

# Kanishka Gunawardana

Department of Computer Engineering, University of Peradeniya, Sri Lanka

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## Profile

I am an enthusiastic final-year Computer Engineering undergraduate with a fervent interest in Computer Architecture, Embedded Systems, Neuromorphic Computing and Computer Vision. Driven by a passion for leveraging cutting-edge technology to tackle complex challenges and create impactful solutions, with strong leadership skills and a collaborative team spirit.

## 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*

- Presents an optimized MPSoC architecture for low-resource JPEG encoding using a pipelined approach on Nios II/e processors with Cyclone IV FPGA, employing custom instruction blocks, FIFO queues, and superscalar pipelines for enhanced efficiency.
- Presented at: [6th International Conference on Advancements in Computing](#).
- Published in: [IEEE Xplore](#).

## Experience

### Software Engineering Intern

Jul. 2024 – Dec. 2024

*WSO2 LLC, Colombo, Sri Lanka*

Developed integrations for the Ballerina language, including the [OpenAI Finetunes Connector](#). Worked on ISO20022-to-Swift MT message conversion using Ballerina DataMapper, focusing on transforming financial messages for seamless interoperability.

### Undergraduate Teaching Assistant

Jun. 2022 – Present

*Department of Computer Engineering, University of Peradeniya*

GP106: Computing, CO222: Programming Methodology, CO300: Third Year Project - Supervised lab sessions on Python and C programming. Assisted in quizzes, lab materials, and course projects while advising and mentoring third-year student projects.

### Project Nenathambara










Sep. 2023 – Jul. 2024

*Department of Computer Engineering, University of Peradeniya*

Led University of Peradeniya's outreach program for [Project Nenathambara](#), organizing workshops on Arduino and robotics for underprivileged students in Sri Lankan schools.

## Selected Projects

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- Configurable Neuromorphic NoC Architecture for SSN (FYP)** | *Group* | Nov. 2024 – Present
- Designing and implementing a RISC-V-based neuromorphic hardware architecture on FPGA for Spiking Neural Networks (SNNs), optimized for high-speed and low-power applications with synchronous communication and memory distribution to reduce bottlenecks and improve performance.
  - Supervision: Dr. Isuru Nawinne
  - Technology: **RISC-V, Verilog-HDL, FPGA, Cyclone IV, Altera Quartus**
- Design and Implementation of a RISC-V Pipelined CPU** | *Individual* | Dec. 2024 – Present
- Designing and implementing a CPU supporting the RV32IM RISC-V instruction set architecture with a 5-stage pipelined design, focusing on high efficiency and accurate instruction execution.
  - Technology: **Verilog HDL, Icarus Verilog, GTKWave**
- Impact Tracking System For Athletes (3YP)** | *Group* |   Nov. 2023 – Mar. 2024
- Developed a real-time head impact monitoring system for contact sports using wearable devices and desktop dashboards, facilitating prompt concussion identification, post-session data transmission, and comprehensive analytics for player safety and informed decision-making.
  - Contributions: Designed and developed wearable device hardware and firmware, established the centralized hub and local area network, contributed to backend API development, and handled deployment on AWS infrastructure.
  - Technology: **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 using FastAPI and contributed to image preprocessing, including segmentation using deep learning techniques (Mask R-CNN), to accurately quantify plant leaf color.
  - Techniques: Image Segmentation using Mask R-CNN, Colour Extraction, K-mean Clustering
  - Technology: **Python, OpenCV, Pytorch, FastAPI, Flutter**
- Obstacle Robot Swarm for Swarm Robotic Project** | *Group* |   Feb. 2024 – Present
- Leading the development and firmware update of obstacle robots with collision avoidance algorithms 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**
- 8-bit Single-cycle Processor** | *Group* |  Mar. 2023 – Jun 2023
- Designed and implemented an 8-bit single-cycle processor architecture in Verilog HDL to emulate a MIPS inspired ISA, enabling functionality for arithmetic, logic, data transfer, and control flow operations.
  - Built a comprehensive testbench for verification, ensuring processor functionality and timing constraints.
  - Technology: **Verilog-HDL, GTKWave**
- Digital Reporting Platform for Technical Visits** | *Group* |   May. 2024 – Present
- Developing web and mobile applications for documenting technical service visits with real-time reporting, approval workflows, and comprehensive analytics. The mobile app is utilized by technicians, while the web app is accessed by administrators to enhance task management and oversight.
  - Contributions: Optimizing the technician selection process for specific tasks using user-provided data.
  - Techniques: Natural Language Processing, Clustering and Searching
  - Technology: **Python, TensorFlow**

## Achievements

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- SLIoT Challenge 2023** | *Sri Lankan Biggest IOT Competition* | Team: IMPAX Mar. 2024
- 1st runners-up(Out of 100+ Teams) | *Organized by University of Moratuwa 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*
- IEEEExtreme 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 Association of Computer Engineering Students of the University of Peradeniya*
- ACES PreCoders v10.0** | *6 hour algorithmic programming competition* | Team: Five4Five Sep. 2023
- University Rank - 2(Out of 50+ Teams)
- ACES Hackathon 2023** | *An inter-university hackathon organized by the ACES* | Team: LearnLink Sep. 2023
- LearnLink - An innovative online marketplace for buying and selling books

## Selected Certificates

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- Machine Learning Specialization - Stanford University & DeepLearning.AI(Coursera) Sep. 2023
- Supervised Machine Learning: Regression and Classification
  - Unsupervised Learning, Recommenders, Reinforcement Learning
  - Advanced Learning Algorithms
- Engineering Drawing and 3D Modelling using AutoCAD - TecView Insitute Mar. 2021

## Technical Skills

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**Languages:** Python, C/C++, Java, SQL, JavaScript, Verilog HDL, ARM assembly  
**Frameworks:** Arduino, Express.js, Spring Boot, FastAPI  
**Libraries:** OpenCV, NumPy, Matplotlib, Pandas, Pytorch, TensorFlow  
**Developer Tools:** Git, Docker, Quartus, GTKWave, AWS

## Extra-Curricular Activities

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- Head of Web Development - Robotics Society - University of Peradeniya Sep. 2023 - Present
- Executive Committee Member - Robotics Society - University of Peradeniya Dec. 2022 - Sep. 2023
- Member of Rotaract Club of University of Peradeniya Dec. 2021 - Present

## References

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**Prof. Roshan G. Ragel** | [roshanr@eng.pdn.ac.lk](mailto:roshanr@eng.pdn.ac.lk)

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

**Dr. Isuru Nawinne** | [isurunawinne@eng.pdn.ac.lk](mailto:isurunawinne@eng.pdn.ac.lk)

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