Harsh Dubey

411 Berry Chase Way, Cary, NC 27519

had7143@gmail.com
(605) 592-6747

EDUCATION

South Dakota State University (SDSU) **May 2021**
Bachelor of Science: Electrical Engineering

TECHNICAL SKILLS

- Software/Firmware Development - Experienced in developing software/firmware for wireless networks and embedded systems using microprocessors, microcontrollers, and field programmable gated array (FPGA).
- Programming Languages - Proficient in C/C++, JavaScript, and PIC assembly.
- Operating Systems - Experienced in working with Contiki-NG OS and Free RTOS.
- Wireless Networks - Knowledge in designing, developing, and implementing software for the 802.15.4 MAC/PHY standard for low power wide area network (LP-WAN) and low-rate personal area network (LR-PAN).
- IoT Solutions - Experienced in designing IoT solutions, creating dashboards, and developing remote control software for IoT devices. Familiarity with Node-RED, Influx DB, Prometheus, MySQL DB, Ngnix, and Grafana.
- Development Boards and Processors - Experienced in working with Silicon Labs' EFR32BG board, PIC microchip controllers, Arm Cortex processors, Arduino Uno, Arduino Mega, Altera's DE-10 FPGA, and Altera's Cyclone-2 FPGA.
- Communication protocols - Skilled in working with wired and wireless protocols such as I2C, SPI, UART, USB, MQTT, lwm2m/COAP, LoRaWAN, and RPMA.
- FPGA - Skilled in writing Verilog, writing test benches using Model Sim, and working with other Quartus/Lattice Diamond tools. Experienced in working with DE-10 lite and Cyclone-2 FPGA boards.
- Hardware - Skilled in debugging printed circuit boards (PCBs) using oscilloscopes, logic analyzers, and multimeters.

WORK EXPERIENCE AND SENIOR DESIGN PROJECTS

Firmware Engineer – Wireless Networks

Trilliant Networks, Inc. | Cary, NC | **July 2021- July 2022 & Feb 2023 - present.**

As a Firmware Engineer at Trilliant's wireless team, I developed, upgraded, and tested software for various products in Trilliant's RPMA (point-to-point) 900 MHz and Mesh 2.4 GHz network, including streetlight controllers (SLCs), ANSI power meters and water meter interfacing units (MIUs). Furthermore, I worked closely with customers to provide support and design IoT solutions/demos for them. Some of my specific responsibilities included:

- Developing software in C/C++ for Trilliant's Spectra ANSI meter with RPMA (point-to-point) 805.15.4 900 MHz network interface card (NIC). The project requires adding various features in the NIC to support wired and OTA reading/updating of standard, manufacturing and procedure tables for ANSI meters.
- Leading product development for Trilliant's water MIUs, which involves testing firmware/hardware developed by vendors for Trilliant's RPMA 805.15.4 900 MHz network, creating unit tests, and assisting the software team with driver development.
- Creating dashboards, remote control software, and testing applications using Node-RED, JavaScript, Influx DB, Prometheus, Oracle DB, MySQL DB, Nginx, and Grafana.
- Configuring and setting up Linux servers to host various services, applications and dashboards.

Wireless Software Engineer

Amazon.com, Inc. | Cupertino, CA | **July 2022- Feb 2023**

As a Wireless Software Engineer at Amazon's Just Walk Out Technology, I designed, developed, and implemented software for wireless networks. Some of my key contributions include:

- Designing and implementing a software library and an application using Contiki-NG OS and C/C++ to create a Frugal Event Detection Device (FRED) on an EFR32BG processor. The library included various APIs for efficient data reading, timestamping, packetization, and transmission of data. The application included various processes to send lwm2m/COAP message through high-speed UART via tunslip6 to a lwm2m server.
- Creating a load cell validation (LCV) library for an 805.15.4 2.4 GHz network coordinator using Contiki-NG and C/C++. The LCV library includes various APIs that enable the device to collect ADC data for a specific time interval, sort it, find the median, and send the two most recent medians to an app for validating the installation of the wireless smart shelf.

