Vismay Vakharia

Bengaluru, India | LinkedIn | GitHub

Tech Arsenal

- Robotics | Motion Planning | Control & Estimation | Machine Learning | CAD | SLAM | Computer Vision | NLP
- Python | NumPy | PyTorch | Tensorflow | SciPy | Pandas | CasADi | Scikit Learn | spaCy | C# | JavaScript | C++
- Robot Operating System (ROS1 & ROS2) | MATLAB | Simulink | PyBullet | Gazebo | SolidWorks | Autodesk Inventor | LaTeX | git | Arduino | Unity | Microsoft Office Suite | Linux

Work Experience

- **Tech Lead** at Tata Consultancy Services - Research (*Bengaluru*) *Aug'22 – Present*
  - Managing end-to-end development of omni-directional mobile robot, including mechanical design and software
  - Successfully migrated entire development stack from ROS1 to ROS2 and setup CI pipeline
  - Coordinated with Airtel - 5G research team to integrate their network system with our tele-operation framework as a part of industrial collaboration of manufacturing use-case and gained more than 100% improvement in Takt time
- **Researcher** at Tata Consultancy Services - Research (*Bengaluru*) *Aug'18 – Jul'22*
  - Built an high-fidelity simulation environment for ANA Avatar XPRIZE competition along with algorithms for mitigating effects of delay and packet loss, leading to semi-finals
  - Led the ground robot team for Challenge 2 of MBZIRC-2020 where our team achieved 6th position internationally

Projects & Internships

- **Robo Scientist**
  Worked on an avatar system for real-time human presence in remote locations
  - Successfully developed Deep Learning based ML algorithms for 6D pose estimation and Deep Reinforcement Learning for dual-arm mobile manipulation enhancing stability and efficiency
  - Created a multi-headed control framework for teleoperation, shared autonomy, and full robot autonomy that handles delay compensation & packet loss
  - Built simulation environment in Gazebo and PyBullet, integrating ROS controllers and sensors
  - Led the development of navigation system for the omni-directional robot with safety algorithms for collision avoidance
- **Palpicker**
  Design an autonomous pallet-picker for smart warehousing
  - Created a resource management algorithm for task allocation across robot fleets
  - Implemented Kalman Filter for odometry using various sensors
- **The Mohamed Bin Zayed International Robotics Challenge – 2020 (MBZIRC)**
  Participated in an international robotics challenge to build structures using autonomous systems
  - Developed a Gazebo simulation environment with ROS for navigation, localization, and obstacle avoidance (SLAM) using Lidar, IMU, GPS, and camera
- **Lateral Control of Autonomous Vehicle**: Research Intern at Texas A&M University, USA *May'17 - Jul'17*
  Developed a vehicle dynamics model for lateral control
  - Applied system identification techniques to refine the model and estimated tire cornering stiffness using least squares
- **Cable Actuated Rehabilitation Glove**: Research Project at IIT Gandhinagar, India *Jan'17 - Dec'17*
  Built an exoskeleton glove to assist stroke/paralysis patients
  - Designed and tested a prototype glove using 3D printed and machined parts and installed actuators, sensors and microcontroller, developed a Simulink simulator connected to the glove for real-time data visualization

Publications

- **SMC 2024** (*IEEE International Conference on Systems, Man, and Cybernetics*)
  - System for Autonomous Management of Retail Shelves using an Omnidirectional Dual-arm Robot with a Novel Soft Gripper
  - Teleoperated Omni-directional Dual Arm Mobile Manipulation Robotic System with Shared Control for Retail Store
- **SMC 2023** (*IEEE International Conference on Systems, Man, and Cybernetics*)
  Model-Mediated Delay Compensation with Goal Prediction for Robot Teleoperation Over Internet [ref]
- **MOMA 2022** (*IROS Workshop on Mobile Manipulation and Embodied Intelligence*)
  An Efficient Method for Accurate Pose Estimation and Error Correction of Cuboidal Objects [ref] [paper]
- **ECC 2021** (*The European Control Conference*)
  Transparency Enhancement in Teleoperation: An Improved Model-Free Predictor for Varying Network Delay in Telerobotic Application [ref]

Education

- **Georgia Institute of Technology, USA** *Jan'22 – Dec'23*
  Masters of Science, Major in Computer Science GPA: 3.9/4
- **Indian Institute of Technology Gandhinagar, India** *Jul'14 – May'18*
  Bachelor of Technology, Major with Honors in Mechanical Engineering GPA: 8.95/10