Siddharth Jain

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SUMMARY

I'm a versatile engineer who loves tackling new challenges and doing my best to excel in them. With a strong background in embedded systems, reinforcement learning, and DevOps, I bring a reliable and adaptable approach to my work. I'm eager to apply my skills and passion to help drive success in your organization.

EDUCATION

Arizona State University — Tempe, AZ
Master of Science, Robotics and Autonomous Systems - Thesis — May 2024
Focus: Embedded Systems, Reinforcement Learning, Deep Learning, Multi-Robot Systems, Optimal Control

D. J. Sanghvi College of Engineering — Mumbai, IN
Bachelor of Engineering, Mechanical — May 2022

TECHNICAL SKILLS

Languages	Python, Embedded C/C++, MATLAB, SQL, Bash, Terraform
Software	Docker, ROS2, Gazebo, Rviz, Solidworks, Arduino IDE, Altium Designer, Jenkins, Git
Frameworks	PyTorch, FreeRTOS, FastAPI, OpenCV, Tesseract OCR
Hardware	Raspberry Pi, SX12xx, NVIDIA Jetson, ESP32, Atmega 328, ARM Cortex-M
Protocol	NRF BLE, CAN Bus, ZigBee, LoRa, MQTT, Ethernet, Wi-Fi, SPI, I2C, LoRaWAN, UART, TCP, UDP
AWS	IoT Core, Lambda, Sagemaker, OpenSearch, DynamoDB, S3, EC2, API Gateway, SQS, Insights, Redis

WORK EXPERIENCE

Enterprise Technology — Oct 2022 - Present
ML Ops and AI Development Engineer — Tempe, AZ

- Developed a **Python library for accessing 45 LLM** models, routing between **vision and audio using Lambda** and API Gateway.
- Deployed **Terraform plans** to create and manage **AWS clusters** and instances for **POC, beta, and production** stages.
- Managed **SQS for Lambdas** via Terraform and deployed multi-stage **Dockers on Kaniko** for continuous deployment.
- Architected LLM deployment on AWS Lambda using **binaries in C**, achieving **10 tokens/sec**, optimizing cost-efficiency.
- Integrated text-to-speech, **speech-to-text**, and **facial recognition** on a robot head running on Raspberry Pi using **multi-threading**.
- Added **Lambda Insights** for memory profiling. Effectively **reducing the memory required** for every lambda and saving cost.

Embedded Systems Engineer — Tempe, AZ

- Implemented **AES-128 encryption** to enhance the security of custom **UHF mesh networks** using MQTT on an edge device.
- Engineered a **BLE LoRa mesh** network on **ESP32 for SOS** alerts, significantly improving emergency response efficiency.
- Optimized **MPU9250 sensor** in IoT trackers, extending battery life to 1 year by enabling **deep sleep mode**.
- Maintained a **LoRa and LoRaWAN mesh** network with **25 nodes** to track golf carts on campus via **MQTT on AWS**.

Bio-Inspired Robotics, Technology and Healthcare Lab — Dec 2022 - Present
Graduate Student Researcher - Thesis — Tempe, AZ

- Automated **friction analysis of PDMS** pads on curved surfaces, leading 180 experiments for thesis research.
- Designed a 3-axis testing apparatus with a 6-axis load cell and a **PID controller**, achieving robust control.
- Controlled **UR-16e 6-axis robotic arm** for load-carrying tasks and designed a **SpaceMouse controller in ROS**.

DJS KRONOS INDIA — Mar 2019 - May 2021
Vice Captain — Mumbai, IN

- Led the design of a **4WD ATV** on Simulink, achieving a **17% increase in operational efficiency**; awarded 2nd Best 4WD Team.
- Built a DAQ system using the **GSM SIM 900** module on a Raspberry Pi Zero via **ThingSpeak Communication**.

PROJECTS

Dexterous Manipulation with a Robotic Hand | Reinforcement Learning, Actor Critic, Python, Linux

- Developed an Advantage Weighted Actor-Critic algorithm to enhance the performance of a 6-DoF robotic hand.
- Achieved up to a 20% improvement in dexterous manipulation success rates.

Multi Robot Search & Rescue | ROS2, RTAB, OpenCV

- Developed a decentralized quadcopter swarm with Potential-Field and Frontier Exploration algorithms for 3D mapping.
- Validated the swarm's ability to produce 100x100 grid maps in Gazebo, simultaneously avoiding local minima.

Custom LoRa & Ethernet Communication Board | ESP32 S3, PCB Design, FreeRTOS, Embedded C

- Designed a 4-layer PCB with ESP32 S3, focusing on LoRa and Ethernet integration using FreeRTOS and dual-core processing.
- Employed Xtensa LX7, RFM95W LoRa, and LAN8720 Ethernet, integrating 50-ohm impedance control for RF integrity.

UAV Line Follower Drone | Simulink, Edge Detection

- Developed a line follower function for the Parrot Mambo Mini-Drone, identifying specific HSV values of the track within 20 ms.
- Deployed via Simulink, achieving a 95% accuracy rate using edge detection to detect the edges of the track.