

Keshara Weerasinghe

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EDUCATION

University of Virginia

PhD in Computer Engineering GPA 3.90/4.00

Aug. 2022 – Present

Charlottesville, Virginia

University of Peradeniya

BSc in Computer Engineering GPA 3.34/4.00

Nov. 2016 – September 2021

Peradeniya, Sri Lanka

Trinity College Kandy

High School

Jan. 2002 – August. 2015

Kandy, Sri Lanka

PUBLICATIONS

- M Arif Rahman, Keshara Weerasinghe, Lahiru Wijayasingha, Homa Alemzadeh, Ronald D. Williams, and John Stankovic. 2023. “Poster Abstract: SenseEMS - Towards A Hand Activity Recognition and Monitoring System for Emergency Medical Services”. In The 22nd International Conference on Information Processing in Sensor Networks (IPSN23). Association for Computing Machinery, New York, NY, USA, 310–311. <https://doi.org/10.1145/3583120.3589823>.
- K. T. B. Weerasinghe, S. C. Tennakoon, K. N. U. Kularatne, I. Nawinne, R. Ragel and H. Jayakody, “Using Near-Infrared Spectroscopy for Vein Visualization,” 2021 10th International Conference on Information and Automation for Sustainability (ICIAfS), 2021, pp. 363-368, doi: 10.1109/ICIAfS52090.2021.9606126.

EXPERIENCE

Graduate Research Assistant

Department of Electrical and Computer Engineering, University of Virginia

Aug 2022 – Present

Charlottesville, Virginia

- Context-Aware Augmented Reality for Cognitive Assistance in EMS
- Developing a safety engine for tele-operation in Robotic Surgery

Instructor / Teaching Assistant

Department of Computer Engineering, Faculty of Engineering, UOP

September 2021 – Present

Peradeniya, Sri Lanka

- Assisted CO224 - Computer Architecture
- Assisted CO323 - Computer Communication Networks
- Assisted CO328 - Software Engineering
- Assisted CO543 - Image Processing
- Assisted CO326 - Computer Systems Engineering: Industrial Networks

Research Assistant

Department of Computer Engineering, Faculty of Engineering, UOP

September 2021 – Present

Peradeniya, Sri Lanka

- Anomaly Detection in Injection Molding process using Computer Vision for Industrial Automation

Trainee Software Engineer

99x Technology

March 2021 – September 2021

Colombo, Sri Lanka

- Implemented internationalization and localization to an Angular application.
- Integrated MSAL (Microsoft Authentication Library) with B2C authentication support for Angular application.
- Developed localization management API using .NET core web API.
- Integrated Microsoft App Insights to Angular application for advanced analytics and performance monitoring.
- Integrated static code analysis tool (SonarQube) and automated testing with azure pipeline management.
- Built and deployed angular custom libraries to a private registry using Azure Artifacts.
- Integrated Atlassian status page API for the in-house status management portal.

Casual Teaching Assistant - Programming Methodology

April 2020 - June 2020

Department of Computer Engineering, Faculty of Engineering, University of Peradeniya

Peradeniya, Sri Lanka

- Instructed and guided the 2nd year undergraduates through the programming fundamentals, analyzing complex problems, using C language

PROJECTS

Context-Aware Augmented Reality for Cognitive Assistance in EMS — Ongoing Research 2022

Machine Learning, Image Processing, Android, C++, Python

- Developing a context-aware AR cognitive assistant system for cooperative situational awareness in medical emergencies.
- CognitiveEMS integrates AR smart glasses and smartwatch devices with data analytics for real-time context inference based on multimodal sensor data (audio, video, hand motion) to provide just-in-time context-dependent feedback to responders.

Using Near-IR Spectroscopy for Vein Visualization — Final Year Research Project 2021

Python, NIR Spectroscopy, Image Processing, OpenCV, Javascript, C++, CAD/CAM

- Implementing a cost-effective and efficient method to detect veins and provide a real-time vein visualization using Near-infrared illumination and image processing techniques.
- Designing an illumination system that favors a variety of skin types, with more weight on darker shades of skin, as the difficulty in vein visualization on darker skins is not taken into consideration in existing devices.

COVID-19 Real-time ICU Patient Monitoring System — Covid Voluntary Project 2021

Go, HL7 Protocol, VLANs, NodeJS, Nuxt, Javascript, Cisco IOS, PostgreSQL

- Designed, Developed & Implemented a Real-time Remote ICU Patient Vital Monitoring System within 3 days which connects to all ICU Patient Vital Monitors retrieving patient vitals and displays real-time to the health personnel, giving them the ability to monitor any amount of patients in a central location without physically visiting them, thus reducing the risk of exposure.
- Implemented at Peradeniya Teaching Hospital Covid Ward and Kandy General Hospital Covid ICU.

