Siddharth Jain

+1 (623) 326-7382 tellsiddh@asu.edu [linkedin.com/in/tellsiddh/](https://www.linkedin.com/in/tellsiddh/) [github.com/tellsiddh](https://github.com/tellsiddh) [www.tellsiddh.com](https://www.tellsiddh.com/)

# EDUCATION

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| **Arizona State University, Tempe, USA Expected May 2024**  [Master of Science, Robotics and Autonomous Systems](https://drive.google.com/file/d/1Y9mR41qhEuClIk_S0FfX5IGGk68GIOPv/view?usp=sharing) *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](https://drive.google.com/file/d/1EK2GAxSud9VAEfF_BGgw6Pj2z7uDS-Bi/view?usp=sharing)  *Relevant Coursework: Structured Programming Approach, Industrial Electronics, Robotics, Machine Design*  **TECHNICAL SKILLS** | | | *GPA: 8.74/10* |
| **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**  **WORK EXPERI** | | SPI, I2C, CAN Bus, UART, ZigBee, LoRa, Wi-Fi, BLE, MQTT, Ethernet, NFC | |

**Embedded Systems Engineer Oct 2022 – Present**

## [Enterprise Technology](https://tech.asu.edu/about) 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*](https://birth.engineering.asu.edu/) *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](https://www.instagram.com/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**](https://github.com/tellsiddh/awac-implementation)[|](https://github.com/tellsiddh/awac-implementation) [*Reinforcement Learning, Actor Critic, ROS, Python*](https://github.com/tellsiddh/awac-implementation)

* 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**](https://github.com/tellsiddh/stewart-platform-for-object-balancing)[|](https://github.com/tellsiddh/stewart-platform-for-object-balancing) [*MATLAB & Simulink, Inverse Kinematics, PID Tuning*](https://github.com/tellsiddh/stewart-platform-for-object-balancing)

* 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**](https://github.com/tellsiddh/UAV-line-follower)[|](https://github.com/tellsiddh/UAV-line-follower) [*MATLAB, Simulink, Edge Detection*](https://github.com/tellsiddh/UAV-line-follower)

* 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**](https://github.com/tellsiddh/fraud-detection-ml-statistical-analysis)[|](https://github.com/tellsiddh/fraud-detection-ml-statistical-analysis) [*Python, TensorFlow, LSTM, Deep Learning*](https://github.com/tellsiddh/fraud-detection-ml-statistical-analysis)

* 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**](https://github.com/tellsiddh/dynamic-path-finding)[|](https://github.com/tellsiddh/dynamic-path-finding) [*Python, Matplotlib, Algorithm Design, Dynamic Programming*](https://github.com/tellsiddh/dynamic-path-finding)

* 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**](https://github.com/tellsiddh/esp32-lora-ethernet-board)[|](https://github.com/tellsiddh/esp32-lora-ethernet-board) [*ESP32 S3, PCB Design, Embedded C, FreeRTOS*](https://github.com/tellsiddh/esp32-lora-ethernet-board)

* 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.