamic universities.

Keywords: Business Development Center, Content, Navigation, User Interface, Visual, Website Evaluation.

From Logs to Insights in the Pulp & Paper Industry: Generating Structured Alarm Reports Using LLMs and RAG

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Abstract

Effective alarm management is essential in industrial environments to ensure operational safety and minimize costly downtime. Traditional rule-based reporting systems often struggle to handle heterogeneous alarm log formats and the complexity of natural language queries, limiting their adaptability in real-world applications. To address these limitations, this study proposes a generative alarm reporting system that integrates Large Language Models (LLMs) with a Retrieval-Augmented Generation (RAG) framework. The system converts natural language queries into structured JSON filters, enabling efficient retrieval of contextual information from historical alarm logs. Three open-source LLMs – CodeLlama-7B, LLaMA 3.1-8B, and Mistral-7B – were locally deployed and evaluated using both quantitative and qualitative methods. Experimental results show that CodeLlama-7B achieved the best overall performance, with an Exact Match Accuracy of 0.80, a Field Match score of 93.8%, and a 0% Parse Failure Rate, outperforming the other models in reliability and structural consistency. Compared to conventional rule-based approaches, the proposed LLM-RAG integration demonstrates improved relevance, interpretability, and responsiveness in alarm reporting. This work represents the first systematic benchmarking of locally deployed open-source LLMs for industrial alarm management, providing a replicable framework and highlighting their potential to advance intelligent, real-time, and domain-specific reporting in the pulp and paper industry and beyond.

Keywords: Alarm Management, Large Language Model, Retrieval-Augmented Generation, Semantic Search, Text Embedding.

Monkeypox Classification Using Convolutional Neural Networks (CNN) Pruned Residual Network-50 (ResNet-50) Architecture on Flutter Framework

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Abstract

The monkeypox outbreak, which was previously only found in Africa, has now spread to other continents, including Asia, causing public concern as it occurred shortly after the COVID-19 pandemic was declared over. This disease has symptoms similar to cowpox, chickenpox, and measles, making early detection based on visual observation difficult. To address this issue, various studies have developed Deep Learning (DL)-based classification models using datasets such as WSI, MSID, MCSI, and MSLD v2, which are also utilized in this research. This study proposes a pruned ResNet-50 model using the Global MP method for pruning and QAT for quantization. These modifications not only maintain the model's performance with an accuracy of 94.44%, precision of 94.12%, recall of 94.71%, and F1-score of 94.16%, but also significantly reduce the model size to just 20.993 MB. As a result, the model can be implemented on Android devices with limited resources, enabling rapid and practical early detection of monkeypox in the field without requiring large-scale servers. Blackbox testing results show that the Flutter-based application utilizing this model performs well, potentially providing tangible support for medical personnel and the public in monitoring the spread of monkeypox in a more efficient and accessible manner.

Keywords: CNN, Flutter, Monkeypox, Pruning, Quantization, ResNet-50

Enhancing Lateral-Movement Intrusion Detection via SHAP-Driven Feature Selection and SMOTE in a Voting Ensemble

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Abstract

Modern virtualized networks generate substantial east-west traffic, which can conceal the lateral movement of attackers. Detecting such infiltration attacks is challenging due to overlay encapsulation (e.g., Virtual eXtensible LAN, VXLAN) and flat subnet architectures. This study evaluates a Voting Classifier ensemble (XGBoost, Random Forest, and Logistic Regression) on the CICIDS2017 Thursday-WorkingHours-Afternoon-Infiltration subset, which is highly imbalanced (36 infiltration flows vs. 252,754 benign flows). A systematic ablation study was conducted by varying SHAP-based feature selection (Top-5 vs. Top-30 features), classification thresholds (0.3, 0.5, 0.7), and data balancing with the Synthetic Minority Over-sampling Technique (SMOTE). Performance was assessed using ROC-AUC, precision, recall, and F1-score. Results indicate that using more SHAP-important features improves ROC-AUC and recall, while SMOTE substantially enhances minority-class detection. The best configuration is Top-30 SHAP features with SMOTE, achieved ROC-AUC = 0.976 and F1-score = 0.78, whereas using fewer features or omitting SMOTE significantly reduced recall and F1-score. These findings establish a robust methodology that combines interpretable feature selection with data balancing to effectively improve IDS performance, providing a practical solution for detecting lateral movement attacks in highly imbalanced, modern virtualized environments.

