

AKILA KARUNANAYAKE

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Interests

Robotics(perception, mapping)

Edge Computing

Domain Specific Architecture

Education

University of Peradeniya

Undergraduate in B.Sc. Engineering(Hons.) Computer Engineering

Nov. 2018 – Sep. 2024

GPA 3.85/4.00

Trinity College Kandy

G.C.E. Advanced Level Examination

Jan. 2004 – August 2017

District Rank - 59/2784, National Rank - 831/32075

Research Experience

Human Skeleton based Action Recognition

University of Peradeniya, Sri Lanka

Oct 2024 – Present

- Using pose estimation heatmaps with attention to accurately predict group activities
- Supervision: Prof. Roshan Godaliyadda

Uncertainty-guided Knowledge Distillation for Stereo Matching

HESL, Nanyang Technological University, Singapore

Dec 2023 – Sep 2024

- Construction of a lightweight and accurate stereo matching deep learning network
- Supervision: Prof. Lam Siew Kei and Dr. Wu Meiqing.
- Under review

Configurable Neuromorphic NoC Architecture for Spiking Neural Networks

University of Peradeniya, Sri Lanka

May 2023 – Dec 2023

- Design and implementation of a RISC-V-based neuromorphic hardware on FPGA for Spiking Neural Networks.
- Supervision: Prof. Roshan Ragel and Dr. Isuru Nawinne.
- Github : <https://github.com/cepdnack/e17-4yp-Neuromorphic-NoC-Architecture-for-SNNs>

Low Cost LIDAR Global Localization

*Robotics and Autonomous Systems, I2R, A*STAR, Singapore*

April 2023 – September 2023

- Researched into low-cost LIDAR global localization of mobile robots.
- Research done as part of A*STAR SIPGA Award.
- Supervision: Dr. Lawrence Chen and Dr. Saurab Verma.

Pseudo RGBD ORBSLAM2

HESL, Nanyang Technological University, Singapore

Dec 2022 – May 2023

- Code implementation of Pseudo RGB-D for Self-Improving Monocular SLAM and Depth Prediction by L.Tiwari et al.
- Supervision: Prof. Lam Siew Kei and Dr. Wu Meiqing.
- Github : <https://github.com/Akilax0/Pseudo-RGB-D-for-Self-Improving-Monocular-SLAM-and-Depth-Prediction>

Work Experience

Department of Computer Engineering

Volunteer Developer, Maintainer and Instructor

March 2020 – Present

- Development and maintenance of the following department sites.
 - * <https://projects.ce.pdn.ac.lk/ongoing-projects/>
- Project coordinator for 40+ undergraduates working on different development projects.
- Setup and Maintenance of servers at the Department.
- Casual instructor for Computer Architecture (CO224) and Computer Systems Engineering (CO326).

STERNX (Startup) | <https://www.sternxengineering.com/>

May 2020 – Jan 2022

Junior Software Engineer

- Developed front end for the company depicting the services and blog posts of the employees.
- Utilized Javascript frameworks, HTML, CSS to allow updates on external sites to be displayed on the relevant site .

Projects

Autonomous Landmine Detector <i>C++, Python, AWS, Selenium</i>	Jun 2022
<ul style="list-style-type: none">Developed an autonomous bot controlled by an ESP32 to scan a given area for landmines using electromagnetic methods and display results on a webapp.Created a back-end using AWS services to store parameters used in each turn and its results.Technologies: ESPIDF, MQTT, I2C, SPI .Github : https://github.com/cepdnaclk/e17-3yp-Landmine-Detector	
Smart Building <i>Automation, IoT</i>	Oct 2022
<ul style="list-style-type: none">Project lead for a group of 60 undergraduates.Design and prototype implementation of the system.Technologies: MQTT, NodeRED, Docker, Arduino.Github : https://github.com/cepdnaclk/e17-co326-Smart-Building	
Analysis Tool for Industrial Images <i>OpenCV , Automation</i>	Feb 2022
<ul style="list-style-type: none">Created a tool to analyze the performance of an image processing algorithm used to detect deformities in an industrial molding machine.Dashboard and API were created to visualize the results.Technologies: OpenCV, React, ExpressJS, WebSocket.Github : https://github.com/cepdnaclk/e17-co328-Analysis-Tool-for-Industrial-Images	
Compiler for Cool Language <i>COOL, C++</i>	Feb 2022
<ul style="list-style-type: none">The combination of a lexer, parser, semantic analyser, and code generator that can be used to compile programs written in Cool programming language.Github : https://github.com/Akilax0/assignments	
Vehicle Number Plate Analyzer <i>Image Processing, OCR</i>	Feb 2022
<ul style="list-style-type: none">Created Tool to analyze CCTV captured images and recognize number plates of vehicles.Classical image processing techniques were used to remove noise and scale the raw images such as super-resolution, histogram analysis, and Fourier domain analysis.Optical character recognition used to extract information from the resulting images.Report: https://drive.google.com/file/d/14ejy8Z_6T3mxUF3Oj9dBymhuGgTtWvGL/view?usp=sharing	
8-bit processor <i>Verilog, ARM assembly</i>	October 2020
<ul style="list-style-type: none">Designed 8-bit ALU with a register file for memory using Verilog.Simulated processor behavior using Icarus Verilog and input and output signals were observed using GTKWave.Tested behavior using ARM assembly code.Github : https://github.com/Akilax0/FPGA_CO503/tree/main/CO224	
Image Processing techniques to detect damaged fruit <i>Python, OpenCV</i>	November 2019
<ul style="list-style-type: none">Image Filtering with OpenCV was used to create an algorithm to detect the deformities of fruit .Created application using python to continuously monitor given set of images .	

Competitions

1st place at ACES Coders (of 120+ teams)	2022
<i>12 hour competitive programming competition for university undergraduates in Sri Lanka.</i>	
1st place at Code Squad v3.0 (150+ teams)	2022
<i>6 hour competitive programming competition for university undergraduates in Sri Lanka.</i>	
1st and 2nd Runner up of MoraXtreme 6.0 and 7.0 respectively (of 200+ teams)	Oct.2021/22
<i>12 hour competitive programming competition for university undergraduates in Sri Lanka.</i>	
185th and 142nd world rank of IEEE Xtreme 15.0 and 16.0 respectively	Oct.2021/22
<i>24 hour competitive programming competition for university undergraduates worldwide.(out of 6000+ teams)</i>	
5th place at IESL UIY	2021
<i>Undergraduate innovator of the Year competition organized by IESL for undergraduates of Sri Lanka</i>	
Jaffna Coders Competitive Programming Competition	2019
<i>Entered the Final 20 teams out of 100+ teams</i>	
Top 20 country rank of Google Code Jam, ACES Coders	2019-2022

Technical Skills

Languages	C, C++, Verilog HDL, Python, Java, HTML/CSS, JavaScript
Developer Tools	ESP-IDF, Quartus, GTKWave, AWS, Android Studio
Technologies/Frameworks	Linux, Git, Pytorch, OpenCV, Tensorflow, Keras, Jekyll

Extracurricular

Teaching Git & Github Fundamentals with Hackers' Club for all undergraduates	2021
<i>Workshop to introduce basic developer skills</i>	
• Slides: https://drive.google.com/drive/folders/18zGvksfkHTUNqcctLs4e_bIR5jXdUOgL?usp=sharing	
Member of the Web Consultation team of University of Peradeniya	2021- 2022
<i>Group focused on improving university's digital presence</i>	
Swarm Robotics group	2021- Present
<i>Documentation and project supervision</i>	

References

Will be presented on Request