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Shivaprasad V

System Design Engineer — Embedded & Communication Systems

About Me

System Design Engineer focused on embedded systems, communication systems, and real-time signal processing. Experienced in building end-to-end hardware–software systems with emphasis on latency, reliability, and measurable system performance.

Education

2025 - 2028 **Bachelor in Electronics and Communication Engineering**
Madras Institute of Technology

2022 - 2025 **Diploma in Electronics and Communication**
Sri Sairam Polytechnic College - **CGPA: 9.7**

Skills

Programming C, C++, Python, MATLAB, Embedded C

Hardware & System Design PCB Design, Signal Integrity, Hardware–Software Integration, Telemetry Systems, Ground Station Design, Sensor Fusion, Digital Twin Simulation, GNU Radio

Analysis & Validation Real-Time Systems, Reliability Testing, Fault Analysis, Latency Optimization, System Validation, End-to-End System Design

Experience

2025 **R&D Intern - CE+T Power Solutions**
Power Electronics

- Conducted testing on inverter systems under thermal and fault conditions
- Assisted in identifying failure cases and validation scenarios
- Performed reliability and stress testing under different operating conditions

2024 - 2025 **R&D Intern - Sri Sairam Techno Incubator Foundation**
Embedded Systems & PCB Design

- Developed embedded firmware and integrated hardware with software
- Designed PCB layouts with emphasis on signal integrity and reliability
- Performed debugging, testing, and validation during development

Research

2025 - 2026 **Wireless Occupancy Estimation via RSSI Signal Processing**
Madras Institute of Technology, Anna University

- Developed RSSI-based occupancy estimation without dedicated sensors
- Designed statistical filtering pipeline and signal feature extraction methodology achieving 89.47% classification accuracy

2024 - 2025 **Echo Lync - RSSI Based Localization**
Sri Sairam Polytechnic College

- Implemented localization logic using wireless signal strength from distributed receiver nodes
- Optimized the system for low-latency tracking and stable real-time position updates

Projects

1. **Adaptive Signal-Driven FIR Filter System**
   - Designed and implemented a real-time signal processing system on Arduino UNO performing acquisition, adaptive filtering, and output reconstruction
   - Achieved 40 kHz sampling rate using interrupt-driven ADC and register-level optimization
   - Implemented circular buffering for continuous, non-blocking data flow
   - Implemented automatic cutoff frequency identification and dynamic filter configuration with manual override
   - Established 1 Mbps serial communication with ~17 ms input latency
   - Achieved ±4 Hz frequency accuracy compared to input signals
   - Maintained ~18% CPU utilization during operation
   - Supported filter configurations up to 10th order, with 4th order used during real-time operation

2. **Stellar Crest — CubeSat ADCS Prototype**
   - Built a prototype CubeSat attitude determination and control system using ESP32, MPU6050, and three reaction wheels
   - Acquired IMU data at 50 Hz and implemented complementary-filter-based Roll, Pitch, and Yaw estimation
   - Designed a cascaded PID controller with outer angle loop and inner velocity loop for three-axis stabilization
   - Developed a real-time digital twin for simulation, controller tuning, and deployment validation
   - Implemented telemetry visualization, command uplink, and event logging through a custom ground station
   - Built an SDR communication link using ADALM Pluto devices operating at 862–868 MHz with CPFSK modulation
   - Added 256-channel CSPRNG frequency hopping and GNU Radio signal processing for resilient RF communication

3. **AM Optical Communication Link**
   - Built transmitter and receiver for DSB-FC based optical communication
   - Performed signal conditioning and evaluated system performance under noise and bandwidth constraints
   - Implemented modulation and demodulation with experimental validation

4. **Delay Based Slope Sign Modulator and Demodulator**
   - Built a prototype slope sign modulation and demodulation system using delay-based signal comparison
   - Evaluated system behavior under varying input frequencies and waveform conditions

5. **RTOS-Based Multi-Core Embedded System**

- Implemented dual-core task scheduling using RTOS with semaphore-based synchronization
- Integrated MQTT communication between ESP32 and Python systems
- Achieved <1 ms task switching latency and ~10 ms communication delay
- Structured system for stable concurrent task execution

6. **Automated Shoreline Analysis System**

- Developed a Python-based tool for shoreline change analysis
- Processes geospatial data and generates reports, intermediate outputs, and statistical summaries
- Designed for automated execution without manual intervention

Presentations

2025 **Conference Presentation**
"Wireless Occupancy Estimation via RSSI Signal Processing"
Engineering Advances 2025 International Conference

2024 **Technical Workshop Instructor**
"PCB Design and Manufacturing"
Sri Sairam Techno Incubator Foundation

Professional Training

2026 **Workshop on Satellite Systems, CubeSats & Remote Sensing,**
CEG Campus, Anna University

2025 **ROS Training Program,**
Sri Sairam Techno Incubator Foundation

2024 **INUP-i2i Electronics & Measurement Techniques.**
Indian Institute of Technology, Madras

Languages

Tamil Native Language

English Professional Proficiency

Hindi Intermediate Speaker