SONU KANAGALA

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EDUCATION

Master of Science, Internet of Things, Northeastern University, Boston, MA *May 2026*
Coursework: Embedded Systems, Wireless Sensor Networks, Digital Signal Processing, RF/Microwave Circuits, Machine Learning

Bachelor of Technology, Computer Science, GITAM University, India *Apr 2024*
Coursework: Microprocessors & Microcontrollers, Sensor Technology & Instrumentation, Industrial IoT, Wireless Sensor Networks, Cloud-based IoT, Python Programming, Data Structures, Database Management Systems, Quantum Computing, Computer Architecture

SKILLS

Microcontrollers & Firmware: STM32, ESP8266, C, C++, interrupts, timers, GPIO, UART, I^2C, SPI, state machines, register level bring up

Test & Validation: oscilloscopes, logic analyzers, DMMs, signal tracing, test plans, pass fail tables, root cause analysis

Electromechanical & Sensors: ultrasonic, ECG front end, soil moisture probes, actuator interfacing basics, feedback and calibration workflows

Tools & SW: Python test scripts, Linux shell, Git, Wireshark, MATLAB, Node-RED, MQTT/HTTP telemetry, documentation and SOPs

Foundations: analog and digital concepts, filtering basics, data structures, algorithmic efficiency, requirements to test mapping

EXPERIENCE

Embedded & Network Automation Intern — Healthcare Applications *May 2024*
Department of CSE, GITAM University

- Built a microcontroller driven vitals pipeline integrating SpO_2, ECG, BP sensors with C firmware and Python tools delivering < 2 s telemetry refresh and 90%+ agreement across 10+ validation runs
- Authored Linux friendly provisioning scripts with retries, health checks, timestamped logs reducing setup effort 60% and improving fault recovery 70% over 20+ cycles
- Produced wiring diagrams, configuration steps, acceptance checks enabling 3 repeatable builds with 0 rework and < 15 min bench bring up
- Verified links with oscilloscopes, logic analyzer captures, and Wireshark traces creating pass fail tables reusable by QA and hardware teams

PROJECTS

Wireless Sensor Network Simulation & Validation — Northeastern University *Mar 2025*

- Implemented C++ counters for retry and backoff behavior in ns 3 exporting CSV and PCAP artifacts across 40+ Linux runs for deterministic analysis
- Achieved $\sim$ 30–35% fewer retransmissions and $\sim$ 20–25% lower 95p latency with RTS CTS using Python parameter sweeps and figure ready plots
- Correlated traffic timing and metadata with $> 95\%$ alignment in Wireshark supporting test reports and review

Smart Crop Monitoring System — GITAM University *Apr 2024*

- Integrated calibrated sensors with a microcontroller and Wi Fi telemetry achieving < 5 s cloud latency and 90% accuracy across 200+ samples over 100 m^2
- Authored setup and calibration SOPs with labeled connectors and acceptance checks yielding 0 build errors and < 10 min field swap time
- Implemented duty cycling and bounds checking extending node uptime to 48+ hours and rejecting outliers before aggregation

Autonomous Vehicle Interaction Simulation — Northeastern University *Jan 2025*

- Combined ultrasonic sensing and short range RF presence with temporal filtering in MATLAB reaching 95% detection across 10+ scenarios with < 2 s alerting
- Generated confusion matrices and latency histograms mapping requirements to test outcomes for review

FIT FOR FORMLABS ELECTRICAL ENGINEERING INTERN

- Design prototype and validate electronics and electromechanical subsystems by bringing up microcontrollers, sensors, and interfaces with oscilloscopes and logic analyzers and by writing C firmware plus Python test scripts
- Move between analog and digital domains by applying filtering basics, timing analysis, and structured test plans tied to system requirements
- Collaborate across hardware, firmware, and test to make clear design decisions and document steps so builds are repeatable and ready to ship