Shahmeel Naseem

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EDUCATION

Georgia Institute of Technology **Aug 2024 – May 2026 (Expected)**
Master of Science in Robotics – GPA 3.70 Atlanta, GA
University of Maryland, College Park **Aug 2019 – May 2023**
Bachelor of Science in Bioengineering – GPA 3.55 College Park, MD

EXPERIENCE

Georgia Tech Research Institute **May 2025 – Present**
Graduate Research Assistant Atlanta, GA

- Simulate pattern coverage by variable-scale **multi-agent systems** using **Python**, **Voronoi decomposition**, and **density estimation** on image-derived spatial targets.
- Apply **image processing** techniques using **OpenCV** and **scikit-image** to extract coverage patterns from input images, enabling agents to match and track evolving target distributions.
- Develop **decentralized algorithms**, validate system-level behavior, and visualize **swarm** performance to support research in autonomous multi-robot coordination.

Robotarium **Feb 2025 – Present**
Research Assistant Atlanta, GA

- Conduct research at a remotely accessible swarm robotics testbed for validating algorithms in real-world conditions.
- Migrated backend from MQTT to **ROS2**, designing real-time publisher/subscriber and server/client interfaces in **Python** and **MATLAB** for swarm robotics infrastructure.
- Leading integration of **distance** and **INS** sensors into new robot platforms, including **sensor evaluation**, **hardware interfacing**, ROS2 package development, and **simulation modeling** for accurate **SLAM** and **obstacle avoidance**.

PROJECTS

RoboWrestling **Aug 2024 – Present**
RoboJackets – Georgia Institute of Technology Atlanta, GA

- Design and build a custom autonomous robot including **CAD** modeling (**SolidWorks**), **3D printing**, custom **PCB** design, and **embedded systems** integration for sumo-style competitions.
- Develop **C++** software for autonomous **navigation**, opponent detection, and strategy execution using **state machines**, **sensor fusion**, and real-time **control**.
- Collaborate via **Git** with pull requests and feature branches, supporting **code reviews** and iterative development.

Autonomous Maze Navigation **Jan 2025 – Apr 2025**
Georgia Institute of Technology Atlanta, GA

- Developed **ROS2** packages using **Python** for TurtleBot3 using **LiDAR**, **SLAM**, **PID control**, and image-detection using **OpenCV** for autonomous maze traversal.
- Implemented **path planning**, **localization**, and **sensor fusion** techniques to enable robust navigation of environments.
- Utilized **Ubuntu**, **Bash** scripting, and **Git** for pipeline automation and **version control**; modeled robot **dynamics** and performed real-time **debugging** in simulation and hardware.

Airline Delay Prediction **Jan 2025 – Apr 2025**
Georgia Institute of Technology Atlanta, GA

- Built a machine learning pipeline in **Python** using **Pandas** and **scikit-learn** to forecast flight arrival delays from weather and airline data, emphasizing **data preprocessing** and modeling.
- Applied **feature engineering** and Principal Component Analysis **(PCA)** for dimensionality reduction and data enhancement, improving model robustness and performance.
- Trained and evaluated **Ridge** and **Linear Regression** models using **k-fold cross-validation** and **RMSE** to assess accuracy and tune hyperparameters for generalization.

SKILLS

Technical: Computer Vision | Image Processing | Sensor Fusion | SLAM | Localization | State Estimation | Kalman Filtering | Particle Filtering | Bayesian Inference | Motion Planning | Path Planning | Control Theory | PID Control | Discrete Time Control | Machine Learning | Kinematics & Dynamics | Optimization | Linear Algebra | Embedded System Design | Hardware-Software Integration | Technical Documentation

Software/Tools: Python | C++ | ROS2 | Git | Linux | VSCode | Gazebo | MATLAB | Docker | OpenCV | scikit-image | scikit-learn | NumPy | Jupyter Notebook | SolidWorks | LaTeX