Keywords: *Class Imbalance, Intrusion Detection, Lateral Movement, SMOTE, Voting Ensemble.*

Identification and Classification of Cyber Attacks on ELDIRU UNSOED using Random Forest Algorithm

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Abstract

Academic information systems such as Eldiru Unsoed are vital digital assets vulnerable to cyberattacks, while conventional rule-based Web Application Firewalls exhibit detection weaknesses. The standard ModSecurity with Core Rule Set (CRS) system is proven to have a recall of only 5.34%, meaning it fails to identify the majority of actual attacks and creates a security gap. This research designs a detection system based on the Random Forest algorithm to address this problem. The primary training data originates from the Nginx server logs of the Eldiru Unsoed system from the period of December 2024 to January 2025, with its performance subsequently validated using the public CSIC 2010 dataset. Through analysis of these logs, the model was developed by engineering hybrid features that include lexical analysis, CRS rule context, and N-grams to classify web traffic. Evaluation results show the proposed Machine Learning-Random Forest (ML-RF) model increases recall from 5.34% to 72.00% and the F1-Score from 10.10% to 80.00%. This improvement in metrics, while maintaining a precision of 91.00%, indicates that machine learning integration yields a more balanced and reliable cybersecurity defense mechanism to meet modern threat detection challenges in protecting digital assets.

Keywords: Cyber Security, Machine Learning, Random Forest, Web Application, Web Application Firewall.

*Performance Comparison and SEO Optimization Between
Laravel Blade and Laravel Inertia in the Development of the Muncak.id Website in
Indonesia*

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Abstract

Climbing mountains in Indonesia requires careful preparation, especially in understanding safe hiking routes and related information. A hiking route information website serves as a practical solution for hikers to access data easily and quickly. This study compares the performance and SEO optimization between Laravel Blade and Laravel Inertia in the development of the muncak.id website, which provides information on mountain hiking routes. The performance indicator tested is execution time, measured using Laravel Dusk. One of the test results for the hiking route access feature shows that Laravel Inertia Vue.js has an average execution time of 1.56 seconds, which is faster compared to Laravel Blade, which reached 3.89 seconds. In terms of SEO, both websites show good quality with no issues found. However, there are still opportunities for improvement in some areas marked as warnings and opportunities. Overall, Laravel Inertia with Vue.js proves superior in performance and consistency, as well as more effective in SEO optimization, making it the better choice for developing informative websites.

Keywords: Incremental, Inertia, Laravel, SEO, Vue, Website.

***Implementation of K-Means on Packaged Coffee Sales Data
for Simulating Goods Entry in Sole Proprietorship Businesses***

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Abstract

In retail businesses operating under the sole proprietorship structure, decision-making regarding partnerships with beverage distributors – especially those offering packaged coffee – remains a challenge. Store owners often face uncertainty about the profitability of accepting product offerings, which can lead to suboptimal inventory decisions. This study addresses that issue by simulating goods entry scenarios and applying clustering techniques to historical packaged coffee sales data, enabling data-driven insights into product performance and distributor value. Studies focusing on clustering within retail include segmenting customer behaviour and stock management strategies, yet many lacked specific application to single owner businesses and product-centric simulations. This research is novel in its contextual focus on packaged coffee distribution within sole proprietorship environments, integrating real sales metrics and clustering algorithms to empower store owners with actionable evaluation tools. Results demonstrate that clustering reveals patterns of profitable product categories and distributor consistency, offering scalable insights for micro-retail optimization. The findings provide a framework that differs from prior studies by emphasizing the intersection between small business dynamics and algorithmic decision support. Ultimately, this research contributes to the advancement of informatics by demonstrating how clustering-based simulations can enhance decision-making in micro-retail environments through practical, data-driven methodologies.