Face Shield Project — Covid Innovative Humane Engineering 2020 March

CAD, CAM, CNC Machining, Laser Cutting

- Designed a Re-Usable Face Shield and started production at a time of crisis when the country went into full lock-down due to the Covid-19 pandemic, and the health sector did not have a sufficient amount of PPE (Personal Protective Equipment) due to no imports and halted in-house production.
- With the support from the Faculty of Engineering, I could produce and distribute more than 10000 Face shields to the entire country (Hospitals and all health personnel, Police, First Responders, etc.)

Pera-Ride - Eco Friendly Smart Bicycle Sharing System — Group Project 2020

NodeJS, Nuxt, MongoDB, Atmega Microcontrollers, MQTT, Bluetooth, Javascript, C++

- A complete platform for Bicycle Sharing System designed for the University of Peradeniya giving the ability for the students and staff to travel using a bicycle within the university.
- **My Contribution:** System Design, Back-end design and development, Embedded System Design and Development, Database Integration, UI Design

Health-Watch — Embedded Systems Group Project 2019

NodeJS, Vue, MongoDB, MQTT, Javascript, C++, ESP8266 SoC, PCB

- Designed and developed a wearable for patients, elderly to monitor basic vitals and giving the ability to remotely monitor them via a mobile app or a web app.
- **My Contribution:** PCB Design and Manufacturing, Watch Firmware Design and Development, MQTT Integration, CAD/CAM 3D Design and Manufacturing of the watch

IIOT based Automated Bottle Filling System — Group Project 2020

NodeRed, KEP-Server, OPC-UA, SCADA, Atmega Microcontrollers, ESP8266 WiFi SOC, Javascript, C++

- An automated bottle filling machine with an IIOT based SCADA controlling platform using Industry Standard Communication Protocols (OPC-UA) to control and monitor the system.

- **My Contribution:** Hardware Electronics Design, Embedded System Design, and Development

WiFi PABX — Group Project

2018

Java, Android-Studio, MySQL, Asterisk, SIP

- Developed a mobile application through which those who are in the same Local Area Network can communicate with each other through the SIP server.
- **My Contribution:** Server Design and Development, Asterisk, and DB Integration.

HappyPet - Smart Pet Feeder — Group Project

2017

MQTT, MySQL, Atmega Microcontrollers, ESP8266 WiFi SOC, Swift (iOS Development) Javascript, C++

- Implemented a smart pet feeding machine that gives food and water to indoor pets according to a predefined schedule or request via the mobile application by the user.
- **My Contribution:** iOS Mobile Application, System Design

TECHNICAL SKILLS

Languages: C, C++, C, Java, JavaScript, Typescript, Python, GoLang

Frameworks: .NET, Angular, Springboot, ReactJS, NodeJS, Vue, Nuxt, Bootstrap, OAuth, HTML/CSS

Continuous Integration: Microsoft Azure, Azure DevOps, Netlify, Github Actions, AWS, Heroku.

Database Systems: MYSQL, MongoDB, PostgreSQL.

Embedded Systems: Atmel Microcontrollers, ESP8266 Wi-Fi SOC, PCB Designing and Manufacturing, CAD/CAM Technologies, 3D Printing, CNC Manufacturing, CO2 Laser Manufacturing.

ACHIEVEMENTS

- **Best Research Article** - awarded for the paper titled **Near-IR Spectroscopy for Vein Visualization**, at the **Engineering Students Project Symposium and Conference of University of Peradeniya 2021**.
- **Best Product/Project University Category SLASSCOM Ingenuity Awards 2021**
Won the above award under central province for the **Realtime Covid-19 ICU Patient Monitoring System** which was implemented in **2020 April**.
- **ACES Hackathon 2019 Winner** under 'Agriculture' Category
- **ACES Hackathon 2018 - 3rd place** under embedded and network systems.

REFERENCES

- **Prof. Roshan Ragel**
Professor in Computer Engineering
Department of Computer Engineering, Faculty of Engineering, University of Peradeniya.
roshanr@eng.pdn.ac.lk
- **Dr. Isuru Nawinne**
PhD (UNSW), BSc.Eng. (Hons)(Peradeniya)
Department of Computer Engineering, Faculty of Engineering, University of Peradeniya.
isurunawinne@eng.pdn.ac.lk
- **Dr. Asitha Bandaranayake**
PhD (Cincinnati), BSc.Eng. (Hons)(Peradeniya)
Department of Computer Engineering, Faculty of Engineering, University of Peradeniya.
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