HARSHA GANEGODA

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EDUCATION

2018-2020   **The University of Alabama in Huntsville, AL, United States,**
Master of Science in Computer Engineering
Thesis: An Implementation of the Wireless Body Area Network of Synchronized Inertial Sensors for Balance Testing

2011–2015   **University of Peradeniya, Sri Lanka,**
Bachelor of Science in Computer Engineering

PROFESSIONAL/RESEARCH EXPERIENCE

08/2021–Present   **Embedded Linux Engineer, Eurotech, Inc**, Madison, AL
- Developing embedded Linux Distributions, support packages, and device drivers using Yocto for ARM/x86 products.
- Developing embedded Linux tools to support IoT gateways

Skills: Shell Script, C, Python, Yocto, BSP, Linux Kernel, Bootloaders, Driver Development, Ansible playbook, Jira, GitHub, Docker, Agile Development, Continues integration and development, Software/ Hardware troubleshooting, Jenkins

12/2019–07/2021   **Embedded Design Engineer, Firia, Inc**, Madison, AL
- Developed and implemented next generation wearable devices and telemedicine systems for healthcare applications.
- Developed and implemented IoT based embedded systems such as cloud connected door locks and emergency light.
- Developed Linux based system applications.
- Designed electronic hardware circuits.
- Schematic drawing and PCB designing using Ki-CAD.
- Designed Web based device firmware update utility for STEM curriculum and technology platforms.
- Designed and implemented Raspberry Pi based test station for flashing firmware during mass production.

Skills: C/C++, Shell Script, Python, Bootloaders, JavaScript, React, Sensor Interfacing, Ki-CAD, Soldering, Web USB, IoT, Docker, BLE, Wi-Fi, MQTT, Protobuf, TCP/IP, I2C, I2S, SPI, UART, RTOS, Linux, Jira, BitBucket, Agile Development, Continues integration and development, Software/ Hardware troubleshooting, GitLab

08/2018-12/2019   **Research Assistant, NASA Marshall Space Flight Center,** Huntsville, AL
- Designed and developed next generation wearables sensor platforms for Astronauts health monitoring for NASA.
- Designed and developed 3D printed custom electronics which help NASA advanced space exploration.

Skills: C/C++, Python, Eagle CAD, Soldering, BLE, Wi-Fi, TCP/IP, MQTT, I2C, SPI, UART, Wearable Sensor Design, Wireless Body Area Network, In Space Manufacturing, 3D Printed Electronics, MATLAB, IMU, GPS/GLONASS, Barometer, Continues integration and development, Software/ Hardware troubleshooting

08/2018-12/2019   **Graduate Research Assistant, Department of Electrical and Computer Engineering, The University of Alabama in Huntsville,** Huntsville, AL

- Designed and developed wireless body area network for human posture balance testing
- Designed wireless sensor network including smartwatch/smartphone applications to acquire vitals and biomedical signals.
- Designed IoT based smart home environment for assisted living facility.
- Schematic drawing and PCB designing using Eagle-CAD.

Skills: C/C++, Python, Eagle CAD, Soldering, BLE, Wi-Fi, TCP/IP, MQTT, I2C, SPI, UART, Wearable Sensor Design, Wireless Body Area Network, Algorithm Development, MATLAB, RTOS, IMU, GPS/GLONASS, Barometer, Linux

11/2016-11/2017   **Embedded Engineer, Atlas Labs**, Colombo, Sri Lanka (Australian startup)

- Designed and developed embedded systems around TI microprocessors and TI-RTOS.
- Implemented sensor library top of the real time operating systems for barometer, IMU, GNSS receiver, RFID and flash memory using SPI/I2C and UART.
- Power management for microprocessors and sensors
- Schematic drawing and PCB designing using Ki-CAD.
- Designed graphical user interface for embedded devices using Qt creator.

Skills: C/C++, Python, Ki-CAD, Soldering, BLE, Wi-Fi, TCP/IP, MQTT, I2C, SPI, UART, Wearable Sensor Design, Algorithm Development, TI-RTOS, IMU, GPS/GLONASS, Barometer

10/2015-11/2016 **Research and Development Engineer, Multirotor Unmanned Aerial Vehicle Laboratory, CodeGen International**, Sri Lanka

- Designed and implemented fully autonomous multi-copter based on Arduino and Raspberry Pi platforms.
- Implemented embedded software in C/C++ for flight controller operation.
- Designed and implemented data communication protocol between ariel vehicle and ground station.
- Worked on multi-threading and inter-process communication on Linux
- Designed and implemented flight algorithms such auto take off, auto landing for autonomous ariel vehicles.

Skills: C/C++, Python, Eagle CAD, Soldering, BLE, Wi-Fi, TCP/IP, MQTT, I2C, SPI, UART, Algorithm Development, MATLAB, RTOS, IMU, GPS/GLONASS, Barometer, Linux

10/2014-03/2015   **Industrial Internship, IBM**, Colombo, Sri Lanka

- Experienced in IBM System X hardware/software installation technical support services.
- Technical support on IBM System Storages DS4000 and TS3310 Tape Systems/3590 Tape libraries.
- Technical support on IBM Systems Software products such as Tivoli Storage Manager.

