Shaunak A. Mehta

+1 (267) 466-7174 | mehtashaunak@vt.edu | Github | Google Scholar | Linkedin | Website

EDUCATION

PhD in Robotics — September 2025 (Expected)
Virginia Tech, Blacksburg, VA — GPA: 3.96/4.0

Master of Science in Robotics — December 2024
Virginia Tech, Blacksburg, VA — GPA: 3.95/4.0

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

WORK EXPERIENCE

Graduate Research Assistant — August 2021 - Present
Virginia Tech, Blacksburg, Virginia, USA

- Formalized a method to learn latent mappings for complex robot actions without using human demonstrations.
- Unified learning from Demonstrations, Corrections and Preferences under a flexible reward learning framework.
- Developed a framework for assisted grasping using a novel rigid-soft gripper based on a soft switchable adhesive.
- Developed an offline learning algorithm to modify the learning dynamics and increase robustness for suboptimal inputs.
- Proposed a waypoint-based reinforcement learning algorithm for efficient learning of robot manipulation tasks.
- Formulated a novel behavior cloning algorithm to ensure local stability of learned policy to mitigate covariate shift.
- Designed an interface and an accompanying algorithm to enable users to teach robots using 2D drawings.

Student Associate (Research Internship) — January 2024 - May 2024
Honda Research Institute (HRI-US), San Jose, California, USA

- Explored and implemented state-of-the-art algorithms for dexterous manipulation of multi-fingered grippers.
- Determined the best approaches to solve for different subtasks of long horizon dexterous manipulation task.
- Proposed a novel teacher-student reinforcement learning approach combining real world data.
- Developed a hierarchical framework combining imitation learning, reinforcement learning and model based control.
- Achieved successful sim-2-real transfer for long-horizon dexterous manipulation task on multi-fingered robot hands.

Undergraduate Student Researcher — July 2019 - May 2021
Indian Institute of Technology (IIT) Jodhpur, India

- 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 an extracted eleptical track.
- Worked on vision based control and motion planning of a half humanoid robot.

Research Internship — May 2019 - July 2019
Mechatronics, Instrumentation and Control Lab (MICL), IIT Patna, India

- 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 surgical training.
- Achieved force feedback in x and y direction using a cable driven parallel mechanism.
- Integrated a ferrofluid based damper and a capstan drive mechanism to achieve force feedback in z direction.

Automation + Mechanical Engineering Intern — May 2018 - June 2018
Godrej Interio, Mumbai, India

- Designed and prototyped an automated rail guided 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

PUBLICATIONS

- **Mehta, S. A.** , Nemlekar, H., Sumant H. Losey D. P. (2025). L2D2: Robot Learning from 2D Drawings. arXiv preprint. preprint available here

- **Mehta, S. A.** , Ciftci, Y. U., Ramachandran, B., Bansal, S., Losey, D. P. (2025). Stable-bc: Controlling covariate shift with stable behavior cloning. IEEE Robotics and Automation Letters. DOI: 10.1109/LRA.2025.3526439
- **Mehta, S.A.** and Zarrin, R.S., (2024, November). On the feasibility of a mixed-method approach for solving long horizon task-oriented dexterous manipulation. In 2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids). DOI: 10.1109/Humanoids58906.2024.10769963
- Keely, M., Kim, Y., **Mehta, S. A.** , Hoegerman, J., Sanchez, R. R., Paul, E., Mills, C., Losey, D.P., Bartlett, M. D. (2024). Combining and Decoupling Rigid and Soft Grippers to Enhance Robotic Manipulation. arXiv preprint. DOI: 10.48550/arXiv.2404.13755
- **Mehta, S. A.** , Habibian, S., Losey, D. P. (2024). Waypoint-Based Reinforcement Learning for Robot Manipulation Tasks. In 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). DOI: 10.48550/arXiv.2403.13281
- **Mehta, S. A.** , Meng, F., Bajcsy, A., Losey, D. P. (2024). StROL: Stabilized and Robust Online Learning from Humans. IEEE Robotics and Automation Letters.DOI: 10.1109/LRA.2024.3354626
- Jonnavittula, A., **Mehta, S. A.** , Losey, D. P. (2024). SARI: Shared autonomy across repeated interaction. ACM Transactions on Human-Robot Interaction. DOI: 10.1145/3651994
- **Mehta, S. A.** , Losey, D. P. (2024). Unified learning from demonstrations, corrections, and preferences during physical human-robot interaction. ACM Transactions on Human-Robot Interaction.DOI: 10.1145/3623384
- **Mehta, S. A.** , Kim, Y., Hoegerman, J., Bartlett, M. D., Losey, D. P. (2023, April). RISO: Combining Rigid Grippers with Soft Switchable Adhesives. In 2023 IEEE International Conference on Soft Robotics (RoboSoft) (pp. 1-8). DOI: https:10.1109/RoboSoft55895.2023.10122030
- **Mehta, S. A.** , Parekh, S., Losey, D. P. (2022, May). Learning latent actions without human demonstrations. In 2022 International Conference on Robotics and Automation (ICRA) DOI: 10.1109/ICRA46639.2022.9812230
- Mithun, P., **Mehta, S. A.** , Shah, S. V., Bhatnagar, G., Krishna, K. M. (2020). Student Mixture Model Based Visual Servoing. arXiv preprint. DOI: 10.48550/arXiv.2006.11347

SELECTED PROJECTS

Integrating Preferences with Adverserial Inverse Reinforcement Learning Jan 2022 - May 2022
Virginia Tech, Blacksburg, Virginia, USA

- Analyzed the existing loss functions for imitation learning that leverage different sources of feedback — crossentropy loss for preferences and causal entrpoy for reward learning.
- Integrated the loss functions for reward learning and preferences under a unified framework.
- Evaluated our proposed approach of combining different feedback forms against state-of-the-art methods that learn from demonstrations and preferences.

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

- 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 - Feb 2021
Indian Institute of Technology(IIT), Jodhpur, India

- 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.

TECHNOLOGY SUMMARY

- **Languages:** Python, C/C++.
- **Developer Tools:** VS Code, MATLAB, Arduino
- **Technologies/Frameworks:** Linux, GitHub, Robot Operating System (ROS), Pytorch, OpenCV, Nvidia Isaac Gym, PyBullet, Fusion 360, SolidWorks.
- **Robots:** FrankaEmika Panda, Universal Robots UR10, UR5, Fetch, Sawyer Robot, Kinova Gen-3 Lite.
- **Interests:** Imitation Learning, Dexterous Manipulation, Human-Robot Interaction, Robot Learning, Reinforcement Learning, Foundational Models, Vision Based Control, Soft Robotic Grippers, Embodied Agents.