Pratham Salvi

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Academic Qualification

M.Eng in Robotics, University of Maryland, College Park *Aug 2025 – May 2027*
(Expected)

B.Tech in Mechanical Engineering, Vellore Institute of Technology, Vellore *Oct 2020 – Jul 2024*
CGPA: 8.17 / 10

Work Experience

Robotics Researcher, Tata Consultancy Services, Bengaluru *Jan 2024 – Present*

- Developed locomotion using behavior cloning, imitation learning, and DRL with 95% gait stability.
- Applied MPC and ZMP techniques for dynamic gait stabilization on a proprietary biped robot.
- Simulated locomotion in Isaac Gym using equivariant networks, reducing training time by 40%.
- Enabled real-time imitation learning from live video for human-robot interaction.
- Designed and prototyped a full-scale biped with a patented ankle joint mechanism.

Robotics Automation Intern, Solar Industries India, Nagpur *May 2023 – Nov 2023*

- Improved warehouse workflows in FlexSim, increasing efficiency by 25%.
- Designed autonomous UAV missions using PX4, ArduPilot, and Gazebo.
- Integrated YOLOv5 for UAV delivery with 92% object detection accuracy.
- Contributed to patented booster design using CFD-based optimization.

Projects

Panda Arm – Vision-Based Motion Planning *ROS, MoveIt, OpenCV*

- Integrated Intel RealSense D435 camera with OpenCV for real-time object detection and 6DOF pose estimation
- Developed collision-free trajectory planning using MoveIt framework with custom cost functions
- Implemented closed-loop visual servoing achieving 2mm positioning accuracy in Gazebo simulation

UR5 – Vision-Based Model Predictive Control *Python, CasADi, ROS*

- Designed nonlinear MPC controller for visual servoing with real-time optimization using CasADi
- Implemented image-based visual servoing with feature tracking and velocity command generation
- Validated controller performance under varying lighting conditions and dynamic obstacles

Brain Tumor Classification using Deep Learning *TensorFlow, Keras, Python*

- Developed CNN architecture for multi-class brain tumor classification from MRI scans (4 classes)
- Achieved 94.5% validation accuracy using data augmentation, dropout regularization, and transfer learning
- Implemented grad-CAM visualization for model interpretability and clinical validation

Technical Skills

- **Robotics:** Motion Planning | Control Systems | SLAM | Kinematics | Dynamics | State Estimation
- **AI/ML:** Reinforcement Learning | Computer Vision | Deep Learning | Imitation Learning | Neural Networks
- **Programming:** Python | C++ | MATLAB | PyTorch | TensorFlow | NumPy | OpenCV | CasADi
- **Tools:** ROS/ROS2 | Isaac Gym | Gazebo | MuJoCo | PyBullet | SolidWorks | Git | Linux

Intellectual Property

Patent: Bipedal Robot with Coaxial–Orthogonal Hip Mechanism and Ankle Actuation with Torque Augmentation Mechanism.
Filed in 2025

- **SMC 2025** *(IEEE International Conference on Systems, Man, and Cybernetics)*
  - Encoding Symmetries of Humanoid Robots using Equivariant Neural Networks in Reinforcement Learning for Locomotion [ref]

Leadership & Achievements

Team INFINIX – CAD Head, VIT Vellore *Jul 2023 – Jul 2024*

- Led 12-member design team for NASA Human Exploration Rover Challenge, managing CAD workflow and design optimization
- Reduced rover weight by 18% through topology optimization and advanced materials selection- .

RoboVITics – Core Committee Member, VIT Vellore *Feb 2021 – Jul 2024*

- Won 2nd place in robotics hackathon among 150+ teams; organized technical workshops reaching 500+ students
- Coordinated MLH-sponsored Robowars competition and managed event logistics for 1000+ participants .