Keywords: *Clustering, Distributor Evaluation, Goods Simulation, Packaged Coffee Sales, Retail Analytics, Sole Proprietorship.*

Sentiment Analysis Of Getcontact Application Reviews On Google Play Store Using Naive Bayes Algorithm

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Abstract

In the contemporary digital era, the exponential growth of information technology has brought unprecedented convenience while simultaneously giving rise to significant new threats. The increasing incidence of digital fraud, phishing, and unsolicited communications has become a serious concern for the wider public. In response to these challenges, apps like GetContact have emerged as essential tools for digital security and user empowerment. Against this backdrop, this comprehensive study aims to delve deeper into public perceptions of the GetContact app by conducting a systematic sentiment analysis of user reviews on the Google Play Store, a rich repository of authentic feedback.

The methodological framework applied in this study is systematic and rigorous. The process begins with the acquisition of raw data in the form of unstructured text from a total of 990 user reviews. This data then undergoes a crucial pre-processing stage, which includes text cleaning, tokenization, and stop-word removal to ensure data quality and standardization before analysis. For the core task of sentiment classification, the Naive Bayes algorithm was strategically chosen due to its proven effectiveness and computational efficiency in natural language processing (NLP) tasks, particularly text classification. This algorithm is applied to automatically label each review into one of three predefined sentiment categories: positive, negative, or neutral. The empirical results obtained from the analysis reveal a clear distribution of sentiment among users. Detailed quantitative analysis reveals a significant predominance of negative sentiment, encompassing 419 reviews, or approximately 42.3% of the total dataset. Positive sentiment follows with 291 reviews (29.4%), while neutral sentiment represents the smallest portion, with 280 reviews (28.3%).

To clarify these findings and provide a multifaceted interpretation, this study utilized data visualization techniques. Line charts were used to illustrate the proportional distribution of each sentiment, while word clouds offered qualitative insight by visually highlighting the most frequently occurring and impactful terms within each category. This effectively revealed the core themes of both praise and criticism expressed by users. Ultimately, this study goes beyond mere classification; the predominance of negative feedback provides critical, actionable insights for GetContact developers and product managers, pinpointing specific areas of user dissatisfaction that require immediate attention for future updates and improvements.

Keywords: *sentiment analysis, getcontact, google play store, naive bayes*

***Modernizing Village Public Governance through an
Artificial Intelligence-Based Information System***

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Abstract

The rapid development of digital technology demands the modernization of village public administration to become more adaptive, efficient, and technology-based. This study aims to design and implement an Artificial Intelligence (AI)-based Village Information System for Popalia Village, integrating an AI Generative Model and a Natural Language Processing (NLP) chatbot to improve service efficiency, accuracy, and accessibility. The research adopts a Research and Development (R&D) approach, involving stages of requirement analysis, system design, prototype development, AI integration, functional testing using the Black-box method, and usability testing with the System Usability Scale (SUS). The functional testing produced a 95% pass rate, indicating that all core features operated according to specifications, while the SUS evaluation with 10 respondents yielded an average score of 87.0, categorized as "Acceptable" with an A grade and "Excellent" adjective rating. These results demonstrate that the system can deliver effective and high-quality public services by automating document creation, validating citizen data, and enabling information access through the NLP-based chatbot. The findings suggest that AI integration in village administration systems has significant potential to reduce manual workload, minimize administrative errors, and enhance transparency. Further development is recommended to expand the scope of usability testing, conduct performance and stress tests, and strengthen data security and AI model updates to ensure long-term reliability and adaptability to technological advancements and community needs.

Keywords: Artificial Intelligence, Chatbot, Document Automation, Natural Language Processing, Public Service, Village Information System.

Designing AI - IoE Precision Farming to Create Sustainable Eco-Friendly Hydroponic Greenhouses

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Abstract

Conventional greenhouses, while boosting crop yields, face critical sustainability challenges due to high energy consumption and resource inefficiency, particularly in developing nations where manual management prevails. This research addresses these limitations by designing a comprehensive AI-IoE system architecture to create a smart, resource-efficient, and sustainable operational model for eco-friendly greenhouses. The development methodology involved a systematic process of requirements analysis, integrated hardware and software design, prototype assembly, and functional testing. The system utilizes an ESP32 microcontroller as its central control unit, integrating a suite of six sensors comprising light intensity, temperature, humidity, pH, Total Dissolved Solids (TDS), and CO₂ to monitor critical environmental parameters in real-time. This integration utilizes the extensive dataset for AI based predictive analysis, enabling the intelligent forecasting of environmental trends and proactive resource management. The research resulted in a complete system blueprint, including a detailed electronic circuit design, a production-ready Printed Circuit Board (PCB) layout, defined operational control logic, and an intuitive web-based dashboard for remote monitoring and management. This integrated AI-IoE architecture provides a tangible solution that surpasses previous fragmented approaches by offering holistic environmental control. The findings present a significant contribution to precision farming, establishing a scalable and efficient framework to enhance greenhouse productivity and ecological sustainability.

