Harsh Mahesheka
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EDUCATION

Indian Institute of Technology (BHU), Varanasi — **Varanasi, India**
- *Bachelors of Technology in Electrical Engineering; GPA: 9.68* — *Jul. 2020 – present*

S.K.P. Vidhya Vihar — **Bhagalpur, India**
- *class XII Secondary Education; Percentage: 95.6%* — *Jul.2018 – Jul. 2020*

PROJECTS

Multi-Agent task scheduling and Navigation for dynamic systems using GNN based communication [Link]

Implemented a GNN based communication with baseline MADDPG and Centralised Omni Directional Navigation for improving task scheduling in a real-world scenario of a warehouse in scheduling package dropping across various parts of the warehouse. We also deployed the algorithm on real robots using ROS, where we built Omni drive-controlled robot completely integrated with ROS.

JerBot – a bio-mimetic bipedal robot [Link]

Formulated an alternate design for addressing the problem of biped locomotion, mimicking the agile and superior locomotion skills of Jerboa. Fabricated a prototype and did the mechanical validation of our hardware through PID control, load testing, disturbance rejection, etc. Also, built a custom Open AI Gym environment for experimenting with various Deep RL, algorithms to learn optimal control strategies. We are currently improving our models based on testing in various simulations like Tower, Pybullet, Mujuco.

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 Deep and neural learning networks(like CNN), Currently working on novel vision-based navigation algorithms and building 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 the project was done under collaboration with NTU, Singapore.

EXPERIENCE

• Working under the guidance of **Dr. Shyam Kamal** for the Multi-Purpose Household Bot Project.

• Working at **Roboreg**, Robotics Research wing at IIT (BHU), Varanasi

• Core member at **Literary Society**, IIT (BHU), Varanasi

SKILLS AND INTERESTS

- **Areas of Interests**: Robot Operating System, Autonomous Navigation, Digital Electronics
- **Languages and Libraries :**
    - o C++, Python, MATLAB, C
    - o CMake, Tensorflow, OpenAI gym, OpenCV, PyBullet
- **Technologies** :
    - o Robotic Operating System, Robot Operating System 2, Moveit

RELEVANT COURSES'S TAKEN

- **ROS for Beginners 1** and **ROS for Beginners 2** by Anis Koubaa, **Learn ROS2 as ROS1 Developer** by Eduoard Renard on Udemy, **Complete Python Bootcamp** by Jose Portilla on Udemy
- **Mathematics**: **MA-101** Engineering Mathematics-I(Real analysis), **MA-202** Probability and Statistics, **EE211** Linear Control Systems

ACHIEVEMENTS

- Won **IAROS 2021** under Industrial Automation Track.
- 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 multiple 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.

MEMBERSHIPS

- o Member and Team Lead at **Roboreg**, Robotics Research Wing at IIT BHU.
- o Core member at **Literary Club**, IIT BHU.
- o Core member at **Robotics Club**, IIT BHU.