

NAVEEN BALAJI

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EXPERIENCE

Graduate Research Assistant

Healthcare Robotics Lab

📅 Aug 2021 – present

📍 Georgia. Tech

- Incorporated collaborative **reinforcement learning** algorithms into assistive tasks to improve human-robot interaction.
- Created various assistive environments in the **physics simulator** to generate datasets for training machine learning policies
- Implemented **human pose detection** in the occluded region using trained deep-learning models.
- Automated the **mobile manipulator robots** to do autonomous tasks like object handover and grasping.

Research Assistant

Intelligent Control lab

📅 Oct 2018 - Apr 2021

📍 IIT Kanpur

- Created an attitude and position estimator using the Kalman filter procedure for indoor localization.
- Designed a novel fail-safe system for drone Positioning and **Posture estimation** without a GPS module.
- Developed a robust **vision-based drone landing** system on the color box, with a precise object tracking technique for search and rescue competition.

TECHNICAL SKILLS

- **Robotics:** ROS, Gazebo, Arduino, OpenCV, Moveit, LabView
- **Frameworks:** Pytorch, Tensorflow, Pybullet, OpenAI Gym
- **Languages:** Python, C++, C, MATLAB
- **Softwares:** GITHUB, HTML, AUTOCAD, Simulink, SolidWorks

ACHIEVEMENTS

- 2021 **General Proficiency Medal** for the best academic performance at IITK among the graduate students
- 2021 **Research Proficiency Medal** for the best undergraduate project work done by graduate students
- 2019 **Gold medal** in **Inter-IIT Techmeet** Aerial Robotics [Search & Rescue competition] conducted by Govt. of India
- 2017 **All India Rank 924** in Engineering entrance [JEE Mains] among 1.2 million students

Relevant Coursework

- **Robotics:** Deep Learning, Human-Robot Interaction, Computer Vision, Robot Intelligence: Planning, Optimal Controller theory, Reinforcement learning specialization
- **Programming:** Optimization Methods, Data Structures and Algorithms, Artificial Intelligence.

EDUCATION

Ph.D. - Robotics

Georgia Institute of Technology, Atlanta

📅 2021 – present

B.Tech. - Aerospace Engineering

Indian Institute of Technology, Kanpur

📅 2017 – 2021

PROJECTS

Human Robot Collaboration

- Developed a realistic human-robot simulation environment to analyze **dynamic human behavior** in the control loop.
- Implemented and evaluated various supervised and unsupervised learning algorithms to complete the given task successfully (**PPO, SAC, A2C, behavior cloning, MARWIL**).

Swarm Robotics

- Designed five ground robots and localized the robots based on aruco markers & infrared sensors.
- Implemented Centralized Multiagent path planning algorithm (**Conflict Based Search**) for desired **shape formation**.

Hand gesture based screen control

- Developed a Human-computer interface by using the depth-camera and projector.
- Implemented **gesture** recognition of the hand and transformed those actions to control the computer interface.

Patent

N. Balaji, M. Kothari, and A. Abhishek. System and method for estimation of yaw angle for an aerial vehicle for autonomous navigation, 2019. **Indian Provisional Patent**

Publications

N. Balaji, M. Kothari, and A. Abhishek. Gps denied localization and magnetometer-free yaw estimation for multi-rotor uavs. In *2020 International Conference on Unmanned Aircraft Systems (ICUAS)*, pages 983–990