ASHISH **UPADHYAY**

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Professional Summary

Electrical and Electronic Engineer with 6+ years of Experience in **designing Electronics sub-systems & Firmware Development**, Hardware Validation, spanning across multiple Industries (**Research, Healthcare and Consumer Electronics**). Expertise in providing one stop solutions from Architecture Development, PCB designing, Automating Hardware

- Embedded Software Design & Hardware Development
- Simulations (Multi-Physics, SPICE)
- Wireless Protocol (BLE, TCP & UDP based)
- PCB designing (Schematic Capture & Component sourcing)
- Signal Processing (Filter, Buffer, Converter, Amplifier)
- Scripting for Gang Programming and Automated Testing

Professional Experience

Meta Platform inc., **California, US**
Product Validation Engineer, AUG 2022 – Present

- **SOC & Memory Validation Suite Development:** Designed and implemented a standardized test code targeting CPU, DSP, and memory sub-cores, analyzing workload, power impact, and memory wear-out. Automated testing reduced manual effort by 100% and saved hundreds of man-hours.
- **Firmware development & CI:** Authored firmware tests for Flash, eMMC, CPU, DSP, DRAM, and GPU, covering 100% of code pushes. Tests prevented performance regressions, ensuring software and hardware reliability.
- **Coexistence Testing & Mitigation:** Led testing of high-frequency components, identifying aggressors and victims. Recommended design, electrical, and software changes, improving system performance and reducing interference.
- **Factory Testing & FATP Development:** Developed and implemented factory testing scripts, ensuring smooth production and high-quality products.
- **Technical Expertise:** Demonstrated expertise in AI, CPU, DSP, GPU, and memory technologies, driving product innovation and improvements. Helping Meta develop KPI's for current & future products.

Perigon Health 360, (formally TESPO), **Michigan, US**
Embedded Engineer NOV 2020 – AUG 2022

Develop Embedded Ecosystem for IoT connected **Prescription Dispenser**, that facilitates, **Tracks, Logs and Notifies** user about the **Regiment,** Increasing General Adherence and Compliance of these medication.

- Developed the Hardware, Design the **PCB & Firmware** base for a Wireless (**WIFI, BLE & LTE**) Dispenser
- Establish the **AWS base cloud architecture** for said dispenser (IoT Core, Dynamo DB, API, Cognito, S3, Lambda, Alexa Skill)
- Establish production process for these **10,000+ dispensers**, with gang Programming 3 ICs, Automating Testing and Calibration of each PCB

New York University, New York, US
Research Assistant, Power Lab, and Medical Robotics Lab SEPT 2018 – AUG 2020

Both the labs required Hardware development, **Firmware Design & APIs Development** for peer-to-peer wireless communication,

- Devising a scheme for Quasi Dynamic **Wireless Charging** of Vehicles, using a **Class E power Amplifier** & achieved approx. 80%. efficiency
- Design a Wearable for Covid detection (**NSF Funded**), for Disease marker Analysis.
- **HW & FW** Design for Filtering **low amplitude signals (Such as EMG)**

Technical Skills

ELECTRICAL:
P/LT-Spice • Multi-Layer Printed Circuit (PCB) Board Designing, ALTIUM

ELECTRONICS:
Circuit Design • Schematic Capture • Signal Processing & Filtering • Wired & Wireless Communication Protocols

PROGRAMMING:
C • C++ • Python • Real-Time Operating Systems (RTOS) • AWS suite

WORKING KNOWLEDGE:
Ansys Maxwell & HFSS • MATLAB & Simulink • Windows Embedded & C# • HTML, CSS, and Java Script • Machine Learning Algorithms • Verilog & VHDL • GAMS