- Developing a debug Command Line Interface (CLI) for the 805.15.4 2.4GHz network's edge device's deep sleep mode. The CLI enables communication with the edge node at a baud rate of 9600 during deep sleep and at a baud rate of 115200 during normal mode.
- Creating dashboards and unit tests with JavaScript in Node-RED to evaluate network performance, including monitoring packet loss, data throughput, and latency for the wireless network. I also developed a demo that showcased these dashboards and their functionality using a Raspberry Pi.

Electrical Engineer – Wireless Embedded Systems IoT

South Dakota State University, Agricultural and Biosystems Engineering | Brookings, SD | **Jan 2020 – May 2020 & Dec 2020 – July 2021**

At SDSU, I designed a LoRaWan-enabled remote monitoring system for a swine facility that allowed users to monitor the status of feeders, fans, and heaters through a webpage. My system architecture included LoRaWan sensor nodes connected to a LoRaWan gateway, through which data was sent to Google Firebase and displayed on a webpage.

- Designed and engineered a non-invasive, easy-to-use LoRaWAN-enabled sensor node using Arduino Uno, Arduino Mega, and a LoRaWAN shield for long-distance data transmission.
- Created a C# interface that receives data serially from an Arduino and sends it to the database.
- Designed the backend of the website using Google Firebase.
- Developed the frontend of the website using HTML, CSS, and JavaScript.
- Configured the network gateway using The Things Network.

Electrical Engineer – PLC & HMI Firmware

Banner Engineering | Aberdeen, SD | **May 2019- August 2019**

At Banner Engineering, I designed a PCB fixture to hold and stabilize PCBs while they were being soldered, and automated six industrial ovens by creating a timer system to avoid errors associated with manual time tracking. I also designed electrical control panels and updated existing designs. Some of my specific responsibilities included:

- Designing the PCB fixture using the CLICK PLC, a Banner safety controller, relays, and a Banner touch photo-electric sensor.
- Designing the oven timer system to accept and record heating time and update employees once the devices are heated. This required using the CLICK PLC, CMORE HMI, an indicator light, and a photo-electric sensor.
- Designing neat and easy-to-fix control panels for the ovens and conveyor belts in the Banner production facility.

Senior Design Project – Network Configuration Dongle

Daktronics Inc. | **South Dakota State University, Electrical Engineering** | Brookings, SD |**August 2019 – May 2020**

At SDSU, I designed a configuration dongle to fetch and reconfigure Daktronics' display controller's network settings without the use of any form of network. The dongle communicates using USB 2.0 and can change the network mode, hostname, IPv4 address, netmask, and gateway of the display controller.

- Designed the dongle using an ATSAMD21 Arm Cortex processor and developed its firmware using Arduino IDE and embedded C. I also interfaced the processor with an OLED display and tactile pushbuttons to create an easy-to-use user interface.
- Wrote a .NET C# application to act as a driver for the dongle, allowing the display controller to recognize and initiate communication with it. The application was also coded to send the current system network settings to the dongle and update them as commanded.
- Designed a PCB board to house the processor, display, and pushbuttons.

Senior Design Project – Electrical Engineering Research

South Dakota State University, Math and Computer Science | Brookings, SD | **August 2018- May 2019**

At SDSU, I developed a gaming system that is reactive to the player's brain status. The gaming system's internal logic will trigger different game events while measuring player's brain response using the Electroencephalography signals (EEG) headset. And later build the player's profile that will be used to train a machine learning model.

- Researched and created an emotion model that can be used to classify player's brain responses from the EEG signal acquired from the Open BCI EEG headset.
- Collaborated on creating a 2D space shooter game with 3-levels (easy, medium, and hard) using Unity game engine.
- Collaborated on creating a machine learning model using Keras and TensorFlow.

ADDITIONAL INFORMATION

GitHub: https://github.com/hdubey-debug?tab=repositories