Harsh Mahesheka

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Education

- **Indian Institute of Technology (BHU)** — Varanasi, India
  Bachelor and Masters of Technology - Electrical Engineering; ***GPA: 9.7*** — *July 2020 - June 2025*
  w*ith minor in Computer Science and Engineering*

Experience

- **Robotics Research Center, IIIT Hyderabad** — Hyderabad,India
  Research Internship Under Dr. K. Madhava Krishna — *May 2022 - Present*
  - **Reinforcement Learning Based Global Path Planner**: Working on a RL based Global Planner trained to avoid areas of potential bad localization with aim to reduce localisation drift.
  - **Visual Language Navigation**: Working on grounding waypoints on annotated maps by analyzing complex language commands in Indoor Environment.
- **Google Summer of Code - Open Robotics** — Remote
  Student Developer — *May 2022 - Present*
  - **Package Creation Tool**: Created tool for creating template packages for gazebo robotics simulator.
  - **CMake Macros**: Created macros for installing and sourcing worlds, models, plugins etc. in gazebo robotics simulator.
- **Indian Institute of Technology (BHU)** — Varanasi,India
  Research Project under Dr. Shyam Kamal — *Feb 2022 - Present*
  - **Multi Purpose Household Bot** [Link]: Fabricating and designing a mobile bot that could help in day to day household activities like vacuum cleaning,baby care etc.
  - **Autonomous Navigation in Household Environment**: Implemented Mapping, Localisation, Navigation, Frontier Exploration, Human Following etc., algorithms on the bot in simulator.

Skills And Interests

- **Areas of Interests**: Autonomous Navigation, Robot Learning, ROS
- **Languages and Libraries**: Python, MATLAB, C++, CMake, Ruby, PyBullet, OpenCV, Stable Baselines, Carla, Latex, Git
- **Technologies**: Robotic Operating System(1 & 2), Gazebo, Moveit, Autoware, Machine Learning, Reinforcement Learning

Relevant Course's Taken

- **MA-101** Engineering Mathematics, **MA-202** Probability and Statistics, **CSO-101** Computer Programming, **CSO201** Discrete Maths (Ongoing)
- **ME-314** Mechatronics (Ongoing), **EE-211** Linear Control Systems, **EE-313** Modern Control Engineering (Ongoing)
- **ROS for Beginners 1, ROS for Beginners 2, ROS for Beginners 3** by Anis Koubaa on Udemy.
- **Neural Network and Deep Learning** by Andrew Ng on Coursera.

Projects

- **Centralized Multi-Agent Pick Up and Delivery System** [Link]: Designed and fabricated Omni-directional ROS-based mobile robot for warehouse delivery.Implemented CBS-based Multi-Agent Path Planning and Scheduling as Global Planner and PID Tracking based Local Planner.Developed a Centralized Localization mechanism based on Cameras and odometery data.
- **Autonomous Wheelchair**: Implemented Mapping,Localisation,Navigation,Obstacle Avoidance(Static & Dynamic),Human Following,Human Velocity Prediction etc. on a physical wheelchair using both LiDar and RGBD camera (one at a time) in an indoor environment.
- **UAV guided UGV on Mountainous Terrains** [Link]: Navigated a car with help of a drone on a pre-mapped snow-covered hilly area in Gazebo. The project included Road Segmentation from Visual Data for Mapping, UAV Localization Controls and Planning with my major contribution in UGV Localization Controls, and Planning.
- **Cutlery Sorting Arm** [Link]: Designed a 4 DOF arm that could sort cutlery.The project included Deep learning models for object identification with my major contribution of controlling the arm using moveit under ROS framework. This project was done in collaboration with NTU, Singapore.
- **JerBot – a bio-mimetic bipedal robot** [Link]: Formulated an alternate design for biped locomotion, mimicking Jerboa and Fabricated a prototype along with mechanical validation of hardware.My major contribution was improving design based on trajectory testing done through Towr framework.

Achievements

- Got selected for Google Summer of Code'22 as Student developer in Open Robotics.
- Stood first in Robotics Conclave, third in Labyrinth (ROS based maze solver) and first in Scientist of Utopia (Astronomy based Hackathon) at Technex (Annual Technical Fest of IIT BHU).
- Won IAROS 2021 under Industrial Automation Track.
- Came under top 40 teams Nation Wide in Flipkart Grid 3.0 Robotics Challenge.
- Finalist at Vichesta (ROS Based Competition at Annual Fest of IIT Dhanbad)
- Cleared Tabs in multiple International Debates in both English and Hindi. Also won numerous oratory events like Extempore, Debate, JAM etc. at inter and intra college level.
- Secured an All India Rank of 3900 in JEE Advanced Examination; this is the top 0.3% of people that appeared for the national level exam.

Memberships and Leadership

- **Secretary** of **Robotics Club, IIT BHU.**
- **Senior Member** at **RoboReG** (Robotics Research Group at IIT BHU).
- **Debating Lead** at **Literary Club, IIT BHU**.
- **Founding Member** at **Team Artemis** (Consumer Robotics Research Team at IIT BHU).