Sie, Deta Dirganjaya

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Research Interest

Networked systems, network performance optimization, efficiency of cloud-based ML systems, resource allocation and scheduling for ML, cloud and data center networking.

Education

Dian Nuswantoro University Bachelor of Computer Science

#3 Best Innovation University in Indonesia[1] *Sept. 2022 – Jun 2026*

- Cumulative GPA: 3.91 out of 4.00
- Major GPA: 3.91 out of 4.00
- Coursework: Machine Learning (A), Artificial Intelligence (A), Computer Networks (A), Information Systems (A), Software Requirements Engineering (A), Software Engineering (A), Algorithms and Programming (A).

Research Experience

System and AI Research Training Program (SYAIR), University of Chicago Jan. 2025 – Present

- Selected as one of the top 50 Indonesia students in computer science and related fields for an international research training program led by **Prof. Haryadi Gunawi** of **University of Chicago.**
- Covered 20+ technical papers from SIGCOMM and NSDI conferences.
- Replicated and reproduced key experiments from top-tier publications.
- Received intensive training in research methodologies, technical writing, and engagement with top-tier research communities.

Research Collaboration on Computer Vision Oct. 2024 – Jan. 2025

- Collaborating with **Dr. Guruh Fajar Shidik** of **Dian Nuswantoro Research Center** and **Edi Jaya Kusuma** from **Faculty of Health Dian Nuswantoro University**
- Rectification of projective transforms in images, especially in healthcare such as X-rays often suffers from inaccuracies due to non-optimal optimization parameters, hindering precise image classification.
- Conventional methods for determining transformation parameters tend to rely on fixed heuristics, making it difficult to adjust to angular variations and distortions in the image.
- Using a novel nature-inspired optimization-based metaheuristic algorithm to adaptively search for optimal transformation parameters, significantly improves rectification accuracy.

Research Assistant Sep. 2024 – Present

Dian Nuswantoro Research Center, Dian Nuswantoro University *Hybrid, Semarang*

- Research assistant under **Dr. Guruh Fajar Shidik** on Artificial Intelligence (AI), Distributed Systems, Image Processing, and Distributed Computing.
- Optimizing workload distribution based on CPU and RAM utilization using the Cluster RL Q-Learning technique in an Federated Edge Cloud (FEC) environment simulated with CloudSimSDN.
- Analyzing and testing the impact of the "selective" parameter frequency in the SSVSG method on Named Entity Recognition (NER) for Indonesian disaster dataset.

Research Assistant Sep. 2024 – Feb. 2025

AI Research and Development Group, Dian Nuswantoro University *On-site, Semarang*

- Research group under the Faculty of Computer Science Dian Nuswantoro University, led by **Adhitya Nugraha**, focusing on Artificial Intelligence (AI).
- Developed a Virtual Smart Assistant (VSA) system integrating real-time facial recognition and emotion detection with an LLM-based chatbot, enabling users to interact seamlessly through text-to-speech technology.
- Collaborating with the Faculty of Medicine, conducting research on preventing cyberbullying on social media using ML through the Multi-Modal framework.

Work Experience

Teaching Assistant Sept. 2024 – Feb. 2025

AI Research and Development Group *On-Site, Semarang*

- Assisting and teaching students in a career guidance class, preparing them for entering the workforce.
- Responsible for teaching Data Science classes with a total of 50+ students.
- Provided subject matter on data collection, data pre-processing, data visualization, and modeling.

Revenue Analyst Feb. 2023 – Jul. 2023

CV Sanjaya Utama *Remote, Semarang*

- Developed a system for generating product bundle promotions used by the company for product marketing using the Association method.
- Responsible for data analysis, modeling, visualization, maintenance, and development of models to support business decision-making.

Projects

VSA: Virtual Smart Assistant

- A personal assistant designed to support and assist students of Dian Nuswantoro University
- Utilizing facial recognition and emotion tracking to detect students' emotional states.
- Powered by LLM-based conversational AI to provide appropriate responses based on students' emotions.
- Integrated with text-to-speech technology for a more natural and engaging communication experience.
- Contributed 1000+ LOC (3200+ lines of group code).
- Tools used: Python, JavaScript, Vite, ONNX, CUDA, Jetson Nano, DGX A100.