Keywords: *Eco-friendly greenhouse, Internet of Everything, Precision farming, Smart hydroponic, Sustainable agriculture, Wireless sensor networks.*

Classification of Worker Productivity and Resource Allocation Optimization with Machine Learning: A Case Study in the Garment Industry

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Abstract

This study presents an integrated predictive-prescriptive framework for improving workforce management in the garment industry by combining machine learning classification with linear programming optimization. Using a publicly available dataset of 1,197 production records, productivity levels were categorized into low, medium, and high classes. Data preprocessing included handling missing values, one-hot encoding of categorical variables, and class balancing using SMOTE. Eleven classification algorithms were evaluated, with XGBoost achieving the highest performance (accuracy 85.4%, weighted F1-score 85.3%, Cohen's Kappa 0.781) after hyperparameter tuning via Bayesian Optimization. The optimized model's predictions were then incorporated into a linear programming model, implemented with PuLP, to maximize the allocation of high-productivity workers across production departments under capacity constraints. The results yielded an allocation plan assigning 142 high-productivity workers, significantly enhancing potential operational efficiency. The novelty of this work lies in integrating an optimized ensemble learning model with mathematical programming for end-to-end productivity classification and resource allocation, a combination rarely explored in labor-intensive manufacturing contexts. This framework offers a scalable decision-support tool for data-driven workforce planning and could be adapted to other manufacturing domains with similar operational structures.

Keywords: Bayesian Optimization, Garment Industry, Linear Programming, Machine Learning, Productivity Classification, Workforce Optimization, XGBoost.

Development of a Web-Based Management Information System for Student Creativity Program (PKM) Using Extreme Programming and Laravel Framework

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Abstract

This research originates from the absence of an integrated system for managing the Student Creativity Program (PKM) at the Faculty of Engineering, Universitas Jenderal Soedirman, which has caused inefficiencies in archiving, monitoring, and reporting. To address this problem, a web-based management information system was developed using the Extreme Programming (XP) methodology, selected for its flexibility, iterative process, and strong user involvement. The novelty of this study lies in the development of a system specifically designed for PKM management at the faculty level, which has not been previously available. Unlike prior studies, the system not only supports proposal submission but also integrates review, scoring, revision, and progress monitoring. The development process followed the four main stages of XP: planning, design, coding, and testing, with active user participation in each cycle. Blackbox testing confirmed that all core features functioned properly. The implementation of this system has proven to enhance efficiency, transparency, and accountability, reduce administrative workload, and contribute to informatics by demonstrating the practical application of the XP methodology in developing academic information systems.

Keywords: Information System, Web Service, Extreme Programming, Laravel, PKM Management.

Analyzing the Effects of Code Splitting and Server-Side Rendering on a Vue.js POS Application's Performance and SEO

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Abstract

User interface performance is a critical factor in web application development, particularly concerning page loading speed and its impact on user experience (UX) and search engine optimization (SEO). Vue.js, as a popular framework for building single-page applications (SPAs), offers features such as code splitting and server-side rendering (SSR) to enhance content loading efficiency. This research aims to measure the effectiveness of implementing code splitting and SSR on the performance and SEO of a Vue.js based point of sale (POS). The results indicate that code splitting is effective in reducing initial load time, as demonstrated by a decrease in the average first contentful paint (FCP) from 1.05 seconds to 0.67 seconds in a client-side rendering (CSR) architecture. SSR, on the other hand, shows advantages in two key aspects, SEO and interactivity. The implementation of SSR successfully improved the average Google ranking from 1.7 to 1.3 and increased the click-through rate (CTR) from 35.3% to 64%. Additionally, SSR significantly reduced the average Total Blocking Time (TBT) from 33.75 ms to just 3.75 ms, indicating that the page became nearly instantly interactive.

