# 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 3.71/4.00*

**Trinity College Kandy** **Jan. 2004 – August 2017**
*G.C.E. Advanced Level Examination* *District Rank - 59, National Rank - 831*

## Relevant Coursework

- Embedded Systems
- Computer Architecture
- Compilers
- Data Structures
- Software Methodology
- Algorithms
- Operating Systems
- 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 relevent site .

**Department of Computer Engineering** **Spring 2020 – Present**
*Volunteer Developer and Maintainer*

- Development and maintainance of the following department sites.
  - https://projects.ce.pdn.ac.lk/ongoing-projects/
- Project Cordinator 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

**Analysis Tool for Industrial Images** | *Open CV , Automation* **Feb 2022 - Present**

- 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** | *COOL, C++* **Feb 2022**

- 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** | *Image Processing, OCR* **Feb 2022**

- 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** | *Verilog, ARM assembly* **October 2020**

- 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** | *Java* **October 2020**

- 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** | *Python, OpenCV* **November 2019**

- 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 Runner up of MoraXtreme 6.0 (of 180+ teams)** **Oct.2021**
*12 hour competitive programming competition for university undergraduates in Sri Lanka.*

**208th world rank of IEEEXtreme 15.0 (of 5500+ global teams)** **Oct.2021**
*24 hour competitive programming competition for university undergraduates worldwide.*

**5th place at IESL UIY** **2021**
*Undergraduate innnovator of the Year competition organized by IESL for undergraduates of Sri Lanka*

**Jaffna Coders Competitive Programming Competition** **2019**
*Entered the Final 20 teams out of 100+ teams*

**Top 20 country rank of Google Code Jam, Hash Code, Kick Start, ACES Coders** **2019-2020**

## 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

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|---|---|
| **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 exisiting 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*