Projects

Medication Dispenser

- Design the Electronics 'and PCB for a prescription-based online Dispenser
- Establish the IoT backend, ensuring the data encryption, Production flow & OTA updates
- Write cloud-based logics (AWS Lambda) for Physical & Backend automation
- Write Free RTOS base, Firmware to establish BLE, Wi-Fi, LTE Connection alongside Sensor, and Motor Control
- Write Alexa Skill for Automated Dispensing and prescription status
- Design UI for Customer Service team for getting the dispenser status and debug it
- Solve EMI (conductive & emitted radiation) problem in the Alpha Build, to meet UL & Class B requirements

The Feinstein Institute for Medical Research, Northwell Health, **New York, US**

Research Assistant, Bioelectronics & Sensing JUN 2019 – MAY 2020

For Two semesters JUN 2019 – AUG 2019 & JAN 2020 – MAY 2020 Performed benchtop and **in vitro/in vivo** experimental studies on **neurological implants** Creating a prototype device that provides single-channel, constant-current monophasic stimulation to vagus nerves. While charging the implant inside the Host's body (Mice)

- Designed and Evaluated Implantable micro-electronic devices developed for **neuro-stimulation and recording**.

Compac Industries India Limited, **New Delhi, India**

Engineer Automation, Research and Development JAN 2018 – AUG 2018

Developed custom solution as per every customer specs, study the Contract for Functional Specifications and produce the most viable solution for the reported demand or problem

- Engineered three **intrinsically safe** Products for Data Acquisition & Processing and dynamic Control from Concept Development to End Product
- Developed a central Server for storage of Live Data & Dynamic Control of all the installed equipment, Using TCP/IP, MQTT and WebSocket's protocols

Education

New York University, Tandon School of Engineering, New York MAY 2020

Master of Science, Electrical Engineering

ABES Engineering College, APJAKTU, NCR, India JUNE 2016

Bachelor of Technology, Electrical and Electronics Engineering

SCADA for CNG dispensing Station over WAN (per ATEX guideline)

- Module to Update & Monitor Data on **MODBUS over RS-485, I2C, SPI, UART for 100+** CNG dispenser already deployed
- Full Duplex Transmission over **Web Wi-Fi (802.11bgn) and LAN**
- Scripting Wireless Networking & Display Driver Schemes to update Live changes and increase web Stability with LTE
- Code Software Applications to enable remote printing, Email or Whats app/Message using **SMTP and developer API**, with Vehicle Plate Snap using Onboard Camera

Wireless High-Power Transfer System (for Moving Vehicle)

- Designing of **Class E Amplifiers, Class D Amplifiers** & **H-Bridge** configuration, with operating frequency of 13Mhz (**International Automatic Control Conference, CACS Doi: 10.1109/ CACS47674.2019.9024729**)
- Control Circuits Design for Power Management & Conversion, Dynamic Charging, and Isolation
- Pre analysis using **Ansys Maxwell** for Coil Design

Neuromodulator

- Use MIT 4 Coil system to power up an implant of **size 15X18X1.4mm**
- Design a Class E Amplifier for Debug the Hardware to ensure the Modulator (**Analog Current Pump** controlled by Interrupts), Sensors (**SPI I2C & Analog Scaling**) and Communication (**RF/NFC**)
- Ensuring the communication and Wireless power are within the threshold with **Multi-physics Simulation**
- Test design of each PCB for the Stress conditions of Rx Power, Communication Output & EMC Immunity

Wireless Rehab Module

- Develop Hardware & Software to read **IMU, Stereo Mic, temperature Heart rate and blood O2**, in a form factor **smaller than Quarter dollar**
- Send out the data remotely over **Wi-Fi & classic Bluetooth**
- Design the firmware so that the compute module displayed and **Hosted data with live plot on a webserver**

Real Time Video Processing

- To **recognize gestures** in the form of hand symbols Rock, Paper, and Scissor, via Webcam and wrote a game play script as per the rules of ROCK PAPER SCISSOR
- Sent the data over web to an embedded controller controlling six stepper motors of **a Bionic Arm** enabling remote gesture mimicking