KAHFI SOOBHAN ZULKIFLI

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RESEARCH INTERESTS

Systems for Machine Learning and vice versa, Operating/Storage Systems, Cloud Computing, Database, Performance Analysis, Computer Architecture, Computer Networks

EDUCATION

Bandung Institute of Technology Aug 2019 – Apr 2024 (Expected)
#1 Engineering School in Indonesia Overall GPA **3.4/4.0**, Major GPA **3.3/4.0**
B.Sc, Computer Science

PUBLICATIONS

EVStore: Storage and Caching Capabilities for Scaling Embedding Tables in Deep Recommendation Systems. *In Proceedings of the 28th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2023*

Daniar H. Kurniawan, Ruipu Wang, **Kahfi S. Zulkifli**, Fandi Wiranata, John Bent, Ymir Vigfusson, Haryadi S. Gunawi**.**

RESEARCH EXPERIENCE

International Research Collaboration on **Machine Learning for Storage Systems** Sep 2022 – Current

- Collaborating with Prof. **Haryadi Gunawi** of The University of Chicago and Achmad Imam Kistijantoro of Bandung Institute of Technology
- Research on **reducing tail latency** in **solid state drives** (SSDs) with **machine learning** since they exhibit **anomalous performance**
- The major obstacle is designing a machine learning model that has **fast inference speed** and provides **accurate predictions**, at the same time should show **more stable latencies** than non-ML techniques (random, heuristic-based)
- Modified an existing **object-storage library** with a **machine learning model** that show **smaller tail in latency** compared to other existing optimizations and deployed it across **20 nodes**
- Supported as an undergraduate research assistant by the **MoECRT ACE Open Research** program

International Research Collaboration on **Systems for Machine Learning** Aug 2021 – Aug 2022

- Collaborated with Prof. **Haryadi Gunawi** of The University of Chicago
- Research on **reducing memory footprint** of **deep learning recommendation systems** due to **huge embedding vector tables**
- The main challenge is the **tradeoff** between **accuracy and speed** — the inference request has an **all-or-nothing** property which requires access to **multiple embedding vector tables**
- Designed a **novel 3-layer embedding vector table lookup system** with **new caching algorithms based on groupability** and **reduced floating-point precisions**
- **Reduced memory usage** by up to **94%** and **average latency** by up to **23%** while **quadrupling throughput** at **0.2% loss in accuracy**

PROJECTS

National Geospatial Data Warehouse (Webgis Indonesia) May – August 2022

- Developed a Data Warehouse with real-time climate and earthquake data from the Indonesian Meteorological, Climatological, and Geophysical Agency (BMKG) and Geospatial Data from Open Street Map
- Build an Extract-Transform-Load (ETL) pipeline using Open Talend Studio and PostgreSQL
- Maintained daily ingest pipeline of 6150 new rows by using horizontal sharding to reduce read latency

Mosaik.id (Radya Laps Harapan Bangsa) January – April 2022

- Designed a Safe Internet Mobile App to promote Safe Internet usage in remote areas of Indonesia

- Developed the Backend Architecture with C# and Database with MariaDB single-handedly

Ventilator-Indonesia (Collaboration between top national universities and industries) May — June 2020
- Managed the inventory of the ventilator production
- Collaborated with members from various backgrounds (academia, industry, business)

TECHNICAL SKILLS

Programming Languages**:** Experienced in projects using Python, cPython, Java, C, C++, C#, Prolog, Kotlin, Javascript, Typescript, SQL
Systems: Facebook DLRM, Ubuntu, CentOS
Database**:** MariaDB, Ceph, Apache Hive
Integration: Talend Open Studio, Logstash
DevOps: Gitlab CI-CD
Cloud Computing: Azure, Chameleon Cloud Testbed
Big Data: Elastic Search, Kibana Dashboard

HONORS AND AWARDS

Nominee of **National Student Creativity Program** Funding (Top National Prestigious Program) July 2020
- Received funding from the National Ministry of Education
- Designed '*Bandung Smart Transportation*' integrated with current Bandung Public Transport system

TEACHING ASSISTANT

Comlabs-USDI ITB Sep 2020 — Dec 2020
Introduction to Computing Laboratory (KU1102)
- Graded 66 students work in programming tasks in Python
- Instructed 66 students in improving their computational thinking skill

ORGANIZATION AND VOLUNTEERING

Student Cabinet (Bandung Institute of Technology) July 2020 — January 2021
Head of Research and Development
- Spearheaded user research on 150 students regarding self-actualization
- Directed UI/UX testing of prototype "student Linkedin" website

REFERENCES

Haryadi S. Gunawi **Associate Professor**
Computer Science, University of Chicago haryadi@cs.uchicago.edu

Achmad Imam Kistijantoro **Assistant Professor**
Computer Science, Bandung Institute of Technology imam@staff.stei.itb.ac.id

Yudistira Dwi Wardhana Asnar **Head of Undergraduate Computer Science Program**
Computer Science, Bandung Institute of Technology yudis@staff.stei.itb.ac.id