HARSHA VARDHAN GUNTREDDI

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Summary

A highly motivated Computer Science student with hands-on experience in Full-Stack Development, Data Science, and Machine Learning. Proven ability to write reusable, testable, and efficient code through complex projects in IoT, deep learning, and distributed systems. Seeking to leverage expertise in software development and system design to contribute to innovative user-centric solutions.

Experience

Project Intern *India*
SONY-SSUP *Dec 2024 - Jun 2025*

- Developed an Edge-based Cyber-Physical System (CPS) using Spresense and STM boards to optimize solar drying in a smart polyhouse.
- Engineered a real-time data acquisition system with Daisy Seed 1.1 and SPRESENSE, integrating an IoT sensor network to enhance agricultural efficiency.
- Designed a robust FreeRTOS architecture with mutex-protected queues for fail-safe inter-task communication and error handling.
- Integrated SHT21 sensors, ESP32 for WiFi, and GSM modules for cellular backup to upload sensor logs and images via MQTT/FTP.

Education

Amrita University *Coimbatore, India*
Bachelor of Technology in Computer Science and Engineering *Sep 2022 — Jun 2026*

Projects

Distributed Video Communication & Streaming Platform *Python, Flask, Nginx, Prometheus*

- Architected a unified platform for on-demand streaming and real-time multi-node video calling, optimized for low latency on a local network.
- Implemented agent-based load balancing with a Flask API using the Join-the-Shortest-Queue algorithm to manage resources.
- Engineered an adaptive bitrate streaming solution to ensure a smooth user experience based on real-time network conditions.
- Deployed Prometheus and Grafana for comprehensive, real-time performance monitoring and system health insights.

Pneumonia Detection in Chest X-Rays via Transfer Learning *Python, TensorFlow, Keras*

- Achieved 93% accuracy in binary classification of pneumonia by engineering a deep learning diagnostic model with a VGG16 backbone.
- Implemented a two-stage transfer learning protocol and on-the-fly data augmentation to significantly boost predictive performance.

Deep Learning Framework for Adaptive Encryption in Edge Systems *Python, RNNs, Raspberry Pi*

- Developed lightweight ASCON and GIFT encryption algorithms to protect edge devices from differential, integral, and cube attacks.
- Designed a dynamic RNN-based security model to adapt encryption techniques based on real-time threat.

Blockchain Project: Quantum-Secure Ledger *PoW, ECDSA, SHA-256*

- Built a lightweight blockchain with ECDSA-based transaction signing and SHA-256 hashing to ensure tamper-proof data integrity.
- Designed a miner node (Ubuntu) to validate transactions via Proof-of-Work (PoW) with adjustable difficulty.
- Simulated attacks (e.g., double-spend) to test robustness, achieving a 100% detection rate.

Home Lab Self-Hosted Infrastructure *Proxmox, Docker, Ubiquiti*

- Designed and deployed a PoE-based Network Attached Storage (NAS) system running on TrueNAS Core.
- Self-hosted a full-stack website, Plex Media Server, and a dedicated Minecraft server.
- Established a robust home network using Ubiquiti gear, including a self-developed VPN and a Dockerized ad-blocking DNS server on a Raspberry Pi.

For a more comprehensive look at my work, please visit my GitHub profile.

Certifications

AI ML *Jan 2025*
IIT Madras (onsite)

IoT Automation with Raspberry Pi *Jan 2025*
IIT Madras (onsite)

AWS Academy Graduate - Cloud Foundations *Aug 2025*
AWS Academy

Technologies

Languages: Python, Java, C, C++, JavaScript, Go, Scala, Prolog, Embedded C

Web Development: React, Node.js, Express, Flask, HTML/CSS, RESTful APIs, Tailwind CSS, Bootstrap

Data Science ML: TensorFlow, Keras, Scikit-learn, OpenCV, NLTK, Matplotlib

Cloud DevOps: AWS, GCP, Azure, Docker, CI/CD, Jenkins, Prometheus, Grafana, Nginx

Databases Version Control: SQL, NoSQL, Git, GitHub

Core Competencies: Full-Stack Development, Distributed Systems, Machine Learning, IoT, Scalability, Networking (TCP/IP), Data Structures Algorithms, System Design, Security