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

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.

Undergraduate Teaching Assistant Jun. 2022 – Present
Department of Computer Engineering, University of Peradeniya
Computing (GP106), Programming Methodology (CO222), Third Year Project (CO300) - Assisted in labs, quizzes, projects and course materials, supporting students in Python programming, C programming, DSA and project mentoring.

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

Project Nenathambara - Department of Computer Engineering, 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

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

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

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

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