Adnan Amir

617-372-1595 amir.ad@northeastern.edu linkedin.com/in/adnanamir010 github.com/adnanamir010 adnanamir010.github.io

EDUCATION

Northeastern University **Sep. 2023 – Dec. 2025**
Master of Science in Robotics *Boston, MA*

NMIMS University **Jul. 2019 – Jul. 2023**
Bachelors of Technology (Honours) in Mechatronics with minor in Robotics and IoT *Mumbai, India*

EXPERIENCE

Northeastern University - Institute for Experiential Robotics **Sep. 2024 – Present**
Research Engineer

- Led a team of 4 in developing two robotics projects: cold spray **digital twin** saving $200K-1M in equipment costs and **PARIS robot** (E-Robot Prize Finalist) targeting 15% reduction in heating/cooling costs for 60% of MA building emissions
- Architected **GPU-accelerated** cold spray simulation (**NVIDIA Warp**) to train **PINN surrogate models** for non-linear deposition, replacing $60/lb material testing with synthetic data generation on a single RTX 4070
- Implemented **HIL simulation** using **Isaac Sim** with **ROS2** bridge for real robot trajectory capture and **SDF-based** deposition analysis achieving 1.3ms inference; 100x faster than Fast Point Transformer at 140ms
- Deployed **Unitree Go2 + Kinova** platform with **thermal/visual fusion** for hotspot mapping, **PointSLAM/nvblox** for 3D reconstruction, and **cuMotion** for confined space manipulation under $10K target cost

Nordson Corporation **May. 2024 – Jan. 2025**
Robotics and Automation Engineer

- Reworked the most critical subsystem of the assembly line for the company's top-selling product, working with drives, **PLCs, sensors and pneumatics**, increasing uptime by 25% through **flexible automation** and optimal workflow
- Developed and deployed on an **Allan Bradley PLC**, a visual inspection AOI using **Keyence cameras**, leveraging **computer vision and deep learning** to detect defects, reducing scrap rate by 2% and enhancing product quality
- Led efforts as a **Subject Matter Expert** in a Rapid Improvement event, utilizing **lean manufacturing tools** within a cross-functional team to boost operational efficiency, reducing production bottlenecks and waste

Automata Systems **May. 2023 - Jul. 2023**
Robotics Intern

- Developed the software stack and technical documentation for using **EtherCAT** communication protocol with **Raspberry Pi & Panasonic Drives**. using bash scripts and **Linuxcnc – RT**, a low latency OS (Similar to RTOS)
- Designed and Implemented **Debian based RTOS firmware** for a real-time **six-axis robot controller** using C++ and EtherCAT, testing on a custom robot arm hardware prototype which received funding for manufacturing

SKILLS

Programming Languages: Python, C++, MATLAB, C, LabView, Inform III, Codesys and Allan Bradley ladders and ST
Softwares: Fusion360, Solidworks, LABView , Proteus, Gazebo, Simulink, Coppeliasim, Isaac Sim
Tools & Libraries: ROS1/2, Moveit1/2, Pandas, Tensorflow/Pytorch/JAX, QT creator/Tkinter, Orocos-KDL/Drake, cvxopt/Gurobi/Ceres, Linux, Git, Eigen/numpy, OpenCV, gymnasium, Isaac Sim/Gym

PROJECTS

Autonomous Mars Rover **Jul. 2022 – Aug. 2023**
ROS1 | RTAB-SLAM | Solidworks | PCB Design | Various Sensors | Manufacturing

Engineered from concept to prototype, a versatile mobile manipulator with a 4WD base, 5 DOF arm, A KinectV2, **Orbbec 2D Lidar**, IMU, **Garmin GPS**, Temp/Humidity & Soil sensor. Capable of navigation via **ROS Nav** and 3D mapping via **RTAB**. Hardware design included a rocker bogey, 20" tubed tires and Aluminum 6061 chassis

Patrol Bot: Autonomous Security Robots **Jul. 2021 – Aug. 2023**
Tensorflow | Deep Neural Networks | Motion Planning | Camera | IoT | Solidworks | PCB Design

Engineered an inconspicuous surveillance bot designed as a **low-cost** add-on to CCTV systems, automating nightshift monitoring. The system as a whole is implemented as a **swarm** of robots, communicating via **IoT** and using a custom person detection dataset trained on **Inception-V2** for night vision cameras.

PUBLICATIONS

Design and Implementation of an IoT-Based Patrol Robot **2022**
IEEE Bombay Section Signature Conference (IBSSC), Mumbai, India, 2022, pp. 1-6 doi: 10.1109/IBSSC56953.2022.10037325

Design and Analysis of Strawberry-Picking Industrial Robotic Arm **2022**
IEEE Bombay Section Signature Conference (IBSSC), Mumbai, India, 2022, pp. 1-6 doi: 10.1109/IBSSC56953.2022.10037337