Kanishka Gunawardana

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github.com/KATTA-00 | scholar.google.com/citations

Profile

A motivated and passionate fresh Computer Engineering graduate with keen interests in Computer Architecture, Embedded Systems, Neuromorphic Computing, Computer Vision, and Intelligent Systems. Committed to leveraging advanced technologies to address real-world challenges, with proven leadership skills and a strong collaborative mindset.

Education

University Of Peradeniya Nov. 2021 – Present
Undergraduate in B.Sc. Engineering(Hons.) Computer Engineering ***Current GPA: 4.0/4.0***
Field Rank: **1/90**

Dharmaraja College Kandy Nov. 2006 – Aug. 2019
G.C.E. Advanced Level Examination ***Z-score: 2.5661***
National Rank - **149/19508**, District Rank - **11/1189**

Publications

Optimized Multi-Processor System-on-Chip (MPSoC) Design for Low-Resource JPEG Encoding
K.H. Gunawardana, R.A.J.C. Adhikari, I. Nawinne

- Proposed a pipelined MPSoC for efficient JPEG encoding to improve throughput, utilizing Altera Nios II/e processors on a Cyclone IV FPGA, enhanced with custom instructions, custom FIFO queues, and superscalars.
- Presented at: ICAC 2024, Published in: IEEE Xplore

Experience

Temporary Instructor Aug. 2025 – Present
Department of Computer Engineering, University of Peradeniya
Instructing courses in computer architecture and embedded systems, conducting labs and evaluations. Engaged with the PeraMorphIQ Neuromorphic Research Group on neuromorphic accelerator research and development, mentoring teams on on-chip learning and power optimisations. Additionally mentoring architecture project groups at the ESCAL Lab.

Software Engineering Intern Jul. 2024 – Dec. 2024
WSO2 LLC, Colombo, Sri Lanka
Developed Ballerina integrations, including the OpenAI Finetunes Connector. Worked on ISO20022-to-SwiftMT message conversion using Ballerina for financial message interoperability, along with SaaS-based app design and development.

Selected Projects

SNAP-V: A RISC-V SoC with Configurable Neuromorphic Acceleration for Small-Scale Spiking Neural Networks (FYP) | *Group* | Nov. 2024 – Present

- Designing and developing a neuromorphic SoC for small-scale SNNs, featuring a configurable neuromorphic accelerator with on-chip learning, tailored for low-power edge applications such as robotics and IoT applications.
- Integrating RISC-V-based general-purpose computing and sensor interfacing capabilities like to support embedded tasks alongside SNN execution, addressing bottlenecks of conventional neuromorphic architectures.
- Supervision: Dr. Isuru Nawinne, Prof. Roshan G. Ragel
- Technology: **RISC-V, Chisel, Chipyard, Verilog-HDL, Synopsys VCS/PrimePower, Vivado**

RV32IM Pipeline Processor | *Group* | Dec. 2024 – Present

- Implemented a 5-stage pipelined RISC-V RV32IM processor with in-order hazard handling, explored AXI-based memory integration for SoC compatibility, performed power analysis using Synopsys PrimePower for optimization, automated the power analysis using a GitHub Actions CI/CD workflow, and prototyped the design on an FPGA.
- Technology: **Verilog HDL, Synopsys DC, VCS, PrimePower, Icarus Verilog, GTKWave, GitHub**

Impact Tracking System for Athletes (3YP) | *Group* | Nov. 2023 – Mar. 2024

- Built a real-time head impact monitoring system for contact sports using wearable devices and desktop applications to aid concussion detection, post-session syncing, and player safety analytics.
- Contributions: Led hardware and firmware design and development of wearable devices, developed the centralized hub and local communication, contributed to backend API, and deployed the system on AWS EC2.
- Technologies: **Arduino, Raspberry Pi, MQTT, Python, Express.js, MongoDB, AWS**

Field-Based Approach for Quantifying Plant Leaf Color | *Group* | Aug. 2023 – Nov. 2023

- Developed a mobile application with a backend that utilizes Image Processing and Computer Vision to objectively quantify plant leaf colour by analyzing information extracted from captured leaf images.
- Contributions: Developed the backend API for image analysis using FastAPI and contributed to image preprocessing, including image segmentation with a Mask R-CNN model fine-tuned for leaf segmentation.
- Technology: **Python, OpenCV, Pytorch, FastAPI, Flutter**

Obstacle Robot Swarm for Swarm Robotic Project | *Group* | Feb. 2024 - Nov. 2023

- Led the development and firmware updates of obstacle-avoiding robots equipped with navigation and collision avoidance algorithms, utilizing a gyroscope and accelerometer for the swarm robotics platform.
- Integrating obstacle robots with the existing swarm platform, enabling studies of dynamic obstacle scenarios.
- Technology: **Arduino, Python, Java, MQTT, OpenCV**

Achievements

SLIot Challenge 2023 | *Sri Lankan Biggest IOT Competition* | *Team: IMPAX* Mar. 2024

- 1st runners-up (Out of 100+ Teams) | *Organized by UOM in collaboration with SLT-MOBITEL and IESL*

MoraXtream 8.0 | *12 hour algorithmic programming competition* | *Team: Five4Five* Nov. 2023

- National Rank - 4 (Out of 400+ Teams) | *Organized by the IEEE Student Branch of the University of Moratuwa*

IEEEXtreme 17.0 | *24 hour algorithmic programming competition* | *Team: Five4Five* Nov. 2023

- Global Rank - 374 (Out of 16500+ participants), National Rank - 24 (Out of 330 Teams)

ACES Coders v10.0 | *12 hour algorithmic programming competition* | *Team: Five4Five* Oct. 2023

- National Rank - 12 (Out of 350+ participants) | *Organized by the ACES*

Selected Certificates

Machine Learning Specialization - Stanford University & DeepLearning.AI(Coursera) Sep. 2023

- Supervised Machine Learning: Regression and Classification
- Unsupervised Learning, Recommenders, Reinforcement Learning
- Advanced Learning Algorithms

Technical Skills

Languages: Python, C/C++, Java, SQL, JavaScript, Verilog HDL, ARM Assembly, Ballerina, TypeScript
Frameworks: Arduino, Express.js, Spring Boot, FastAPI, Node.js, React.js
Libraries: OpenCV, NumPy, Matplotlib, Pandas, PyTorch, TensorFlow
Developer Tools: Git, Docker, AWS, Quartus II, NIOS II, GTKWave, Vivado
EDA Tools: Synopsys Design Compiler, VCS, PrimeTime, PrimePower

Extra-Curricular Activities

Volunteering Project Nenathambara - University of Peradeniya Sep. 2023 - Jul. 2024
Head of Web Development - Robotics Society, University of Peradeniya Sep. 2023 - Aug. 2024
Executive Committee Member - Robotics Society, University of Peradeniya Dec. 2022 - Sep. 2023
Member of Rotaract Club of University of Peradeniya Dec. 2021 - Dec. 2023

References

Dr. Isuru Nawinne | ***isurunawinne@eng.pdn.ac.lk***

Senior Lecturer, Department of Computer Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka.

Prof. Roshan G. Ragel | ***roshanr@eng.pdn.ac.lk***

Professor, Department of Computer Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka.