Naman Malik

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Education

MAHRAJA AGRASEN INSTITUTE OF TECHNOLOGY (GGSIPU)
BTech. in Electronics and Communication (8.51 CGPA) — ***Aug 2019 - July 2023***

Industrial Experience

Combat Robotics
Sr. Robotics Engineer — ***June 2023 – Till Date***

- **Chassis-less Outdoor UGV:** Created custom **ROS2 controllers** and **Hardware Interfaces** to communicate with low-level system; Worked on efficient video and controls packatization to communicate over **Exicom** Radio;
- Worked on modular multi-robot **Navigation** and **Autonomy stack** of the robot.
  - ◇ Localization with **LIO-SLAM**, dual **RTK GPS**, wheel odometry, and **EKF** achieving ∼2 cm localization; Integrated elevation mapping with **grid maps** in **ROS2**; tuned **MPPI** (MPPI Generic) for dynamic trajectories
  - ◇ Built Off-road **Person-Tracking** and **Auto-Aiming** turret feature via **YOLOv11** with custom **re-ID** implementation.
- **Throwable Spherical Surveillance Drone:** Built the control & communication stack enabling **jumping** and **driving**; Added **autojump**, **face recognition**, and **object detection**; integrated low-latency comms for teleop and surveillance.
- **Outdoor Simulator:** Custom simulator on **GZ-SIM** with custom **GZ plugins** for weather, daylight, and noise; pipelines to generate real terrains from **heightmaps** to bridge **SIM** and **Reality**. (**Project Presentation**)

Acceleration Robotics India
Robotics Developer — ***Jan 2022 – June 2023***

- Created modular pipeline using **ROS2** and **Moveit2!** to create remote labs in order to perform remote experiments using **AWS IOT** web services through using various robotic manipulators. The experiments can be tested in **GZ SIM** in order to test the operations and use the generated trajectories for real ARM.
- Implemented custom costmap layer to integrate **Nvidia's Isaac Nvblox** package for vision based obstacle detection using multiple **realsense** sensors for indoor **AMR** by Peer Robotics. (**Project Post**)
- Developed a **VR** based interface for operating an actual or simulated **UR5** Robotic Arm using **Unity3D Oculus Quest**, **ROS** and **Moveit!** (**Project Video**)

Rigbetel Labs
Freelance Robotics Developer — ***Feb 2021 – Jan 2022***

- Created and description package for a custom robotic arm using **Fusion360** and implement **ROS** Manipulation stack using **Moveit!** to get the **IK** calculation and control the arm.
- Created **ROS**-based software stack & simulation for an **AMR** with an attached **UR5** Robotic Arm.
- Created an open-source object follower package for their product - '**TortoiseBot**' using **OpenCV** and **ROS** to make students familiar with the tech stacks. (**Project Video**)

Research Experiance and Publications

Eyantra Lab, IITB (**Project Presentation**)
Robotics Research Intern — ***June 2022 – Aug 2022***

- Development of an Actual **ROS**-based Mobile Robot that is capable of implementing **SLAM** and **Autonomous Navigation** based applications to teach students and provide students a platform to tinker with.
- Design and Fabricate an easy to assemble and modular mobile base for educational purposes.

Eyantra Lab, IITB (**Project Poster** | **Video** | **Presentation**)
Robotics Research Intern — ***June 2021 – Aug 2021***

- Worked on developing a (**AR APPLICATION**) to simulate and control a **UR5** Arm in augmented reality using **ROS**, **Moveit!** and **Unity3d**.

Augmented Reality Manipulator (**DOI: 10.1109/ICE63309.2025.10983947**)
Publication — ***2025***

- In *Proc. 2025 IEEE International Conference on Innovation in Computing and Engineering (ICE)*, Greater Noida, India, Feb. 28–Mar. 1, 2025. Publisher: IEEE.

Leadership & Extracurricular

ATOM Robotics Lab (**Website** | **Github** | **Insta**)
Co-Founder ***Sep 2021 – Apr 2022***

- Co-founded a robotics society/community with active **50+** club members and **1000+** community members.
- Led major and minor projects to promote project-based learning. Highlights:
- **AJGAR** (Visit Project): 6DOF stepper-based robotic arm with **Cycloidal Gearbox**; object recognition, localization, autonomous pick-and-place; payload up to **2 kg**.
- **MR ROBOT** (Visit Project): Low-cost in-house **RPI4** + **ESP32** based **AMR** for autonomous navigation and vision tasks.
- Conducted seminars/workshops on **GIT**, **Linux**, **ROS**, **Computer Vision** for **100+** students.

Public Contributions & Talks

- Contributed on creating realistic simulation demo's with real world extraterrestrial terrains and modular plugins for dynamic weather conditions and daylight changes for the **Space-ROS** & **GZ-SIM** organisations (**PR Link**)
- Gave a talk in **ROSCON India** about creation of simulations for realistic outdoor environments to bridge the gap between simulation and reality. (**Talk Video**)
- Gave a talk in **ROS-Meetup-Delhi** about addition of weather artefacts and dynamic lighting conditions .

Personal Major Projects

- **FUNCTIONAL WEEDER** (Project Video)
- Implemented an **Auction-based** algorithm in **Elixir** for Fleet Management of two agricultural robots
- Implemented an **A*** based path planning algorithm for robots in **Elixir** for a grid like arena.
- Designed 3D printed a 2 DoF robotic arm with 2 finger gripper for pick & place & wrote an **Elixir GenServer** for arm control using a **Raspberry Pi** & **Servo Driver** module.
- **SAHAYAK BOT** (Project Video)
- Created **ROS**-based software stack & simulation for an Autonomous Mobile Base with an attached **UR5** Robotic Arm.
- Used **Gmapping** to implement **SLAM** & **ROS Navigation Stack** with ROS actions to implement autonomous navigation.
- Implemented A Custom Perception Pipeline to Recognize & Localize objects using **Stereo Camera** and **OpenCV** and **FindObject2D** package .
- Implemented **ROS** Manipulation using **Moveit!** to control the **UR5** robotic manipulator.

Technical Skills

- Programming Languages: **Python** | **C++** | **C#**
- Technologies/Frameworks: **ROS/ROS2**, **Gazebo/GZ-SIM**, **OpenCV**, **YOLO**, **Unity**, **Vuforia**, **Gstreamer**
- DevOps Tools: **GIT**, **Github**, **Docker**, **Linux**
- Mechanical/Hardware: **Fusion360** | **Blender** | **Cura** | **3D Printing**

Awards & Achievements

- **Top 4** among **300 teams** in **EYRC** (**Eyantra Robotics Competition**) **2021/2022** - Received an internship for best robot design for a period 2 months to work on a research project at **IITB**.
- **Top 7** among **500 teams** in **EYRC** (**Eyantra Robotics Competition 2020/21**) - Received an online internship to work on a **AR** based Robotics Research Project.
- **First prize** as team atom in **BVCIAM Hackathon** organized by **BVP**.
- **6th Place** in **IRO 2017** National Level.
- **Best run** in **FLL 2016** Nationals.