Sie, Deta Dirganjaya

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RESEARCH INTEREST

Networked systems, network telemetry, ML-for-network, network-for-ML, distributed systems, database, storage systems, operating systems.

EDUCATION

Dian Nuswantoro University   Bachelor of Computer Science
#5 Best Innovation University in Indonesia[1]   *Sept. 2022 – Jun 2026*

- Cumulative GPA: 3.93 out of 4.00
- Major GPA: 3.92 out of 4.00

RESEARCH EXPERIENCE

International Research Collaboration   May. 2025 – Present
University of Maryland, College Park - FROOT Lab   *Remote, Maryland*

- Collaborated with **Prof. Alan Zaoxing Liu** and his Ph.D. students to conduct research on Approximation-First Cloud Telemetry and an open-source project PromSketch-Standalone.
- Designed and implemented a high-performance sketch-based telemetry system for approximate data analytics.
- Developed a full ingestion–storage–query pipeline with windowed aggregation, WAL buffering, and a custom PromQL-compatible query engine for real-time analysis.
- Implemented optimizations including deterministic sketch merging, direct compression, and tolerance-aware query planning to improve scalability and efficiency.

University of Chicago - Indonesia Research Training Program   Jan. 2025 – Jun. 2025

- Selected as one of the top 50 CS students in Indonesia for an international research training program led by **Prof. Haryadi S. Gunawi** of **University of Chicago.**
- Covered 30+ technical papers from SIGCOMM and NSDI conferences.
- Reproduced and enhanced key experiments from top-tier publications.
    * Reproduced and enhanced **OctoSketch: Enabling Real-Time, Continuous Network Monitoring over Multiple Cores** on Chameleon Cloud with Exponential Moving Average (EMA), achieving up to 0.89 accuracy and more stable per-flow estimation.
    * Reproduced and extended **ModelKeeper: Accelerating DNN Training via Automated Training Warm-up** with packet-level load balancing inspired by MLT, using MTU-based weight chunking and ECMP transfer to reduce warm-up bottlenecks in distributed model loading.
- Received intensive training in research methodologies, technical writing, and engagement with top-tier research communities.

Research Assistant   Aug. 2024 – Jan. 2025
Dinus Research Center, Dian Nuswantoro University   *Hybrid, Semarang*

- Research assistant under **Prof. 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 a Federated Edge Cloud (FEC) environment simulated with CloudSimSDN.
- Contributed to international collaborative research with the Faculty of Health and the University of Split, Croatia, in Optimizing Artificial Neural Networks for Predicting Stunting.

Research Intern   Aug. 2024 – Jan. 2025
Dinus AI Research and Development Group, Dian Nuswantoro University   *On-site, Semarang*

- Research group under the Faculty of Computer Science, Dian Nuswantoro University, led by **Ardytha Luthfiarta**, 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.
- Collaborated with the Faculty of Health on research to prevent cyberbullying on Indonesian social media using a Multi-Modal machine learning framework.

Work Experience

Teaching Assistant   Aug. 2024 – Jan. 2025
Dinus AI Research and Development Group   *On-Site, Semarang*

- Assisting and teaching students in a career guidance class, preparing them to enter 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.

Business 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 association rule mining.
- Responsible for data analysis, modeling, visualization, maintenance, and development of models to support business decision-making.

Projects

Promsketch-Standalone   FROOT Lab

- A fully autonomous cloud telemetry runtime supporting ingestion, sketch-based storage, PromQL-compatible querying, and visualization without relying on traditional telemetry systems.
- Designed a parallel event-driven ingestion pipeline capable of processing millions of time-series samples per second with significantly reduced latency and resource overhead.
- Implemented a sketch-aware query and storage engine enabling real-time analytics over compressed metric summaries with high statistical accuracy and drastically lower memory footprint.
- Tools used: Go, Python, Docker, Kubernetes, Prometheus, Grafana, Kafka.

VSA: Virtual Smart Assistant   Dinus AI Research and Development Group

- A personalized virtual assistant built to support and assist students at Dian Nuswantoro University in accessing campus services and emotional support.
- Utilizes facial recognition and emotion tracking, including using a custom lightweight CNN architecture designed from scratch for edge inference.
- Powered by an LLM-based conversational engine trained and fine-tuned on a custom-built Indonesian academic and student-dialogue corpus to generate contextually empathetic and supportive responses.
- Incorporates real-time acoustic noise suppression and input signal filtering to maintain clear speech capture and robust voice interaction even in dynamic and noisy surroundings.
- Deployed as a unified edge system on NVIDIA Jetson and Raspberry Pi devices, enabling real-time adaptive inference under constrained compute and bandwidth conditions.
- Tools used: Python, PyTorch, TensorFlow, OpenCV, ONNX, CUDA, Jetson Nano, Raspberry Pi, DGX A100.

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, achieving up to $3\times$ 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.
- Tools used: Python, ONNX, CUDA, Jetson Nano.

Prior Publications

1. **Sie, Deta Dirganjaya**, Guruh Fajar Shidik, Maulidya Ayu Ardiena, Radhitya Marendratama, and Edi Jaya Kusuma **"Analyzing the Impact of Transpose Layers on CNN-Based Deep Learning"**, *iSemantic 2025, Accepted for publication.*

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

- Learned deep learning fundamentals including neural networks, CNNs, and RNNs.
- Enhanced 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

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

TECHNICAL SKILLS

Programming Languages: C++, Go, Rust, Python, Java.

Databases: RocksDB, InfluxDB, MongoDB, MySQL, SQLite.

Libraries: TensorFlow, PyTorch, Keras, ONNX, NumPy, Ray, net, OpenCV, Ultralytics, SciPy, Scikit-Learn, MLxtend, Seaborn, Matplotlib, Pandas, NVIDIA TensorRT, Torch-TensorRT.

Tools: CUDA, Docker, Kubernetes, Prometheus, Grafana, Kafka, VictoriaMetrics, Cisco Packet Tracer, Git, pprof, Intel VTune.

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

REFERENCES

Prof. Alan Zaoxing Liu — *Research Collaborator and Assistant Professor*
Computer Science, University of Maryland, College Park — *zaoxing@umd.edu*

Prof. Haryadi S. Gunawi — *UChicago - Indonesia Research training instructor and Professor*
Computer Science, University of Chicago — *haryadi@cs.uchicago.edu*

Prof. Dr. Guruh Fajar Shidik — *Research Advisor and Professor*
Computer Science, Dian Nuswantoro University — *guruh.fajar@research.dinus.ac.id*

Ardytha Luthfiarta — *Academic Advisor and Lecturer*
Computer Science, Dian Nuswantoro University — *ardytha.luthfiarta@dsn.dinus.ac.id*