PAVAI VENDHAN GANESAN

M.Sc. Electrical Engineering & IT Student — Embedded Systems, Electronics and Communication

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PROFESSIONAL SUMMARY

Master's student in Electrical Engineering and Information Technology at Deggendorf Institute of Technology, specialising in Electronics and Telecommunication. Hands-on experience across embedded systems, custom PCB design, physical-layer network testing and industrial network security (Modbus/TCP over SSH), complemented by laboratory characterisation with SEM and AFM. Structured, detail-oriented approach to testing, measurement and documentation, backed by a peer-reviewed IEEE publication. Seeks an internship or working-student position in embedded systems, hardware testing and communication technology to apply this practical skill set in an industrial environment.

SKILLS & INTERESTS

Hardware & Embedded Systems: ESP32, KiCad, PCB Design, Raspberry Pi, Arduino

Protocols & Networking: Modbus/TCP, SSH Tunneling, Wireshark, TCP/IP, I2C, 1-Wire

Software & Programming: Python, C++, pymodbus, Matplotlib, Matlab, Simulink

Laboratory & Analytical Equipment: Zeiss Ultra 55 SEM, DI Dimension 3100 AFM, Nanoscale Imaging, Surface Analysis

Languages: English - C1, German - B1 (learning), Tamil - Native

WORK EXPERIENCE

Network Hardware & Test Engineer Intern - Thamizhaga Cable TV Communication Ltd. – Ranipet Division Oct 2023 - Jul 2024

Ranipet, India

- Managed the physical layer infrastructure for a regional broadband and digital television network, conducting continuous signal attenuation testing and hardware fault debugging across optical fiber and coaxial distribution nodes.
- Validated, configured, and deployed Optical Network Terminals (ONTs) and Digital Set-Top Boxes, ensuring firmware stability, proper MAC/PHY layer initialization, and robust Ethernet and RF connectivity prior to network integration.

Blockchain & Web3 Research Intern - Kairaa Tech Serve Apr 2023 - Sep 2023

Chennai, India

- Researched Web3 protocols, dApps, and smart contract architecture to support technical strategy.
- Analyzed industry trends and blockchain consensus mechanisms for the development team.
- Achievement: Delivered a foundational research report on layer-2 scaling solutions that shaped the product roadmap.

PROJECTS

Industrial Cybersecurity: SSH Tunneling for Modbus/TCP - DIT

- Architected a cryptographic mitigation strategy to secure legacy SCADA/ICS networks in 3 weeks, encapsulating vulnerable, plaintext Modbus/TCP traffic within an AES-encrypted Secure Shell (SSH) tunnel via local port forwarding.
- Developed a virtual PLC testbed in Python (pymodbus, sshtunnel) and utilized Wireshark for deep packet inspection, successfully proving 100% data confidentiality and HMAC integrity against eavesdropping and data injection attacks.
- Engineered an automated benchmarking suite via Makefile to stress-test the architecture with 1,000 concurrent TCP requests, evaluating its viability for resource-constrained embedded edge gateways.
- Analyzed system metrics using Matplotlib, proving the security wrapper added a negligible 0.33 ms latency overhead while unexpectedly optimizing global CPU utilization from 39.7% down to 14.3% through superior OS-level TCP stack management.

Non-Contact EMF Voltage Tester & Custom PCB - Independent Hardware Project

- Engineered an analog non-contact AC voltage tester utilizing a Triple Darlington Pair transistor configuration, achieving a 1,000,000x (10^6) current gain to amplify microscopic electromagnetic fields.
- Designed a custom 2-layer, 120mm x 20mm printed circuit board (PCB) in KiCad across 4 iterations, optimizing trace routing to fit a slim, pen form factor for safe use in 15+ crowded electrical panels.
- Innovated a custom, unshielded spiral copper trace antenna directly on the FR4 substrate, achieving 99.2% reliability in detecting 50Hz/60Hz live AC currents through thick PVC insulation with sub-millimeter fault localization accuracy.

- Optimized the circuit for ultra-low power consumption, reducing draw by 45% and allowing the onboard 5mm LED and 3V piezo buzzer to operate for 120+ hours on a single CR2032 coin cell battery.

IoT-Based Driver Drowsiness & Alcohol Detection System - B.E. Thesis Project

- Designed an automated vehicle safety system using an Arduino microcontroller and a 780–1400 nm infrared sensor to track eye-blink frequencies, successfully detecting driver fatigue in under 1 second.
- Built an intoxication prevention system using a 5V MQ-3 sensor with a 20-second preheat time, cutting vehicle power and alerting on elevated ppm levels.
- Interfaced an IoT Wi-Fi module and a NEO-6M GPS—featuring a 5Hz position update rate and -162 dBm tracking sensitivity—to continuously broadcast the vehicle's live coordinates to a cloud dashboard.

EDUCATION

Deggendorf Institute of Technology Mar 2025 - Present

M.Sc., Electrical Engineering and Information Technology - Electronics and Telecommunication (ENS) Deggendorf, Germany

- Key modules: Embedded software development, Advanced programming techniques, Micro- & nanoelectronics, and Modern radio frequency.

Goethe-Institut Chennai Aug 2024 - Feb 2025

German Language Course Chennai, India

Saveetha Engineering College May 2019 - Mar 2023

B.E., Electronics and Communication Engineering, 87.2% Chennai, India

- Key Modules: Embedded Systems, Microprocessors & Microcontrollers, VLSI Design, Wireless Sensor Networks, MEMS & NEMS.

CERTIFICATIONS

Embedded Systems with AI

Build MATLAB Proficiency

Software Development in MATLAB

Introduction to Cybersecurity

Python Excellence

Computer Networks and Internet Protocol

PUBLICATIONS

Drowsiness Detection in Drivers Using Facial Analysis and Computer Vision — AI and Knowledge Discovery in Concurrent Engineering

IEEE ICECONF 2023 (Chennai, India) 2023

ACHIEVEMENTS

Chairperson - Yi Yuva Entrepreneurship, Saveetha Engineering College 2022–2023

Organiser - Umagine Chennai: Organiser: Umagine Chennai 2023 2023