TECHNICAL SKILLS

Operating Systems	: Microsoft Windows, Linux variants
Languages	: C, C++, Python, JavaScript, Shell Script
PCB Design	: Eagle CAD, Ki-CAD
Signal Processing	: MATLAB
Network Protocols	: TCP/IP, MQTT
Sensor Interfacing	: I2C, SPI, UART, I2S
Cloud/Virtualization	: Microsoft Azure, Google Cloud Platform, Docker
GUI Design	: Android Studio, React, Qt Creator, Processing
3D Printed Electronics	: Voltera V-One
Project Management	: Atlassian Jira & Confluence, Agile Development
Version Control & CI/CD	: Bitbucket, GitHub, GitLab, Jenkins
Other	: Soldering

PUBLICATIONS

2020   **Long Term Monitoring of Respiration and CO2 using Flexible Printed Sensors** – IEEE Aerospace Conference in 2020
- Proposed and implemented an idea of monitoring respiration and CO2 of Astronauts using smart flexible printed sensors.
- This project was granted by NASA Marshall Space Flight Center, Huntsville as a part of NASA ISM (In Space Manufacturing) program.

2020   **An Implementation of the Wireless Body Area Network of Synchronize Inertial Sensors for Balance Testing** – Master Thesis
- Proposed and developed the system to automate balance testing using multiple synchronized sensors.
- The system consists of smartphone with custom application, two wireless sensor nodes, smartwatch with a custom application, and a home server. End of each balance test, results are automatically sent to the remote computer.

2019   **Development of an Automated 30 Second Chair Stand Test using Smartwatch Application** – 41st Annual International Conference of IEEE Engineering in Medicine & Biology Society
- Developed a smartwatch-based interface to automated CDC (Centers for Disease Control and Prevention) recommend 30 Second Chair Stand Test.

2019   **IoT Based Longitudinal Monitoring of Activity and Posture Transitions in Smart Homes** – IEEE SoutheastCon
- Designed and implemented smart home environment which can be used to monitor posture transitions. This enables new opportunities for assisted living facilities.

2017   **Breaking Speck Cryptosystem using Correlation Power Analysis Attack** – Journal of the National Science Foundation of Sri Lanka
- Showed for the first time that a newly introduced light weight cypher called Speck by NSA (National Security Agency) is vulnerable to power analysis attack.
- Practically analyzed the effectiveness of existing countermeasures and did improvements.

2015   **Testbed for Power Analysis Attack Based on the Arduino Prototyping Board**– Proceedings of the Peradeniya University International Research Sessions (iPURSE), University of Peradeniya, Sri Lanka in 2015.

2015   **The A to Z of Building a Testbed for Power Analysis Attacks** – 10th IEEE International Conference on Industrial and Information Systems (ICIIS) in 2015.
- Created a customizable and easy to use testbed for power analysis attacks which can be break AES in 10 minutes.

SELECTED PROJECTS

05/2019–09/2019   **Smart Flexible Sensor Platform for Space Applications**– This project was granted by NASA Marshall Space Flight Center, Huntsville.
- Designed smart flexible sensor platform which is powered by the Cypress 4200 BLE family microcontroller with onboard sensors such as TPH (temperature, pressure, and humidity) environmental sensor, and inertial sensor.
- Our design has prototyping area for custom printed sensors.
- There were presentations and discussions with Flight Surgeons and Medical Avionics groups at NASA JSC, since we developed this flexible embedded platform to monitor Astronaut's health.

05/2018–04/2019   **Evaluation of Intelligent Sensor Platforms for 3D Printed Electronics for Space Applications**– This project was granted by NASA Marshall Space Flight Center, Huntsville as a part of NASA In Space Manufacturing (ISM)

- Evaluated and designed space and applicable technologies for extremely low power embedded sensing and communication platforms suitable for implementation on 3D printed substrates.
- We created a setup for custom printing, and we evaluated applicable sensors and technologies.

2019   **PPG Based Non-Invasive Blood Pressure Estimation –** Graduate Project
- Designed and implemented wireless body sensor network which has a PPG sensor and smartwatch application to read built in PPG sensor.
- Implemented the Raspberry Pi based home server to collect incoming vitals coming from the wireless body sensor network.
- Designed an algorithm to derive blood velocity.

08/2018–12/2018   **Brain Controller for Non-Invasive Stimulation**
- Designed and developed a FPGA based hardware platform which is charged based non-invasive stimulation to modulate physiological state of the user.

11/2016–11/2017   **Electronic Cattle Tag**
- Designed electronic cattle tag powered by solar, based on low power TI microprocessor with RF core which is used to transmit data such as cattle's movements, location, and environment data.

10/2015–11/2016   **Fully Autonomous Quadcopter**
- Designed and developed fully autonomous quadcopter which has ability to auto takeoff, auto landing, and waypoint navigation using Google map.

2014   **Stair Climbing Robot**
- Designed and developed a robot which can follow a line and stairs climbing.

HONORS AND AWARDS

- 2nd place in ROBOChamps 2014, robotics competition organized by Robotics society University of Peradeniya
- Silver Award in SLIIT ROBOFEST 2014, all national robotics competition organized by Electrical & Computer Engineering, Department of Sri Lanka Institute of Information Technology

KEYWORDS

Wearable Monitoring, Wireless Body Area Network, Bio Signal Processing, Telemedicine, Cryptography, Power Analysis Attacks, Data Security, Security Protocols, Jira, Embedded Software Design, Real Time Systems, RTOS, FreeRTOS, Java Script, GitHub, React, C, C++, Python, Windows, Linux, Software Development, TCP/IP, MQTT, Azure, AWS, Google Cloud, 3D Printed Electronics, Next Generation Wearables, Docker, Bitbucket, Confluence, Yocto, BSP, Embedded Linux, SPI, I2C, I2S, UART, BLE, Wi-Fi, IMU, Barometer, GPS/GLONASS, ECG, Protobuf, Jira, Agile Development, Ansible, GitLab, Jenkins

NON-RELATED REFEREES

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