RAY ANDREW

RAY ANDREW OBAJA SINURAT

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Research Interests: Distributed Systems, Operating Systems, Storage Systems, Systems and Machine Learning Interaction

Education

Bandung Institute of Technology, Indonesia **Aug 2015 – Jul 2019**
Bachelor of Science, Computer Science *Overall GPA: **3.36**, Major GPA: **3.35***
Experience: **Teaching Assistant** and **Student Lab Coordinator** at **Database Laboratory**

Publications

Let's Cut the Tail Together with LIBROS: Library, Runtime and OS Supports for Multi-Resource Storage *(MANUSCRIPT READY)* **2020**
Meng Wang, Cesar Stuardo, Daniar H. Kurniawan, **Ray A. O. Sinurat** and Haryadi S. Gunawi

Notification and Prediction of Heap Management Pauses in Managed Languages for Latency Stable Systems *(MANUSCRIPT READY, bit.ly/mitmemPrediction)* **2020**
Daniar H. Kurniawan, Cesar Stuardo, **Ray A. O. Sinurat** and Haryadi S. Gunawi

Computer Vision-Based Palm Full Fruit Bunch Automated Grader **2021**
(MANUSCRIPT IN PREPARATION, READY ON FEB 2021)
Ray A. O. Sinurat, Jason K. Adhinarta, Edmund Anderson and Eden Steven

Patents

A robotic method of monitoring, hydrating, training, and treating bacterial or fungal infections of new-growth fungal cultures to produce densified sheet-like lateral networks of fungal materials *(PATENT PENDING)* **2020**
Edmund Anderson, Eden Steven, **Ray A. O. Sinurat**, Jason K. Adhinarta, Calvin, Alvius Tinambunan, Josavan Ezekhiel and Andrew D. Widjaja

Bachelor Thesis

Indonesian Image Captioning using Semantic Compositional Networks **2019**
Supervisor: Achmad Imam Kistijantoro, ST., MT., Ph.D. & Dr. Eng. Ayu Purwarianti, ST., MT. **Description**: One of the earliest **Indonesian automated image captioning**. The research was done using **modified Semantic Compositional Network (SCN)** topology with additional enhancement using **Attention Networks** to improve the image description quality.

Experiences

University of Chicago - GIK Lab **Jan 2019 – Present**
Remote Research Assistant

- Studying system-related bugs, such as **scalability, distributed concurrency and cascading failure**, focusing specifically on **scalability bugs**
- Researching how **Java Virtual Machines (JVMs) can share memory to reduce memory usage**, especially in a **virtualized environment**, using **Linux system calls** such as mmap and madvise
- Implementing **predictive model for Garbage Collection (GC) Time using live and dead objects** from OpenJDK8 ParallelGC algorithm **to reduce tail latencies**

Emmerich Research Center **Aug 2019 – Present**
Computer Science Researcher and Software Developer

- Developing **accounting dashboard** for **keeping tracks of company's accounting journal**
- Implementing **Fungi Processing Automation Systems for Leather Production**, such as: **Automated Tending Machine and Contamination Detection**. They are **integrated to industrial system (PLC) and Google Cloud** to maintain fungal growth until it is ready to be harvested as leather
- Researching **Black Soldier Fly's lifecycle**, a popular biomass for alternative protein, using **Deep Learning** approach

Dekoruma **May 2018 – Aug 2018**

Software Engineer Intern

- Developed **Mobile Web Marketplace**, such as **Product Details and After Order**, using **React JS and React Native Web**
- Implemented company's **new React infrastructure** by developing **Server Side Rendering with Code Splitting Strategy** (accessible through NodeJS library **Centarius**)
- Developed **novel modal implementation for React Native Web** (accessible through NodeJS library **Modal React Native Web**)

Projects

LIBROS **2020**

Researcher

- An ecosystem of **tail-latency mitigation** which **prompts cancellation notification** from resource managers and **gives accurate delay prediction**
- Extending OpenJDK8 by implementing a **live and dead object counter** for ParallelGC roots and create a **predictive model** forecasting the **time spent on GC** that causes **long tail latencies**
- The model will be combined with the CPU delay model and Lock wait model to give **delay prediction** that can be used for cancellation mechanisms.
- LIBROS **improves multi-storage applications speed by 5-70%**, starting at 90th percentile.

Automated Tending Machine + Contamination Detection (ATM-CD) **2020**

System Designer, Lead Developer

- Owned by **Mycoworks**, San Fransisco-based startup which **produces leather from fungi**
- **Design the architecture** and **the sole developer** of **IoT-related machines** such as Raspberry PI and Nvidia Jetson Nano integrated with industrial system (Festo PLC)
- The system is connected to Google Cloud's Storage and PostgreSQL to **monitor contamination** in the culture.
- The system will **foster the fungi** until harvest time, hence **improving the productivity by 300%**

Gan-Hattra **2017**

System Designer, Lead Developer

- **Led a team** to create a system that **simplifies day to day operation in West Java Province Department of Health**
- The goals are **keeping, maintaining, and synchronizing records** of traditional health care
- Designed the **software architecture and infrastructure** while **developing both of backend and frontend**
- Authorized user can **generate large data reports** on traditional health care workers and their services in designated district health cares and/or cities. Thus, **increasing the productivity by 2-fold**

Technical Abilities

OS: Linux Kernel

System: Cassandra, Hadoop, Kafka, HBase

Runtime: JVM (Hotspot, Garbage Collection, JNI Agent)

Testbed: Emulab Cluster, Chameleon Cloud

Cloud: Google Cloud, Microsoft Azure, Heroku, DigitalOcean

IoT: Arduino, Raspberry Pi, Nvidia Jetson Nano, STM32, ESP32, ESP8266

PL: C, C++, Python, Java, Typescript, Javascript, C#, PHP, Bash

Web: React, Vue, Laravel

DB: MongoDB, MySQL, PostgreSQL, Google Firebase, RethinkDB, SQLite, Redis

IaC & PaaS: Hashicorp Terraform, Docker, Docker Compose

Mobile Dev: Android, React Native

AI: PyTorch, Tensorflow, Keras

Other: LaTeX, GNUPlot, Make, CMake, GDB

References

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

Achmad I. Kistijantoro **Assistant Professor**
Computer Science, Bandung Institute of Technology *imam@informatika.org*

Eden Steven **Center Director**
Emmerich Research Center *eden.steven@emmerich.co.id*