

AKILA KARUNANAYAKE

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Interests

- Embedded Systems
- Computer Architecture
- Machine Automation
- Computer Vision

Education

University of Peradeniya

Nov. 2018 – Present

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

GPA 3.75/4.00

Trinity College Kandy

Jan. 2004 – August 2017

G.C.E. Advanced Level Examination

District Rank - 59, National Rank - 831

Relevant Coursework

- Embedded Systems
- Compilers
- Software Methodology
- Operating Systems
- Computer Architecture
- Data Structures
- Algorithms
- Image Processing

Experience

STERNX | <https://www.sternxengineering.com/>

May 2020 – Present

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 .

Department of Computer Engineering

Spring 2020 – Present

Volunteer Developer and Maintainer

- 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.

Projects

Autonomous Landmine Detector | C++, Python, AWS, Selenium

Jun 2021 - Present

- Developed an autonomous bot controlled by an ESP32 to scan a given area for landmines using electro-magnetic 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>
- Autonomous Path Planning
 - * Implementation of path finding algorithms for autonomous navigation.
 - * Github: <https://github.com/Akilax0/Autonomous-Path-Planning>

Multi-Processor System-on-Chip(MPSoC) | FPGA, C

Feb 2022

- Used FPGA design tools to create MPSoc with shared memory to share data between the processors.
- Extended communication to dedicated hardware FIFO queue for better performance.
- Github : https://github.com/Akilax0/FPGA_CO503/tree/main/Lab3

CRC using customized NiosII processor | FPGA, C

Feb 2022

- Improved performance of Cyclic-Redundancy-Check algorithm by adding a custom instruction to the MIPS ISA of NiosII processor.
- Implementation of hardware functionality using XOR and shift operations.
- Github : https://github.com/Akilax0/FPGA_CO503/tree/main/Lab2

Smart Building | Automation, IoT

Oct 2022

- 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 - Present
<ul style="list-style-type: none"> Created a tool to analyze performance of an image processing algorithm used to detect deformities in an industrial molding machine. Dashboard and API was 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, 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 behaviour using Icarus Verilog and input and output signals were observed using GTKWave. Tested behaviour using ARM assembly code. Github : https://github.com/Akilax0/FPGA_CO503/tree/main/CO224 	
Fractal generator <i>Java</i>	October 2020
<ul style="list-style-type: none"> A tool to display Mandelbrot and Julia sets, for given parameters. Use of multi-threading concepts in generating the images. Github : https://github.com/Akilax0/Fractal-Generator 	
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 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 IEEEExtreme 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 innnovator 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

Certificates and Courses

Classical Cryptosystems and Core Concepts — University of Colarado System	May.2020
Introduction to CyberSecurity Tools & Cyber Attacks— IBM	May.2020

Technical Skills

Languages	C++,C,Verilog HDL,Python,Java, HTML/CSS, JavaScript
Developer Tools	ESP-IDF, Quartus, AWS, Android Studio
Technologies/Frameworks	Linux, GitHub, Jekyll

Extracurricular

Teaching Git & Github Fundamentals with Hackers' Club for all undergraduates **2021**

Workshop to introduce basic developer skills

- Slides: https://drive.google.com/drive/folders/18zGvksfkHTUNqcctLs4e_blR5jXdUOgL?usp=sharing

Member of the Web Consultation team of University of Peradeniya **2021- Present**

Group focused on improving university's digital presence

Swarm Robotics group **2021- Present**

Documentation of the existing project

References

Prof. Roshan G. Ragel | 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

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