Shaunak A. Mehta

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EDUCATION

PhD in Mechanical Engineering — May 2025 (Expected)
Virginia Tech, Blacksburg, VA — GPA: 3.92/4.0

Bachelors of Technology in Mechanical Engineering — May 2021
Indian Institute of Technology, Jodhpur, India — GPA:8.33/10

PUBLICATIONS

- **Shaunak A Mehta** , Yeunhee Kim, Joshua Hoegerman, Michael D Bartlett and Dylan P Losey. "RISO: Combining Rigid Grippers with Soft Switchable Adhesives", arXiv preprint, 2022. DOI: 10.48550/arXiv.2210.15791
- **Shaunak A Mehta** and Dylan P Losey. "Unified Learning from Demonstrations, Corrections, and Preferences during Physical Human-Robot Interaction", arXiv preprint, 2022. DOI: 10.48550/arXiv.2207.03395
- Ananth Jonnavittula, **Shaunak A Mehta** and Dylan P Losey. "Learning to Share Autonomy from Repeated Human-Robot Interaction", arXiv preprint, 2022. DOI: 10.48550/arXiv.2205.09795
- **Shaunak A Mehta** , Sagar Parekh and Dylan P Losey. "Learning Latent Actions without Human Demonstrations", International Conference on Robotics and Automation (ICRA), 2022. DOI: 10.1109/ICRA46639.2022.9812230
- Mithun. P, **Shaunak A. Mehta** , Suril V. Shah, Gaurav Bhatnagar and K.Madhava Krishna. "Student Mixture Model Based Visual Servoing", arXiv preprint, 2020. DOI: 10.48550/arXiv.2006.11347

RESEARCH EXPERIENCE

Graduate Student Researcher — August 2021 - Present
Institute: Virginia Tech
Advisor: Prof. Dylan Losey

- Developed a method to learn latent mappings for complex robot actions without using human demonstrations.
- Developed a method to unite learning from demonstrations, corrections and preferences under one framework.
- Developed a framework for assisted grasping for a soft switchable adhesive mounted on a robot's end-effector.

Undergraduate Student Researcher — July 2019 - May 2021
Institute: Indian Institute of Technology(IIT), Jodhpur
Advisor: Prof. Suril Shah

- Implemented the Basic Visual Servoing algorithm on a Universal Robots UR-5 Manipulator.
- Developed a novel approach for visual servoing based on student t-distribution mixture model (SMM).
- Extracted feature points from an uncooperative tumbling object to create an elliptical track in the image plane. Designed a controller to perform Visual Servoing for tumbling objects using the extracted eleptical track.
- Worked on vision based control and motion planning of a half humanoid robot.

INTERNSHIP EXPERIENCE

MECHATRONICS, INSTRUMENTATION AND CONTROL LAB (MICL), IIT PATNA May 2019 - July 2019
Indian Institute of Technology (IIT), Patna, India
Advisor: Prof.Atul Thakur

Laparoscopic Simulator With 3 DoF Haptic Feedback

- Aimed at the development of a novel kinesthetic haptic device for laparoscopic simulation.
- Worked on user interaction with virtual organs instead of cadavers for realistic experience, for training and improving the skills in surgical process of laparoscopy.
- Achieved force feedback in x and y direction using a cable driven parallel mechanism and in z direction using a ferrofluid based damper and a capstan drive mechanism.

AUTOMATION + MECHANICAL ENGINEERING INTERN, GODREJ INTERIO May 2018 - July 2018
Company: Godrej Interio, Mumbai, India
Advisor: Saurabh Sabu
Design and Development of a Rail Guided Vehicle (RGV)

- Designed and prototyped an automated vehicle for inter plant material transfer to reduce risk of human lives and to improve efficiency.
- Integrated LIDAR sensor for working in an open environment to avoid the obstacles in its path for the purpose of avoiding hazards. Link to Model on Grabcad

SELECTED PROJECTS

Vision Based Control and Motion Planning of a Half Humanoid Robot March 2021 - May 2021
Indian Space Research Organisation (ISRO) Respond Project
Advisor: Prof. Suril Shah

- Set up and controlled the custom half humanoid developed by ISRO using ROS and MoveIt.
- Extracted pose from vision data in 3D Cartesian space to implement motion planning with and without obstacles.
- Implemented eye to hand Image Based Visual Servoing in Joint Space for the custom robot.

Image Based Visual Servoing for Tumbling Objects June 2020 - February 2021
Institute: Indian Institute of Technology(IIT), Jodhpur, India
Advisor: Prof. Suril Shah

- Extracted feature points from an uncooperative tumbling object to create an elliptical track in the image plane. The controller minimizes the error between the current elliptical track and the desired features.
- This algorithm was successfully implemented on a 6 DoF UR-5 robot.
- Focused on grasping of tumbling objects and implementation of the algorithm on a dual arm system for On-Orbit Service.

Vision Based Control of UR-5 Manipulator January 2019 - April 2019
Institute: Indian Institute of Technology(IIT), Jodhpur, India
Advisor: Prof. Suril Shah

- Studied the Basic Visual Servoing algorithm and operation of UR-5 Robotic Manipulator.
- Successfully controlled the position, velocity and acceleration of 6 Degree of Freedom UR-5 manipulator using ROS.
- Multiple feature detection and tracking was achieved with the implementation of visual servoing algorithm.

Bluetooth Controlled Car with Obstacle Avoidance january 2018 - April 2018
Institute: Indian Institute of Technology(IIT), Jodhpur, India

- Interfaced a battery operated vehicle with smartphone with the help of a HC-05 bluetooth module using an Arduino platform.
- Developed an application to connect to and control the car using the smart phone.
- A SONAR interfaced with an Arduino platform was used to scan the surrounding areas for obstacles and accordingly govern the car to safety surpassing the input given by the smartphone.

TECHNOLOGY SUMMARY

- **Software:** Robot Operating System (ROS), MATLAB, Pytorch, OpenCV, Arduino IDE, Fusion 360, COMSOL Multiphysics, SolidWorks, Unity 3D, ADAMS.
- **Landuages:** Python, C/C++.
- **Interests:** Learning from Demonstrations, Imitation Learning, Human-Robot Interaction, Robot Learning, Reinforcement Learning, Soft Robotic Grippers.
- **Robots:** FrankaEmika Panda, Universal Robots UR10, UR5, Fetch, Kinova Gen-3 Lite.

TECHNICAL COURSEWORK

- **IIT Jodhpur:** Introduction to Robotics, Autonomous Systems, Swarm Robotics, Artificial Intelligence, Smart Manufacturing, Industry 4.0.
- **Virginia Tech:** Human-Robot Interaction, Reinforcement Learning, Introduction to Machine Learning, Nonlinear Systems Theory, Applied Linear Systems.