

Manas Manohar Punjabi

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EDUCATION

California State University, Chico May 2026
M.S. in **Electrical and Computer Engineering** - 3.7 GPA
Chico, CA
Coursework: Advanced Embedded Systems, Embedded Digital Design, Digital Signal Processing, Machine Learning, Deep Learning, Secure Computing

University of Mumbai, Dwarkadas J Sanghvi College of Engineering May 2021
B.S. in **Electronics Engineering**
Mumbai, India
Coursework: Microcontrollers and Applications, Embedded Systems and RTOS, Digital Systems, Instrumentation, DSP, Internet of Things (IoT)

EXPERIENCE

Embedded Firmware Engineer Mar 2024 to Jul 2024
Frinso Technologies Mumbai, India

- Developed **OTA firmware updates** for version upgrades, field customization, and recovery support on deployed **ESP32** devices, improving update reliability across customer installations.
- Programmed an **ESP32** sensor hub with **Modbus and UART** multisensor integration, **SD card** local data storage, and deep sleep low power modes, improving battery life by 50% while maintaining reliable sensor logging.
- Developed a local **WiFi AP** configuration webpage for the sensor hub, enabling real time setup of customer selected sensors, network parameters, and deployment settings with minimal installation effort.
- Integrated a **SIMCom GSM** module with ESP based firmware to detect water level emergencies, trigger event based notifications, and send SMS alerts to authorities.

Embedded Firmware Engineer Mar 2022 to Sep 2023
Bar Code India Pune, India

- Collaborated on an **RFID toll reader** achieving **200 tags/s** with **99% accuracy**, transmitting toll data to cloud providers through **MQTT** and to a local app through **sockets** across **WiFi, 4G, Ethernet**, and **BLE** with WiFi AP and web configuration.
- Designed **BLE beacon and gateway firmware** using **nRF52 SoC** with **Zephyr RTOS** and **ESP32** based **IoT** support for zonal tracking, mobile app integration, and wireless asset telemetry.
- Prototyped a **BLE gateway** delivering **5 m** static asset location accuracy using **RSSI based tracking** and evaluated **AoA** and **AoD** concepts for moving assets.
- Delivered **96%** step detection accuracy by developing **accelerometer** based wearable **pedometer** firmware with real time app broadcasting for labor fatigue monitoring and activity tracking.

ACADEMIC PROJECTS

Industrial Hazard Sensor Embedded Firmware and IoT Dashboard CSU Chico, 2026
Tiva TM4C123, TivaWare, Embedded C, Raspberry Pi, MQTT, FastAPI, WebSocket

- Designed and implemented reusable **Embedded C** device driver modules for **GPIO, ADC, I2C, UART**, and **SysTick**, enabling OLED UI control, button input, DHT11, MPU6050, gas, and sound sensor integration with filtering, calibration, fault handling, and MQTT dashboard alerts.

Secure ECIES Client-Server Communication CSU Chico, 2026
C, mbedTLS, TLS, ECDH, HKDF-SHA256, AES-256-GCM, TCP/IP

- Built a **C/mbedTLS** client-server security application using TCP sockets, certificate-verified TLS, and an ECIES-style hybrid encryption layer with ephemeral ECDH, HKDF-SHA256 key derivation, AES-256-GCM encryption/authentication, nonce/tag handling, serialization, and Base64 message packaging.

Crop Classification & Monitoring with Remote Sensing and ML CSU Chico, 2025–2026
Google Earth Engine, Python, MATLAB, CNNs, Random Forest, Sentinel-2

- Published SPIE research developing a parcel-level Sentinel-2 crop classification workflow for Almond, Alfalfa, and Uncultivated AG, fine-tuned VGG16, ResNet-50, and GoogLeNet and benchmarked them against GA, mRMR, and ReliefF Random Forest models, achieving up to 84% testing accuracy. DOI: 10.1117/12.3095166

Matrix Multiplier in SystemVerilog CSU Chico, 2025
SystemVerilog, ModelSim, Xilinx FPGA

- Implemented and verified a parameterized **4 by 4 matrix multiplier** in **SystemVerilog**, simulated in **ModelSim** and synthesized on a **Xilinx FPGA**.

TECHNICAL SKILLS

Languages	C, C++, Embedded C, Python, SystemVerilog, MATLAB, JavaScript
Firmware and RTOS	Bare Metal Firmware, Peripheral Drivers, Board Bring Up, FreeRTOS, Zephyr RTOS, RTOS Tasks, Queues, Semaphores, Interrupts/ISRs, Timers, Low Power Modes, OTA and DFU, Firmware Validation
MCUs and Platforms	STM32, ESP32, nRF52, Tiva TM4C123, Raspberry Pi, Arduino, Xilinx FPGA
Interfaces	I2C, SPI, UART, RS 232, RS 485, Modbus, USB, BLE, NFC, WiFi, Ethernet, MQTT, TCP/IP, GPIO, ADC, PWM
Debug and Tools	JTAG and SWD, Logic Analyzer, Oscilloscope, Git, STM32CubeIDE, nRF Connect SDK, TivaWare, Keil, Eclipse, VS Code, ModelSim, Eagle, Proteus
Security and Cloud	mbedTLS, TLS, ECIES, ECDH, AES-256-GCM, HKDF-SHA256, FastAPI, WebSocket, HiveMQ