Sanjay Ganapathy Viswanathan

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Executive Summary

I bring a dynamic combination of technical expertise, problem-solving, and innovation across computer vision, AI, embedded systems, and automation. With proven experience in designing IoT-enabled systems, secure networking protocols, and smart industrial prototypes, I specialize at the intersection of Electronics and Computer Science. My work spans developing vision-based depth estimation systems, wireless charging automation for AGVs, AI-driven fault diagnosis in power systems, and cross-platform encrypted file transfer protocols. I leverage Python, C++, MATLAB, TensorFlow, OpenCV, and Scikit-learn to design solutions that integrate machine learning, computer vision, and embedded hardware for real-world challenges. Passionate about sustainable and intelligent technologies, I excel in building systems that merge efficiency, scalability, and reliability.

Education

SRM Institute of Science and Technology, Kattankulathur, Chennai **Aug 2024 - Aug 2028**

Degree : B.Tech Major: Electrical and Electronics | Semester 2 – (CGPA – 9.72 /10)

Grade 12 - Central Board of Secondary Education **Apr 2022 - Apr 2024**

82% [English – 92 | Computer Science – 87 | Math – 86]

Projects

Monocular Depth Estimation (YOLO, Monocular Depth Estimation [MiDaS], ToF Sensor, Python, OpenCV, TensorFlow) **Jan 2025 –**

- Sensor Fusion for Depth-Aware AI: Built a system integrating YOLO for real-time object detection, MiDaS for monocular depth estimation, and a ToF sensor for absolute distance measurement. The fusion improves detection accuracy in challenging conditions where vision-only or sensor-only methods fall short.
- Cost-Effective Alternative to LiDAR: Designed an affordable solution for industrial and field applications (e.g., mining, dusty environments) by combining AI-driven depth maps with physical sensor data, enabling robust performance without reliance on expensive LiDAR systems.

ANN-Based Transmission Line Fault Analysis (MATLAB, Python, and Scikit-learn) **Sep 2025 -**

- Generated a synthetic dataset of 10,000+ samples in MATLAB/Simulink, modeling diverse leakage fault conditions to create a robust foundation for a machine learning solution.
- Developed and trained an Artificial Neural Network (ANN) using Python and Scikit-learn to classify fault types and precisely predict their location from simulated electrical signal data.
- Achieved a 82% prediction accuracy on the test dataset, proving the model's effectiveness for creating a rapid, data-driven fault detection system to enhance power grid reliability.

Panda File Transfer Protocol (Python and Socket) **Dec 2024 –**

- Developed Panda File Transfer Protocol using Python socket programming, implemented multi-threading and AES-256 encryption for secure, real-time file transfer across platforms, ensuring data integrity and confidentiality.
- Cross-Platform Compatibility and User Interface: Developed a GUI with automated key exchange, network stability features, ensuring smooth, secure file transfers across different operating systems (Cross Platform).

Vision-Guided Docking System for Wireless Charging of AGVs **Present 2025 -**

- Developing a vision-guided wireless charging system for AGVs using OpenCV and ArUco marker detection, enabling precise autonomous docking and alignment of receiver/transmitter coils.
- Implementing real-time feedback control with PID-based correction, improving charging efficiency and reducing coil misalignment errors by ensuring accurate AGV positioning.
- Edge Ai Deployment for edge processing, leveraging computer vision and lightweight algorithms for reliable, low-latency execution in industrial environments.

SKILLS

Programming & Scripting: Python (Socket, Tkinter, Pandas, OpenCV), C, C++, MATLAB
AI & Machine Learning: TensorFlow, Scikit-learn, MiDaS, Edge AI Deployment
Computer Vision & Image Processing: OpenCV, Depth Estimation, SLAM basics
Embedded & IoT Systems: Arduino, NodeMCU, Raspberry Pi, RTOS (Real-Time OS Scheduling)
Networking & Security: Socket Programming, Multi-threading, Cross-platform Communication
Virtualization & Systems: Type 1 & 2 Hypervisors, VMware, VirtualBox
Communication Protocols: I2C, UART, SPI
Domain Applications: Smart Grids, Autonomous Vehicles (AGVs), Industrial IoT, Power System Fault Analysis

HONORS

1) Highlighted In India's prestigious ingenious Tinkerers Book for my Innovation - (National)

2) Youth Ideation (#National Top 100) for my Innovation in Improving the farmer's agricultural business - (National)

3) India's Future Tycoons (#National Top 400) For Innovation in Improving Air Quality -(National)

4) Smart India Hackathon (Top32 Nationally) in AgriFoodTech Category| 1:1Presentation with industry leaders| Ideated to reduce food wastage & a new revenue stream for farmer