Optimizing ANN with Grid Search for Predicting Stunting Among Toddlers

- Investigates the application of Artificial Neural Networks (ANN) in predicting stunting, highlighting the impact of hyperparameter normalization and optimization on model accuracy and reliability.
- Utilizes SMOTE for dataset balancing and MinMaxScaler for normalization to enhance model performance.
- GridSearchCV optimization enables the ANN model to achieve 81.9% accuracy, 88.1% recall, and an 82.9% F1-score, surpassing other comparative models.
- Contributed 600+ LOC.
- Tools used: Python.

CLCM: Custom Lightweight CNN Model for low-end edge devices

- CNN-based face recognition model optimized for high efficiency and real-time performance on low-power devices.
- Outperforms well-known pre-trained models, delivering three times faster inference speed, with an average real-time detection time of 0.013 seconds.
- Efficiently utilizes up to 90% of the Jetson Nano's GPU, ensuring optimal processing power for edge computing.
- Contributed 1000+ LOC.
- Tools used: Python, ONNX, CUDA, Jetson Nano.

Prior Publications

1. **Sie, Deta Dirganjaya**, Guruh Fajar Shidik, Radhitya Marendratama, Chandra Lukita Buana, Aisyah Nuraini, Edi Jaya Kusuma, **"Metaheuristic-Based Hyperparameter Tuning for Projective Transformation Rectification Networks in Medical Image Processing"** *(Manuscript ready upon request).*
2. Maulidya Ayu Arrdiena, **Sie, Deta Dirganjaya**, Guruh Fajar Shidik, **"Analyzing the Impact of Transpose Layers on CNN-Based Deep Learning"** *(Manuscript ready upon request).*

Awards

Flagship Program Student of Department of Computer Science Year 2023 Aug. 2023

- Selected as one of the top 50 out of 1855 computer science students in Dian Nuswantoro University Batch 2022 Flagship Program, an acceleration program for high-achieving students.

Certificates

NVIDIA: Deep Learning Training

- Learn deep learning fundamentals including neural networks, CNNs, and RNNs.
- Enhance model accuracy with data augmentation, transfer learning, and pre-trained models.
- Deploy deep learning models efficiently using NVIDIA tools and frameworks.
- 10+ hours of hands-on, self-paced training with real-world applications.

CCNA: Enterprise Networking, Security, and Automation

- Designed and simulated enterprise networks with BGP for multi-domain routing.
- Configured advanced NAT and WAN security, including VPNs, ACLs, and firewalls.
- Automated network operations using Python, REST APIs, and Cisco DNA Center.
- Explored SDN and virtualization for modern network management.
- 140+ hours of lab practice.

CCNA: Switching, Routing, and Wireless Essentials

- Designed and simulated enterprise networks with VLANs, trunking, and inter-VLAN routing.
- Implemented redundancy solutions using STP variants and EtherChannel for reliability.
- Configured and secured wireless networks, including WLAN architectures and troubleshooting.
- Applied security best practices for device hardening and network segmentation.
- 90+ hours of lab practice.

CCNA: Introduction to Networks

- Learn networking fundamentals, including devices, media, and protocols.
- Build and configure LANs with essential network devices.
- nderstand IP addressing and network services like DHCP and DNS.
- 50+ hours of lab practice.

Technical Skills

Programming Languages: C, C++, Python, Java, SQL.

Databases: MySQL, MongoDB, LiteSQL.

Libraries: TensorFlow, PyTorch, TensorRT, ONNX, NumPy, Ray, NetworkX, OpenCV, SciPy, MLxtend, Seaborn, Matplotlib, Pandas.

Tools: Linux, WSL, Docker, CUDA, Cisco Packet Tracer, Git, Oracle VM VirtualBox.

Misc: NVIDIA Jetson, Raspberry Pi, NVIDIA DGX A100.

References

Prof. Haryadi Gunawi *haryadi@cs.uchicago.edu*

- UChicago - Indonesia research training instructor.
- Professor at Department of Computer Science, University of Chicago.

Dr. Guruh Fajar Shidik, S.Kom, M.Cs *guruh.fajar@research.dinus.ac.id*

- Research Advisor.
- Head of Dian Nuswantoro Research Center, Dian Nuswantoro University.

Adhitya Nugraha, S.Kom, M.CS *adhitya@dsn.dinus.ac.id*

- Research Advisor.
- Head of AI Research and Development Group, Dian Nuswantoro University.