

# SARAYU MANAGOLI

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**Currently seeking full-time opportunities starting May 2021 as Embedded Firmware/Software Engineer, Embedded System Engineer**

## EDUCATION

**Master of Science in Electrical and Computer Engineering - Embedded Systems** (Expected date of graduation: May 2021)

University of Colorado Boulder, Boulder, Colorado, USA

Courses: Embedded System Design, Embedded Interface Design, Wireless Local Area Networks

**GPA: 3.83/4**

Principles of Embedded Software, Advanced Embedded Software Development, Concurrent Programming

Low Power Embedded Design Techniques, Internet of Things Embedded Firmware

Real Time Embedded Systems

**Bachelor in Telecommunication Engineering**

(2013-2017)

BMS College of Engineering, Bangalore, Karnataka, India

**GPA: 8.83/10**

## RELEVANT INDUSTRY WORK EXPERIENCE

**Software Program Developer**

(September 2017-July 2019)

Robert Bosch Engineering and Business Solutions Private Limited

- Handled various CAN frame related functional embedded C developments for Automotive Systems, involving commercial vehicles on SPC58NE84 microcontroller
- Was responsible for review and initial development of requirements for a Thermal System software module (part of the Engine Control and Management system); projects were based on JDP and IFX microcontrollers
- Verification and validation of various unit developments under different testing environments - including with Electronic Control Unit (ECU) hardware and simulation; analyzed and resolved system-level software bugs as part of projects that were advancing towards Series production
- Served as a primary developer for 4-button Cruise Control implementation introduced in an OEM. This involved handling inputs from Commercial Vehicle driver to select between various modes of cruise control
- Part of a 3-member taskforce formed to handle a system-level bug; this required taking charge of processes needed to be handled before Start of Production (SoP) of ECUs

**Software Intern**

(June 2016-July 2016)

Asmaitha Wireless Technologies Private Limited

- Worked on the software development aspect of implementation of "Aware Scheduling of Joint Millimeter Wave and Microwave Resources for Dual-Mode Base Station"

## SKILLS

- Programming:** C (Windows and Linux), C++ and Assembly level languages with adherence to MISRA C
- Simulation tools:** ASCET, LogicPort(for logic analyzer), MATLAB (Beginner), Multisim, Emily52
- Design tools:** Altium, Inkscape, OrCAD, KiCAD, Draw.IO for UML designs
- Scripting languages:** Bash and Shell scripting, Make, Python (Beginner)
- Modification tools, Eclipse-based IDEs:** ECUWorx, AXESstar, MCUXpresso, Code Composer Studio, Simplicity Studio
- Task-handling tools:** Rational Dynamic Object-Oriented System (DOORS) and ClearQuest
- Testing tools:** Universal Debug Engine (JTAG), CANalyzer, ETAS Bus Master, KFlexExplorer
- Communication Protocols:** Controller Area Network (CAN), I2C, SPI, UART
- Software development process:** Agile, CMMI, Lean and ASPICE development models
- Version control systems:** SDOM, GitHub and GitLab
- Functional Safety Standard:** ISO26262
- Production processes:** FMEA and 8D Analysis
- Languages:** German language level A1 certificate holder

## ACADEMIC PROJECTS

- “Detection and Containment of SARS-CoV-2 in Assisted Living Spaces using BLE Mesh” using Blue Gecko Low Power board, accelerometer, temperature sensor and other sensors.
  - Successfully designed and developed a BLE Mesh of 3 Bluetooth nodes which consisted of 2 Low Power nodes and one Friend node.
  - Integrated a temperature sensor which included the use of state machines to enable BLE modes.
  - Integrated a PIR sensor and an accelerometer on the friend and the low power node.
  - Documented and planned firmware reviews for the implementation.

- “**Biometric-based security system**” using a **Blue Gecko Low Power board**, **fingerprint sensor**, **IR sensor** and **Lithium Ion Battery**.
  - My role in this implementation is with respect to the design of the battery management system with the help of **PMIC (Power Management IC)** and a **Lithium-ion battery**, **firmware development** including **sensor integration** and **testing** of the system.
  - This project involves **analysis of datasheets**, **selection of appropriate components**, **schematic design**, **PCB layout developments**, **hardware bring-up** and **reviews**.
  
- “**Smoke Detection System**” on a custom-built **Linux** system using **Buildroot** on **BeagleBone Black** along with **MQ-135 Gas sensor** and **TMP102 Temperature sensor**
  - Assisted in setting up **Linux Buildroot** system for **BeagleBone Black**.
  - Integrated **MQ-135 sensor** by including **analog pins** in the existing **device tree binary (DTB)**.
  - Implemented **shared memory** to accept data from both the above-mentioned sensors.
  - Improved the implementation by including **socket programming** to set up **TCP communication** between two boards.
  
- “**Time Lapse Image Acquisition**” on **Raspberry Pi** using **Logitech C270**
  - The main aspect of this project was to indicate that a **Linux-based system** can be used for **real-time applications**. Images were acquired in **real-time** at **1 Hz** and **10 Hz**.
  - **Multithreading** concept was implemented as various threads were created for tasks such as **frame capture**, **image dump** and **image storage** onto another **RPi board** using **sockets**.
  - Involved **image processing** of the captured frames.
  - Successfully used a **sequencer** which handled the time at which the **semaphores** had to be released for each of the threads.
  - The major take-away from this project was the **Real-Time Operating System (RTOS)** concepts.
  - Enhanced the standard project by establishing a **connection** between two **Raspberry Pi boards**.
  - Achieved a **low jitter** of **100 milliseconds**.
  
- “**Hand Gesture based Recognition System**” using **MSP432**, **flex sensors**, **graphical LCD** and **Bluetooth module**.
  - This project was aimed to develop a system that accepts gestures to indicate some basic needs of the user and replicate the same in the form of an image onto the **LCD** for the interpreter to understand and do the needful.
  - Successfully integrated a **graphical LCD** to the system interfaced by **SPI**.
  - Developed **firmware** for **gesture mapping**.
  - Collaborated and performed several **unit tests** and **system tests** on the product.
  
- A completely functional embedded system was developed as a part of **Embedded System Design** course which involves programming of **SPLD**, **NVRAM**, **LCD device drivers**, **memory mapping**, etc. Projects are based on **MSP432 with ARM Cortex M4** and **8051** micro-controllers
  
- Projects based on **UART**, **I2C** and **FreeRTOS** are being implemented on **FRDM KL25Z** board which includes **ARM Cortex M0** processor. The projects also build on concepts such as **ADC**, **DAC**, **UML State diagrams**, **circular buffers**, **MakeFiles**, **loggers** and **uC Unit test cases**. **FMEA**, **WBS** are also touched upon in the above-mentioned projects.