Harsh Mahesheka
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EDUCATION

Indian Institute of Technology (BHU), Varanasi — **Varanasi, India**

- Bachelors of Technology in Electrical Engineering

CGPA: 9.68 (Till 3rd Semester)
SPI-9.84,9.80,9.38

Jul. 2020 – present

S.K.P. Vidhya Vihar — **Bhagalpur, India**

- Class XII Secondary Education; Percentage: 95.6% — *Jul.2018 – Jul. 2020*

SKILLS AND INTERESTS

- **Areas of Interests**: Autonomous Navigation, Robot Operating System, Robot Learning
- **Languages:** Python, MATLAB, C, C++
- **Libraries**: PyBullet, OpenCV, Tensorflow, OpenAI gym, Keras, Git, Github
- **SKILLS**: Robotic Operating System, Robot Operating System 2, Moveit, Linux, Hardware Implementation

PROJECTS

Centralized Multi-Agent Pick Up and Delivery System **[Link]**

- Designed and fabricated our own Omni-directional ROS-based mobile robot with a delivery mechanism.
- Implemented CBS-based Multi-Agent Path Planning and Scheduling as Global Planner and PID Tracking based Local Planner.
- Implemented Multi ROS master communication between our bots, Jetson Nanos, and laptops.
- Developed a Centralized Localization mechanism based on Cameras, April-tags, and odometry data.
- This project was done for Flipkart Grid 3.0 Robotics Challenge in which we cleared all the initial rounds and are working for further rounds.

JerBot – a bio-mimetic bipedal robot **[Link]**

- Part of team where we have Formulated an alternate design for biped locomotion, mimicking locomotion skills of Jerboa and Fabricated a prototype and did the mechanical validation of our hardware through PID Control, load testing, disturbance rejection, etc.
- Worked on design improvement based on trajectory testing done through Towr framework.
- Implemented PID/LQR based controllers on our custom URDF on Pybulet.

Multi-Purpose Household Bot [Link]

- Designed a multi-purpose household bot that could Vacuum, Autonomously Navigate, follow babies and Detect various threats, among other features under the ROS framework.
- Implemented Navigation stack and Path Planning algorithms on custom URDF, Modeled Airflow of the vacuum system in Solid Works, and Implemented YoloV3 Algorithm for object detection.
- Currently working on creating a Plugin to simulate Vaccum in Gazebo and creating Physical Hardware.

Cutlery Sorting Arm [Link]

- Designed a 4 DOF arm that could sort cutlery, it used Deep learning models for object identification and ROS framework for control.
- We used move_it to control our custom URDF and an on-arm camera for visual data.
- This project was done in collaboration with NTU, Singapore.

Self Balancing Bot

- Implemented DQN based learning algorithm using OpenAI Gym to balance a two-wheeled bot.
- Created a custom environment to test out the algorithms.

RELEVANT COURSES'S TAKEN

- **ROS for Beginners 1**, **ROS for Beginners 2, ROS for Beginners 3** by Anis Koubaa on Udemy
- **Learn ROS2 as ROS1 Developer** by Eduoard Renard on Udemy
- **Complete Python Bootcamp** by Jose Portilla on Udemy

ACHIEVEMENTS

- [ ] Won **IAROS 2021** under Industrial Automation Track.
- [ ] Member and Team Lead at **Roboreg**, Robotics Research Wing at IIT BHU.
- [ ] Finalist at **Vichesta** (**ROS Based Competition** at Annual Fest of IIT Dhanbad)
- [ ] Came under top 40 teams Nation Wide in **Flipkart Grid 3.0 Robotics Challenge** and cleared initial Rounds. Currently working towards future rounds.
- [ ] Cleared Tabs in multiple **International Debates** in both English and Hindi. Also won numerous oratory events at inter and intra college level.
- [ ] Conducted **PyBullet workshops at NTU, Singapore**.
- [ ] 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.
- [ ] Core member at **Literary Club**, IIT BHU.
- [ ] Core member at **Robotics Club**, IIT BHU.