Gururaghuraman Sethuraman

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Executive Summary

Embedded Systems & Electrical Engineer specializing in PCB design, hardware development, motor fault diagnostics, and database architecture for engineering data systems. Author of 2 IEEE publications on IPMSM demagnetization fault detection combining Finite Element Analysis (FEA) with machine learning. Hands-on experience across PCB design (KiCad 9, LTspice), embedded firmware (Embedded C), CAN bus validation on live high-voltage (HV) testbeds, and relational database design, gained through roles at Robert Bosch, Schneider Electric, and AInsurCo. Targeting Embedded Systems, PCB Design, Hardware Engineering, Automotive Electronics, or EV Powertrain Engineering roles.

Professional Experience

AInsurCo — Aug 2025 – Present

Database Architect & Python Developer - *Remote* — *London, The United Kingdom*

- Designed and maintained 10+ relational database schemas/tables supporting core insurance data operations, applying normalization and indexing best practices.
- Wrote and optimized 30+ SQL queries and stored procedures for reporting, validation, and data-retrieval workflows across the platform.
- Resolved 15+ data-integrity and schema-consistency issues through constraint enforcement and automated validation checks.
- Built 5+ Python automation scripts to run scheduled batch jobs (30% of role scope, with database architecture as primary focus) supporting data processing tasks on the database layer.

Robert BOSCH Limited — June 2024 – July 2024

Embedded Hardware Intern - *On-site* — *Bangalore, India*

- Developed and validated 5+ Embedded C firmware modules implementing CAN communication layers for EV benchmarking infrastructure and VCU interfaces.
- Analyzed 100+ CAN frames using CANalyzer, performing frame-level logging, DLC verification, error-state capture, and fault-injection analysis across 3+ live HV testbeds.
- Contributed to technical evaluation of E-axle architecture across 2 HV subsystem configurations, documenting integration behavior per internal test protocols.

Schneider Electric — July 2023 – July 2023

Supply Chain Intern (Electronics Division) - *On-site* — *Chennai, India*

- Validated 150+ PCB components across power-electronics manufacturing lines, identifying non-conformances against design specifications.
- Analyzed component lifecycle and supply dependencies for 8+ critical converter subsystems, supporting procurement risk assessment.

Igarashi Motor Pvt Ltd — Feb. 2023 – Feb. 2023

Manufacturing and Quality Intern - *On-site* — *Chennai, India*

- Audited motor assembly workflows across 3+ production stations, identifying redundant checkpoints and contributing to an estimated 10–15% reduction in inspection cycle time.
- Reviewed and improved BOM accuracy for 20+ line items, strengthening defect-traceability documentation for small-motor production.

Sri Balaji Assembles and Plastics India Pvt Ltd — July 2022 – Aug. 2022

Quality Intern (Electronics Assembly) - *On-site* — *Chennai, India*

- Supported IPC/ISO-compliant quality control checks across 50+ electronic sub-assembly units.
- Collaborated with production teams to isolate component-level defects across 10+ assembly batches, reducing rework cycles.

Education

Grenoble-INP PHELMA — Jan. 2025 – June 2025

Erasmus Exchange Program in Nanotechnology — *Grenoble, France*

- Coursework: Advanced CMOS, Microsystems, Advanced VLSI, Spintronics, Semiconductor Physics, Nanoelectronics

Amrita Vishwa Vidyapeetham — Apr. 2021 – May 2025

Bachelor of Technology in Electrical and Electronics Engineering — *Coimbatore, India*

- Coursework: Embedded Systems, Microprocessors & Microcontrollers, Power Electronics, Control Systems, Electric Drives, Simulation & Modeling

Publications

Demagnetization in V-shaped IPMSM: A Fusion of Finite Element Analysis and Machine Learning
IEEE CONECCT, June 2025

Machine Learning-based Analysis on Non-uniform Demagnetization Fault in IPMSM Using FEM
ICPERS, May 2025

Projects

Li-Ion Battery Protection PCB | *KiCad 9, LTspice, Git* **Personal Project**

- Designed a manufacturing-ready 2-layer PCB (90×40 mm, 11 components) for a single-cell Li-Ion battery with reverse-current protection (Schottky diode), 500 mA resettable PTC polyfuse, and a 100kΩ/100kΩ voltage divider with 100 nF filter capacitor for ADC-compatible battery voltage monitoring.
- Performed manual PCB routing, implemented copper ground pour, generated fabrication-ready Gerber and Excellon drill files, completed DRC with zero errors, and validated circuit behaviour using LTspice simulation. Full BOM and engineering documentation produced.

Demagnetization Fault Prediction in IPMSM using ML | *ANSYS Motor-CAD, Python* **April 2025**

- Trained and evaluated ML models across 10+ fault-severity classes using FEM-simulated datasets for early-stage detection of permanent-magnet demagnetization in EV-class IPMSM units, enabling predictive fault-monitoring for electric drivetrains.

SOH Prediction for LiFePO4 Batteries using ML | *Raspberry Pi 4, Python, MS Excel* **June 2024**

- Built a regression pipeline trained on battery cycling data collected across 50+ charge/discharge cycles to predict State of Health, providing lifecycle decision support for EV battery management systems.

Comparative Study of Subsystems in 32-bit RISC Processor | *Vivado* **Jan. 2025**

- Designed and implemented 3 core subsystems (ALU, data memory, register file) in Verilog HDL, synthesized and tested across multiple FPGA configurations for timing and resource-utilization comparison.

MTJ-based Random Number Generator | *Python* **May 2025**

- Developed and tested a stochastic solver for Magnetic Tunnel Junction (MTJ)-based random number generators across 25+ simulation trials for low-power embedded applications.

Technical Skills

Languages: C, **Embedded C**, **Verilog**, **Python**, **SQL**
Database & Data Systems: Relational Database Design, **Schema Architecture**, **Query Optimization**, **Batch Processing**, **Data Integrity**
Microcontrollers & Platforms: STM32, **dsPIC**, **ESP32**, **Arduino**, **Raspberry Pi**
Protocols: CAN, **UART**, **SPI**, **I2C**
Control Systems & Power Electronics: Motor Control, **Inverter Subsystems**, **HV Architecture**, **IPMSM Diagnostics**
Automotive & EV Tools: CANalyzer, CANoe (basic), **EV Benchmarking**, **VCU Interface Testing**
EDA & Simulation: MATLAB/Simulink, **ANSYS Motor-CAD**, **Vivado**, **KiCad 9**, **LTspice**, Multisim, ETAP, AutoCAD
PCB & Hardware Design: PCB Design, **PCB Layout**, **Schematic Capture**, **PCB Routing**, **Analog Circuit Design**, **Component Selection**, **Ground Plane Design**, **DRC**, **ERC**, **Gerber Generation**, **Bill of Materials (BOM)**, Manufacturing Documentation
Software/Tools: Git, **Docker**, **CI/CD**, MPLAB X

Languages

English- C1 (IELTS - 7.0) **Deutsch**- A1 (GOETHE) **Tamil**- C2 (Native) **Telugu**- C2 (Native)