Siddharth Jain

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EDUCATION

Arizona State University, Tempe, USA **Expected May 2024**
Master of Science, Robotics and Autonomous Systems *GPA: **3.78/4***
Relevant Coursework: *Reinforcement Learning, Deep Learning, Optimal Control, Multi-Robot Systems*

D. J. Sanghvi College of Engineering, Mumbai, India **May 2022**
Bachelor of Engineering, Mechanical *GPA: **8.74/10***
Relevant Coursework: *Structured Programming Approach, Industrial Electronics, Robotics, Machine Design*

TECHNICAL SKILLS

Languages	Python, C++, Embedded C, MATLAB & Simulink, SQL, PowerShell
Software	Docker, ROS2, Gazebo, Solidworks, Linux, Arduino IDE, Altium, Microsoft Office
Frameworks	Tensorflow, Scikit-Learn, PyTorch, React Native, FreeRTOS
Cloud Services	AWS IoT Core, Lambda, Timestream, DynamoDB, S3 Buckets
Hardware	Semtech SX12xx, NRF BLE, ESP32, SAMD21, Arm Cortex-M, ATmega, Raspberry Pi, PCB Design
Protocols	SPI, I2C, CAN Bus, UART, ZigBee, LoRa, Wi-Fi, BLE, MQTT, Ethernet, NFC

WORK EXPERIENCE

Embedded Systems Engineer **Oct 2022 – Present**
Enterprise Technology *Tempe, AZ*

- Developed a UHF mesh protocol with AES encryption for cart tracking, using embedded C++, LoRa, MQTT, and AWS IoT Core. Enabled a BLE mesh network for SOS signals on ESP32 with React-Native, improving emergency response efficiency by 20%.
- Created AWS Lambda functions with API Gateways and Timestream for real-time location capture, enhancing system-cloud interoperability and data retrieval speed by 30% with Python and JavaScript.
- Optimized mpu9250 for deep sleep acceleration-based interrupt in IoT-based cart tracker, extending battery life to 3 years.

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

- Architected an advanced 3-axis linear cartesian robot, incorporating a 6-axis load cell with a closed-loop controller. Developed in Python for embedded Linux environments, this innovation enhanced precision by 15%, contributing to more accurate results.
- Innovatively designed and crafted gripper pads with curved textured surfaces using Polydimethylsiloxane (PDMS) polymer. This development empowered the LTI robot to achieve friction-based mobility on curved surfaces of varied materials and textures

Vice Captain **Mar 2019 – May 2021**
DJS Kronos India *Mumbai, India*

- Led the electric ATV team, using Simulink for vehicle simulation, achieving a 17% increase in efficiency.
- Engineered a DAQ system with GSM SIM 900 Module and Raspberry Pi Zero, transmitting sensor data through the ThingSpeak Communication Library, demonstrating embedded C++ proficiency and optimizing data acquisition.

ACADEMIC PROJECTS

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

- Analyzed on-policy methods and Monte-Carlo return methods, achieving a 20% enhancement in success with the Advantage Weighted Actor Critic. Merged offline data with online tuning for precise robotic functionality. Employed reinforcement learning in a Linux environment to optimize a 6 DoF robotic hand's skill acquisition.

Self Balancing Platform | *MATLAB & Simulink, Inverse Kinematics, PID Tuning*

- Engineered a closed-loop PID controller for Stewart platform using Simulink, optimizing ball motion stability. Reduced Steady State Error through integral tuning, enhancing responsiveness to 0.5 seconds, and demonstrated control principles implementation.

UAV Line Follower Drone | *MATLAB, Simulink, Edge Detection*

- Pioneered a Line Follower function for the Parrot Mambo Mini-Drone, using edge detection techniques to calculate the nearest edge. Identified specific HSV values of the track within an astounding 20 ms using Simulink, culminating in a 95% accuracy.

Machine Learning for Fraud Detection | *Python, TensorFlow, LSTM, Deep Learning*

- Designed a fraud detection system using machine learning, including one-hot encoding and TensorFlow, on a dataset of 1 million bank transactions. Achieved a 97.2% accuracy rate through validation and preprocessing in Python.

Dynamic Pathfinding in Complex Environments | *Python, Matplotlib, Algorithm Design, Dynamic Programming*

- Developed and compared advanced pathfinding algorithms (A*, Dijkstra's, DFS, BFS) using Python. Adapted them to real-world scenarios with moving obstacles, achieving path lengths of 24-25 steps and times ranging from 0.0011 to 3.288 seconds.

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

- Developed a communication board integrating Xtensa LX7, RFM95W LoRa, and LAN8720 Ethernet for connectivity. Implemented a 4-layer PCB design with 50-ohm impedance control for RF signal integrity, using embedded C and FreeRTOS. Crafted concurrent tasks, OTA updates, and power management for enhanced efficiency and reliability.