



# AKILA KARUNANAYAKE

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## Interests

Robotics      Computer Architecture      Embedded Systems      Computer Vision

## Education

**University of Peradeniya** **Nov. 2018 – Present**  
*Undergraduate in B.Sc. Engineering(Hons.) Computer Engineering* *GPA 3.80/4.00*

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

## Research Experience

**Deep Learning Based Lightweight Stereo Matching Estimation** **Dec 2023 – Present**  
*HESL, Nanyang Technological University, Singapore*

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

**Configurable Neuromorphic NoC Architecture for Spiking Neural Networks** **May 2023 – Present**  
*University of Peradeniya, Sri Lanka*

- Design and implementation of a RISC-V based neuromorphic hardware on FPGA for Spiking Neural Networks.
- Supervision: Prof. Roshan Ragel and Dr. Isuru Nawinne.

**Low Cost LIDAR Global Localization** **April 2023 – September 2023**  
*Robotics and Autonomous Systems, I2R, A\*STAR, Singapore*

- 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** **Dec 2022 – May 2023**  
*HESL, Nanyang Technological University, Singapore*

- 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.

## Work Experience

**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.

**Department of Computer Engineering** **March 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 2022**

- 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/cepdnack/e17-3yp-Landmine-Detector>

**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/cepdnack/e17-co326-Smart-Building>

<b>Analysis Tool for Industrial Images</b>   <i>OpenCV, Automation</i>	<b>Feb 2022</b>
<ul style="list-style-type: none"> <li>Created a tool to analyze performance of an image processing algorithm used to detect deformities in an industrial molding machine.</li> <li>Dashboard and API was created to visualize the results.</li> <li>Technologies: OpenCV, React, ExpressJS, WebSocket.</li> <li>Github : <a href="https://github.com/cepdnaclk/e17-co328-Analysis-Tool-for-Industrial-Images">https://github.com/cepdnaclk/e17-co328-Analysis-Tool-for-Industrial-Images</a></li> </ul>	
<b>Compiler for Cool Language</b>   <i>COOL, C++</i>	<b>Feb 2022</b>
<ul style="list-style-type: none"> <li>The combination of a lexer, parser, semantic analyser, and code generator that can be used to compile programs written in Cool programming language.</li> <li>Github : <a href="https://github.com/Akilax0/assignments">https://github.com/Akilax0/assignments</a></li> </ul>	
<b>Vehicle Number Plate Analyzer</b>   <i>Image Processing, OCR</i>	<b>Feb 2022</b>
<ul style="list-style-type: none"> <li>Created Tool to analyze CCTV captured images and recognize number plates of vehicles.</li> <li>Classical image processing techniques were used to remove noise and scale the raw images such as super resolution, histogram analysis, Fourier domain analysis.</li> <li>Optical character recognition used to extract information from the resulting images.</li> <li>Report: <a href="https://drive.google.com/file/d/14ejy8Z_6T3mxUF3Oj9dBymhuGgTtWvGL/view?usp=sharing">https://drive.google.com/file/d/14ejy8Z_6T3mxUF3Oj9dBymhuGgTtWvGL/view?usp=sharing</a></li> </ul>	
<b>8-bit processor</b>   <i>Verilog, ARM assembly</i>	<b>October 2020</b>
<ul style="list-style-type: none"> <li>Designed 8-bit ALU with a register file for memory using Verilog.</li> <li>Simulated processor behaviour using Icarus Verilog and input and output signals were observed using GTKWave.</li> <li>Tested behaviour using ARM assembly code.</li> <li>Github : <a href="https://github.com/Akilax0/FPGA_CO503/tree/main/CO224">https://github.com/Akilax0/FPGA_CO503/tree/main/CO224</a></li> </ul>	
<b>Image Processing techniques to detect damaged fruit</b>   <i>Python, OpenCV</i>	<b>November 2019</b>
<ul style="list-style-type: none"> <li>Image Filtering with OpenCV was used to create an algorithm to detect the deformities of fruit .</li> <li>Created application using python to continuously monitor given set of images .</li> </ul>	

## Competitions

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

## 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, Jekyll

## Extracurricular

<b>Server Maintenance of Department of Computer Engineering</b>	<b>2022 - Present</b>
<i>Setup and Maintenance of servers at the Department</i>	
<b>Teaching Git &amp; Github Fundamentals with Hackers' Club for all undergraduates</b>	<b>2021</b>
<i>Workshop to introduce basic developer skills</i>	
<ul style="list-style-type: none"> <li>Slides: <a href="https://drive.google.com/drive/folders/18zGvksfkHTUNqcctLs4e_bIR5jXdUOgL?usp=sharing">https://drive.google.com/drive/folders/18zGvksfkHTUNqcctLs4e_bIR5jXdUOgL?usp=sharing</a></li> </ul>	
<b>Member of the Web Consultation team of University of Peradeniya</b>	<b>2021- 2022</b>
<i>Group focused on improving university's digital presence</i>	
<b>Swarm Robotics group</b>	<b>2021- Present</b>
<i>Documentation and project supervision</i>	

## 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*

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**Dr. Saurab Verma** | [saurab\\_verma@i2r.a-star.edu.sg](mailto:saurab_verma@i2r.a-star.edu.sg)

*Senior Scientist, Institute for Infocomm Research, Agency for Science Technology and Research, Singapore*