Keywords: Code Spiltting, Express.js, Optimization, SEO, Vue.js, Web Performance

Sistem Pendukung Keputusan Penerima Bantuan Sosial BERBASIS KNN dan MOORA

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Abstract

Telah dilakukan penelitian yang bertujuan membuat Sistem Pendukung Keputusan (SPK) untuk penyaluran bantuan sosial dengan studi kasus di RW 19, Kelurahan Harapan Jaya, Kecamatan Kota Tangerang. Penyaluran bantuan seringkali tidak tepat sasaran. Keluarga yang seharusnya menerima bantuan justru terabaikan, sedangkan keluarga yang tidak berhak justru menerima bantuan, karena prosedur penyaluran masih dilakukan secara manual sehingga keputusan yang diambil kurang tepat. Untuk mengidentifikasi penerima bantuan secara tepat, dibuat sebuah sistem dengan menggabungkan dua metode, K-Nearest Neighbor (KNN) dan Multi-Objective Optimization On The Basis Of Ratio Analysis (MOORA). Pengumpulan data dilakukan melalui wawancara dengan pihak RW dan survei warga. Survei dilakukan menggunakan beberapa kriteria seperti pendidikan, jumlah tanggungan, penghasilan, pengeluaran, sumber air, status kepemilikan rumah, daya listrik, transportasi, dan umur. Sistem ini berhasil melakukan perangkingan terhadap 263 Kepala Keluarga untuk ditentukan kelayakannya dalam menerima bantuan. Akurasi penggunaan metode KNN dalam penelitian ini sebesar 87% pada nilai parameter optimal $K = 15$, sedangkan metode MOORA menunjukkan akurasi lebih tinggi yaitu 95%. Implementasi sistem ini meningkatkan efisiensi dan ketepatan penyaluran bantuan sosial di wilayah yang ditargetkan.

Keywords: Sistem Pendukung Keputusan; K-NN; MOORA; Bantuan Sosial.

Automated KTP-el Data Extraction on the e-Magang Platform Using CNN-Based OCR

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Abstract

In alignment with Indonesia's national digital transformation agenda, which establishes the electronic ID card (KTP-el) as a foundational source of truth, this study details a system to enhance administrative processes for the e-magang platform of the Foreign Policy Strategy Agency (BSKLN), Ministry of Foreign Affairs. This research addresses the inefficiencies and errors inherent in manual data entry by developing an integrated Optical Character Recognition (OCR) pipeline. The methodology begins with a crucial preprocessing stage, involving histogram matching for illumination normalization and hierarchical segmentation using vertical projection to isolate lines, words, and characters. Data extraction is performed by three specialized Convolutional Neural Networks (CNNs) trained and validated using a stratified 5-fold cross-validation approach. A final postprocessing step normalizes and structures the extracted data for system integration. Experimental results demonstrate high standalone model performance. The KTP validation model achieved an accuracy of 97.77%, with 97.75% precision, 97.78% recall, and a 97.74% F1-score. The NIK OCR model reached 99.3% accuracy, with macro precision, recall, and F1-scores of 99.3%, 99.2%, and 99.1%, respectively. The non-NIK OCR model obtained 97.77% accuracy, with a macro precision of 97.75% and a macro recall of 97.78%. In end-to-end testing, the integrated system yielded an average character-reading accuracy of 93.31% and a mean processing time of 14.48 seconds per image. These findings confirm the system's strong potential to improve data integrity and operational efficiency, although overall performance remains sensitive to input image quality and segmentation robustness.

