Imesh Balasuriya

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Profile

A third year Computer Engineering undergraduate with a passion for problem solving and software development, and a strong interest in Computer Architecture and Computer Vision.

Education

University of Peradeniya, Sri Lanka **Nov 2018 – Present**
BSc. Engineering(Hons.) Computer Engineering (Reading) *Current GPA: 3.70/4.00*

Ananda College, Colombo - 10 **2017**
G.C.E. Advanced Level Examination *Combined Mathematics (A), Physics (B), Chemistry (B)*

Technical Skills

Programming Languages: C, Java, Python
Hardware Programming: Verilog HDL, AVR C, ARM Assembly
Web Development: HTML/CSS, JavaScript, Node, React, Express
DBMS: SQL, MongoDB
Developer Tools: Linux (Bash shell), Git Version Control, Cloud Service Platforms (AWS, GCP)
Libraries: OpenCV, NumPy, Matplotlib, Pandas

Experience

Casual Instructor (Teaching Assistant) **2021 – 2022**
Faculty of Engineering, University of Peradeniya

Conducted lab sessions for second-year undergraduates at the Department of Computer Engineering under the following courses.

- CO221 – Digital Design
- CO224 – Computer Architecture

Projects

QuickPark – E-Parking System | *Node, Express, MongoDB, React, React Native, Python, AWS, MQTT* **2021 – Present**
Group | *[Project Page, GitHub Repo]*

- A fully-automated parking system that automatically identifies vehicles, assigns parking spots to them and allows reservation of parking spots for a seamless parking experience.
- Used NodeJS and Express to create a backend along with a MongoDB database to manage users.
- Created a React-based frontend management portal as well as a mobile app using React Native for the car park users.
- Designed two hardware field units for vehicle identification and parking spot allocation that communicate with the backend hosted on AWS via MQTT.
- **Contribution:** Proposing the project, Management portal (Frontend), Mobile app, Spot assignment algorithm using Python, MQTT communication using AWS IoT Core, Hardware designs for on-premise units, Unit testing

Analytical Software for Next Generation Skim Sequencing Data | *Java, Maven, JavaFX* **2022 – Present**
Group | *[Project Page, GitHub Repo]*

- Created a standalone desktop application for analysis of Chloroplast, Mitochondria and ITS region NGS data.
- Implemented existing pipelines using several open-source CLI tools and bundled them together to form a single GUI package.
- **Contribution:** Set-up of pipelines, UI design, Command-line tool integration

Reconstruction of Highly-Degraded License Plate Images | *Python, OpenCV, Tesseract-OCR* **2022**
Group

- Demonstrated the effectiveness of traditional image processing techniques in the reconstruction of low-resolution license plate images obtained from CCTV footage.
- Applied standard techniques to get rid of various degradations such as noise and motion blur and upscaling techniques to improve the resolution of the images.
- **Techniques:** EDSR upscaling, Fourier domain analysis, Degradation modelling (De-blur and De-noise), OCR

Compiler for COOL Language | *C++, Flex, Bison* **2022**
Group | *[GitHub Repo]*

- Implemented a 4-stage compiler for the COOL programming language comprising of a lexical analyzer, parser, semantic analyzer, and a code generator that generates MIPS assembly code.
- Included appropriate error handling in all stages of the compiler.
- **Techniques:** Finite State Machines, Abstract Syntax Trees, Regular Expressions, Context-Free Grammars

8-bit Single Cycle Processor | *Verilog HDL* **2020**
Group

- Designed an 8-bit single cycle processor with a MIPS-style instruction set including an ALU, register file and control logic.
- Designed a memory architecture for the CPU with seperate data and instruction memory along with their respective caches.

Fractal Generator | *Java, Swing, Multi-Threading* **2020**
Individual

- Designed a GUI app that generates the Mandelbrot and Julia sets according to user specifications.
- Improved image generation times using multi-threading and appropriate thread synchronization techniques.

Achievements / Certifications

Hacktitude 2022 Inter-University Hackathon | 99x **January 2022**
37th place out of 200 teams

- Participated as a team of three.
- Worked on a near real-world project involving a web-based LMS application.
- *Technologies used: Node.js/Express, Javascript, EJS, SQLite, Git*

iCS Hack The World 2.0 CTF Competition **December 2021**
2nd Runner-Up

- 24-hour overnight Capture The Flag competiton.
- Participated as a team of four.
- *Technologies used: Steganography tools (opensteg, zsteg), Cryptography tools (CyberChef, hashcat), Linux (Bash shell), Chrome Developer Tools*

Linux Administration and DevOps Engineering Training Program | WSO2 **November 2020**

- Selected as one of 100 participants from over 1,500 registrants.
- Six-month training program covering various important topics in Systems and DevOps Engineering.
- *Technologies learnt: Linux (Bash shell), Google Cloud Platform, Web Servers (Apache, Nginx), Elasticsearch, Ansible*

Introduction to Cybersecurity Tools & Cyber Attacks | IBM **May 2020**

Certificate in Business Accounting | CIMA **November 2018**

Leadership / Extracurricular

ACES (Association of Computer Engineering Students) **2019 – Present**
Faculty of Engineering, University of Peradeniya

- Committee Member for the term 2019/2020.
- Assistant Secretary for the term 2020/2021.
- Secretary for the term 2021/2022. (Current)

Rotaract Club of University of Peradeniya **2019 – 2022**
University of Peradeniya

- Active Member since 2019.
- Director of Public Relations for the term 2020-2021.
- Vice President of Public Relations for the term 2021-2022.

References

References available upon request.