

Aditya Bhalerao

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My engineering experience has equipped me with strong Electrical engineering and Data science fundamentals with hands-on experience in PCBs, sensors, analog design, and embedded systems. I have 2 years of work experience including a year of research lab experience leading a team as an electronics engineer for developing Quantum Technologies using Control systems, High speed digital design, FPGAs, Analog circuit and PCB design, along with a year working as an IoT product development intern using sensors.

EXPERIENCE & INTERNSHIPS

I-Hub Quantum Technology Foundation , Indian Institute of Science Education & Research, Pune

Jun 2024 - May 2025

Research Fellow - Electronics engineer

- Accomplished high-speed Photodiode signal acquisition and FPGA-based control systems for laser frequency stabilization in THz.
- Accomplished full design cycle including researching, component selection, designing schematics & layouts, simulating, building, debugging and testing 4-layer PCBs for Photodiode Transimpedance amplifiers and low-noise dual-mode power supplies.
- Developed error-phase detection logic with FPGA Xilinx Z7 and STM32H753ZI using Verilog, Vitis HLS and C to calculate diode laser frequency and pursue laser locking reducing costs by 15%.
- Developed High-voltage piezo controllers/ actuators for controlling piezo stacks.
- Experience working with oscilloscopes, VNAs, function generators, DMMs, experience with Python for scripting & test automation.
- Worked with He-Ne, ECDLs and Mach-Zehnder Interferometer, aligning and optimizing the optical paths for fringe formations.
- Contributed to the team building an indigenous laser locking system for a Calcium ion trap, reducing costs by around 90%.

Waterapp Technologies Pvt Ltd., Pune

Jul 2023 - Dec 2023

IoT Product development Intern

- Engineered a cost-effective IoT-based water depth measurement prototype for monitoring water levels using Load cell principle with integrated GSM and RF considerations, and Li-Po and TP4056 linear charger used for rural and agro wells reducing costs by 20%.

Indian Meteorological Department (IMD), Pune

Oct 2023 - Jan 2024

ML Intern

- Developed ML python models for rainfall prediction using data observation techniques, contributing to more accurate weather predictions by analyzing meteorological datasets using gridded data and formats such as NETCDF and GRIB.

PROJECTS

Wearable smart ring - Prototype I

- Implemented a 2-layer FPCB for smart ring with Nordic nRF52832 BLE SoC, curved Li-Po arc, PPG and IMU functionalities. Researched and designed with bend-radius considerations, BOM layout, and validation via 3D-printed enclosure in Fusion 360.
- Designing with NIR spectroscopic methods for blood glucose measurement (Non-invasive) using 940nm LEDs.

Designing an ESP32 IoT 4-layer PCB

- Engineered a 4-layer IoT PCB featuring an ESP32, sensor interfaces, regulated power supply with user controls. Completed end-to-end design including schematic creation, PCB layout, and routing. Generated Gerbers and BOM for manufacturing.

LSTM based prediction for Full-stack Weather Forecasting with Cloud Visualization Platform

- Integrated BMP280 and DHT11 weather sensors with Raspberry Pi to stream environmental data via MQTT into a dockerized stack including InfluxDB, Grafana, Node-RED and Portainer. Implemented an LSTM-based predictive model for forecasting.

SKILLS

Analog circuit design, PCB Design, Sensors and Actuators, Digital logic design, Power electronics & BMS, Electro-optics & Photonics
Embedded systems & Microcontrollers, ML/AI, Digital Signal processing, Communication protocols, IoT & wireless systems

EDUCATION & CERTIFICATIONS

Btech, Electronics and Telecommunications engineering
College of Engineering, Pune (COEP)

Diploma, Data Science

Indian Institute of Technology (IIT), Madras

ACM summer school, IoT and next gen networks

KARE, Madurai (**Achievements - Top 20 in India**)

LANGUAGES, SOFTWARES AND TOOLS

Python (Pandas, Numpy, Seaborn, Sci-kit, Sci-py, PyTest),
C/C++, Verilog

LTspice, KiCad, TINA-TI, Proteus, NI Analog discovery,
Altium, Ngspice, ArduinioIDE, LabVIEW, STM32CubeIDE,
MATLAB, Portainer, AWS IoT, Node-RED, Fusion 360, JMP
I2C, USB, SPI, UART, PCIe, Ethernet, Arduino, Raspberry PI,
Node MCU ESP8266, ESP 32 A1S, STM 32, Nordic nRF