Keywords: character segmentation, CNN, flask API, K-Fold Cross Validation, KTP-el, OCR

Deep Convolutional Neural Networks for Wetland Area Identification with Satellite Imagery

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Abstract

Lahan basah merupakan ekosistem penting yang memberikan jasa ekologi seperti penyimpanan karbon, pengendalian banjir, dan pelestarian keanekaragaman hayati. Namun, ekosistem ini menghadapi ancaman yang semakin meningkat akibat perubahan iklim dan aktivitas manusia, sehingga terjadi degradasi dan kehilangan yang signifikan. Identifikasi lahan basah yang akurat menjadi langkah penting untuk mendukung upaya konservasi dan pengelolaan berkelanjutan. Penelitian ini bertujuan mengevaluasi efektivitas deep convolutional neural networks (CNN) yang dikombinasikan dengan chopped picture method (CPM) dan sliding windows untuk mendeteksi lahan basah menggunakan citra Google Earth beresolusi tinggi di Kalimantan Selatan, Indonesia. Penelitian ini menggunakan dua arsitektur CNN, yaitu VGG-16Net dan LeNet-5, yang dilatih pada dataset hasil pemrosesan 220 citra satelit menjadi 89.100 potongan citra berukuran 56×56 piksel. Kinerja model dievaluasi melalui akurasi, presisi, recall, dan F1-score. Hasil eksperimen menunjukkan bahwa kedua arsitektur CNN mencapai kinerja tinggi, dengan LeNet-5 lebih stabil (100%) pada berbagai lokasi uji dibandingkan VGG-16Net yang meskipun mencapai akurasi sempurna di satu wilayah, namun kurang stabil di wilayah lain. Selain itu, LeNet-5 membutuhkan waktu komputasi lebih singkat (10 detik per epoch) dibandingkan VGG-16Net (40 detik per epoch), sehingga lebih sesuai untuk aplikasi praktis dengan keterbatasan sumber daya. Temuan ini menegaskan bahwa CPM efektif meningkatkan variasi dataset pelatihan, sehingga CNN mampu mendeteksi fitur lahan basah yang ambigu dan berbentuk tidak beraturan dengan presisi tinggi. Penelitian ini berkontribusi dalam pengembangan teknik pemetaan lahan basah berbasis penginderaan jauh yang efisien, serta memberikan dukungan bagi konservasi, restorasi, dan pengelolaan ekosistem.

Keywords: Convolutional Neural Networks, Lahan Basah, Citra Google Earth, Chopped Picture Method, Penginderaan Jauh.

Implementation Of The K-Means Clustering Algorithm In Grouping Data On Sales Of Ready To Drink Packaged Coffee Beverages At Maeso Jenar Stores

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Abstract

The rapid development of technology and the increasing number of convenience stores in Indonesia are driving competition in the retail industry. One of the main challenges facing convenience stores is understanding consumer consumption patterns and managing diverse product offerings, particularly in the ready-to-drink coffee category. With the increasing number of brands and product types available, a data-driven approach is needed to optimize product inventory and improve marketing strategies. Therefore, this study applies the K-Means Clustering algorithm to cluster ready-to-drink coffee sales data at Maeso Jenar Department Store. The clustering results are then visualized in a Streamlit-based dashboard, designed to facilitate internal store understanding of sales patterns and consumer preferences. The results show that product brands experience significant sales increases during national holidays, demonstrating consumer behavior patterns influenced by specific times of the year. Therefore, this study is expected to contribute to data-driven decision-making to improve the efficiency and profitability of Maeso Jenar Department Store.

Keywords: Convenience Stores, Dashboard, K-Means Clustering, Packaged Coffee Drinks, Sales Data.

PENUTUP

Dengan berakhirnya SENIKO (Seminar Nasional Informatika dan Komputer) tahun 2025 ini, kita menutup sebuah babak penting dalam perjalanan eksplorasi dan pemahaman kita tentang kontribusi *artificial intelligence* dan *cybersecurity*. Tema yang diangkat tahun ini sangat relevan dan krusial, mengingat AI telah menjadi pendorong utama inovasi di berbagai sektor seperti industri, pendidikan, kesehatan, dan layanan publik. Sementara itu, AI dan *cybersecurity* dapat saling melengkapi.

Kami sangat bangga dengan partisipasi aktif dan antusiasme yang ditunjukkan oleh seluruh peserta. Presentasi dan diskusi yang telah berlangsung selama seminar ini telah memperkaya pengetahuan kita dan membuka wawasan baru yang akan sangat bermanfaat dalam pengembangan teknologi di masa depan.

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Akhir kata, kami berharap dapat bertemu kembali pada acara SENIKO periode berikutnya. Teruslah semangat dalam mengejar ilmu dan berinovasi.

Salam hormat,

[Panitia SENIKO 2025]