ABHILASHA

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Education

Malaviya National Institute of Technology, Jaipur **2021 – 2025**
B.Tech in Electrical Engineering *CGPA: 7.41*
Navjeevan Shikshan Sansthan Sr. Sec. School, Sikar, Rajasthan **2020**
Intermediate / +2 (RBSE) *Percentage: 89.40%*

Experience

Software/Firmware Engineer Intern | *N*XP Semiconductors **January, 2025 – June, 2025**

- Contributed to multiple projects across ARM Cortex M0+, M4, and M7, including HSM firmware development for S32K3XX and S32ZE automotive MCUs.
- Worked on security concepts including secure boot, key management, and cryptographic algorithms.
- Built demos and custom firmware for leading OEMs, along with unit test cases to validate API functionality and ensure reliable software behavior.
- Automated release processes using Python scripts and shell tools, reducing manual intervention by 90% and improving reliability of CI/CD workflows.
- Worked on code coverage, Improved code coverage by 7% through enhancing and implementing effective test cases.
- Utilized the open-source compliance tool Black Duck to detect and mitigate vulnerabilities, ensuring adherence to software license policies and compliance with secure development lifecycle standards.

Projects

Agri Guard: IoT-Based Smart Irrigation System

- Developed an IoT-based smart irrigation and weather alert system using Arduino UNO and ESP8266 Wi-Fi module for real-time field monitoring and control.
- Integrated DHT22, soil moisture, rain, and flame sensors to monitor soil and environmental conditions with precise data logging.
- Programmed using Embedded C/C++ (Arduino) to automate water pump control via a relay module based on sensor thresholds and weather forecasts.
- Build a cloud-based SMS alert system using Node.js and Twilio API for remote warnings, triggered via lightweight cloud functions from ESP8266.

Deep Learning-Based RSMA Optimization for RIS-Aided THz Massive MIMO

- Built a deep learning model framework to optimize RSMA in RIS-assisted THz massive MIMO systems; the model's predictions enhancing overall network performance for 1,000+ devices.
- Developed Transformer-based neural networks for efficient precoding, channel estimation, and signal processing.
- Integrated tools like Python, PyTorch, TensorFlow, NumPy, and Matplotlib for model training, evaluation, and visualization.
- Evaluated multiple feedback mechanisms (csiNet, GMMV-LAMP) and compared performance using NMSE and throughput metrics.
- Explored use cases including enhanced signal reliability and spectral efficiency under different transmission scenarios.
- **Technologies:** Python, PyTorch, TensorFlow, RIS, THz MIMO, Transformer, NMSE, csiNet, GMMV-LAMP

Technical Skills

Languages: C, C++, Embedded C, Python, JavaScript
Developer Tools: Linux, Kernal, CMake, VS Code, GHS, Git/GitHub, Bitbucket, Jenkins, JIRA, MATLAB
Embedded Systems: SoC-based boards (flash/flashless), secure boot, ARM architecture, AES encryption, HSM, RTOS, FGPA, Linux kernel, Makefiles, Linker Files, Android environment, firmware, device drivers
Debug & Testing Tools: TRACE32 (Lauterbach), JTAG, OpenOCD, DSO, test board handling, CI/CD pipelines
Communication & Protocols: OSI & TCP/IP, USB, SPI, I2C, UART, CAN, LIN, Ethernet
Digital Design & Architecture:: Verilog/SystemVerilog basics, UVM exposure, computer architecture concepts

Relevant Coursework

- Digital Electronics
- Analog Electronics
- Algorithms
- Electronic Circuit Design
- Operating Systems
- OOP Concepts
- Computer Networks
- Data Structures

Achievements

- Qualified for the JPMorgan Chase **"Code for Good"** Hackathon 2023, selected among top applicants for showcasing innovative problem-solving and collaborative skills in a real-world tech challenge.
- Secured **2nd Runner-up** at **Sphinx Tech Fest 2024** for *Smart Industrial Safety Helmet*, recognized for its real-time embedded safety and industrial impact.