JAY BHAUTIKKUMAR PRAJAPATI

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Domain Interests: Robotics, Software Development, Machine Learning/Deep Learning

EDUCATION

University of Maryland (A. James Clark School of Engineering) — **College Park, MD, USA**
Master of Engineering, Robotics (GPA: 3.8/4) — Aug 2022 - May 2024
Related Coursework: Robot Design, Path Planning, Perception/Computer Vision, Controls, Deep Learning, Robot Learning

BVM Engineering College (Gujarat Technological University) — **Gujarat, India**
Bachelor of Engineering, Mechanical Engineering (CGPA: 7.88/10) — Jul 2018 - May 2022
Related Coursework: Industrial Automation, Smart Manufacturing, Mechatronics Systems, Embedded Systems and IoT

SKILLS

Programming Skills	Python, C/C++, MATLAB, Object Oriented Programming (OOP), Data Structures, Algorithms, Unit Testing
Software Skills	ROS, ROS2, Rviz, MoveIt, Gazebo, CAD (Solidworks, Creo Parametric, Fusion 360), SLAM, Nav2, Linux
Library and Tools	Git, PyTorch/TensorFlow, OpenCV, NumPy, Pandas, Doxygen, LaTeX, MS Office, Linux, Lucid
Soft Skills	Leadership, Teamwork, Problem Solving, Drive, Initiative, Communication, Public Speaking

EXPERIENCE

A. James Clark School of Engineering, University of Maryland — **College Park, MD, USA**
Graduate Teaching Assistant – Software Development for Robotics, Perception for Autonomous Robots — Aug 2023 – May 2024

- Tutored a cohort of 95 graduate students in fundamental concepts of Computer Vision for robotics, covering topics including object detection, homography, calibration, stereo vision, optical flow, semantic segmentation, and SLAM.
- Instructed graduate students in C++, Object-Oriented Programming, Software Design Patterns, ROS2, ROS2-ROS1 bridge, unit testing, and CI/CD (Continuous Integration / Continuous Delivery).

TRS BVM Student Chapter and Robotics Lab, BVM Engineering College — **Gujarat, India**
Student Research Scholar — Jan 2020 – Jan 2022

- 3D scanned (Einscan Pro) an 11ft tall statue, reverse-engineered a 98% accurate model, and 3D printed miniature models, achieving a 50% reduction in miniature production costs by implementing FDM technology for mass production.
- Led the design and fabrication of a six-wheeled All Terrain Rover featuring GPS waypoint navigation and SLAM capability, and a Four-Legged Quadruped Robot capable of walking, trotting, climbing, and dancing.
- Demonstrated expertise in Micro-Controllers, Micro-Processors, LiDAR, Servo motors, CNC machining, FDM and SLA 3D printing, 3D scanning, CAD, basic electronics, Python programming, C++ programming, and ROS.

PROJECTS

Software module for a Multi-Robot System (Link)

- Developed a software module implementing Agile Iterative Process to simulate a multi-robot system utilizing C++, ROS2, and Google Test Framework. Integrated Continuous Integration/Continuous Deployment (CI/CD) to ensure software deployment.
- Simulated 25+ robots achieving precise geometric alignment with 99% accuracy, achieving 89% code coverage.

Quadruped Four-legged Robot (Link)

- Led a team of five to develop Quadruped Robot with locomotion abilities: walking, turning, side-trotting, and slope climbing.
- Patented the design and utility, securing first position at GUJCOST Robofest – State Level Championship.
- Optimized limb trajectories through reverse-engineered CAD simulations, ensuring precise gait patterns. Employed FDM and SLA 3D printing for robot fabrication. Implemented multithreading in ATmega controller to control twelve servo motors.

Planning for Robotics (Link)

- Applied A* and Dijkstra algorithms to plan paths for a TurtleBot3 burger, both in simulation and hardware implementation.
- Implemented the RRT* algorithm in Python for robot path planning, incorporating dynamic obstacle avoidance through real-time replanning. Executed motion planning for robot manipulators using OMPL.

AudioVision Assist: Enabling accessibility through deep learning (Link)

- Developed a deep learning model using Inception V3 CNN encoder for feature extraction, processing live video feeds to generate vocal descriptive captions, achieving 92% accuracy for real-time accessibility for visually impaired individuals.
- Enhanced model confidence by implementing Block Static Expansion and multi-headed attention vectors, resulting in a 20% increase in real-time description accuracy for visually impaired users, revolutionizing accessibility in digital platforms.