

Vipul Patel

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SUMMARY

Robotics Engineer experienced in ROS2, perception, motion planning, SLAM, and robotic manipulators. Proven ability in deploying autonomous systems, performing field debugging, training operators, providing customer-facing support and communicating technical progress to stakeholders and investors. Skilled in prototyping, sensor integration, calibration, and rapid hardware/software iteration on Linux/Ubuntu.

SKILLS

Programming Languages: Python, C++, Ladder Logic

Robotics: MoveIt2, Kinematics, Motion Planning, SLAM, Reinforcement Learning, Robot Calibration, PID tuning

Software: ROS2, Linux (Ubuntu), Bash, Gazebo, RViz, SolidWorks, Solid Edge, AutoCAD

Hardware: xArm 7, Stretch 3, Autonomous Mobile Robots (AMR), RealSense D435i/D405, Orbbec Femto Bolt, LiDAR sensors, SO-100 arm, Hub/Servo Motors, ZLAC8015D motor drivers

Computer Vision: YOLOv5/v9, Detectron2, OpenCV, CNNs, U-Net, depth sensing, camera calibration

ML/DL Frameworks: PyTorch, TensorFlow, TensorRT, sklearn, LeRobot

Prototyping: 3D printing, rapid prototyping, fixture & mount fabrication

Field Skills: Deployment & Commissioning, Field Debugging, On-site Testing, Customer Support

Coursework: Robot Programming, Modeling & Controls of Robotic Systems, Machine Learning, Artificial Intelligence, HRI, Path Planning and Perception for Autonomous Robots, Robot Learning, Manufacturing and Automation

EXPERIENCE

AgroPixel AI Incorporated

Michigan, USA

Co-Founder, Head of Robotics

July 2024 - Present

- Led development and field deployment of a greenhouse mobile manipulator using xArm 7, Jetson Orin AGX, ROS2 Humble, MoveIt2, Intel RealSense/Orbbec depth cameras, hub-servo motor modules, and a custom built Autonomous Mobile Robot (AMR).
- Developed ROS2 nodes in Python/C++ for motor control, RS-485/USB communication, teleoperation, perception pipelines, and sensor data processing on Linux/Ubuntu systems.
- Built depth-based perception pipelines using RealSense D435i, Orbbec Femto Bolt, and LiDAR for detection, alignment, and pose estimation in real-world environments.
- Performed eye-in-hand and camera-to-robot-base extrinsic calibration to improve end-effector accuracy and overall manipulation precision.
- Integrated the leRobot learning framework to train and evaluate pick-and-place manipulation policies for the xArm 7 using ROS2, MoveIt2, and PyTorch-based modules, improving grasp success and task consistency.
- Configured ZLAC8015D motor drivers, hub motors, custom grippers, and the SO-100 robotic arm; executed wiring, field debugging, and full electro-mechanical integration.
- Designed and 3D-printed custom gripper components, sensor mounts, and robot fixtures to support rapid prototyping and fast iteration during testing and deployment.
- Utilized RViz and Gazebo for motion planning, visualization, simulation, and validation of manipulation tasks.
- Conducted end-to-end commissioning, system bring-up, functional testing, and field validation of robot prototypes at customer-like environments, resolving hardware and software issues on-site.
- Developed and documented Standard Operating Procedures (SOPs) for deployment workflows, testing procedures, calibration routines, and failure-mode handling.
- Managed and guided a three-member robotics team, coordinating development tasks, reviewing technical work, and accelerating iteration cycles toward deployment-ready releases.

IPS Assembly

Michigan, USA

Robotics Research Engineer

January 2024 - May 2024

- Built a custom dataset of 5,000+ images collected using the Intel RealSense D405 and supported the development of an automated leaf-pruning robot for hydroponic facilities, applying computer vision and machine learning to improve plant-care workflows.
- Deployed Hello Robot's Stretch 3 as a proof-of-concept platform for autonomous leaf detection and manipulation using YOLOv9, Detectron2, and Deep Reinforcement Learning (DRL), achieving 92% target-reach accuracy.
- Designed an automated precision-trimming system for small agricultural samples, using Convolutional Neural Networks (CNNs) to generate trim profiles and guide end-effector motion.
- Executed end-to-end robotics experimentation, including on-site testing, dataset creation, perception model training, and integration with control pipelines.
- Improved crop-processing efficiency by 15% and reduced operational labor requirements by 18% through robotics integration and workflow optimization.

Tech Cryptors

Robotics Engineer

Mumbai, India

May 2021 - June 2022

- Performed CAD design and inverse kinematics analysis for a 6-DOF pick-and-place robotic arm with a camera-based vision system capable of assembling 15 components per minute, and simulated the full workflow in Gazebo.
- Developed an educational self-balancing robot kit with IMU integration and implemented a PID control algorithm, enabling students to learn core robotics and control concepts through hands-on workshops.

EDUCATION

University of Maryland

Master of Engineering in Robotics (GPA: 3.7/4.0)

College Park, Maryland, USA

August 2022 - May 2024

Dwarkadas J. Sangvi College of Engineering

Bachelor of Engineering in Mechanical Engineering (GPA: 3.8/4.0)

Mumbai, India

June 2017 - May 2020

SBM Polytechnic

Diploma in Mechanical Engineering (GPA: 3.8/4.0)

Mumbai, India

June 2014 - May 2017

PROJECTS

Early Wildfire Detection & Segmentation Using Xception-Lite & U-Net

University of Maryland

ML, Python

- Developed an early wildfire detection pipeline using a lightweight Xception-Lite classifier, achieving 81.91% accuracy, and benchmarked performance against a transfer-learning model achieving 85.23%.
- Utilized the IEEE FLAME dataset for preprocessing, training, and segmentation with U-Net to support environmental monitoring and early disaster-response strategies.

Autonomous Retrieval UGV

University of Maryland

RPi, Python, Sensors, SLAM

- Constructed a 4WD UGV with IMU, wheel encoders, and an RPi camera, developing a full software stack for motor control, object detection, wireless communication, and autonomous navigation.
- Implemented SLAM-based localization and obstacle-aware motion planning, achieving a 93% retrieval success rate with real-time mapping and online obstacle avoidance.

Multirobot Search and Rescue

University of Maryland

Python, ROS2

- Implemented collaborative robot navigation using Ant Colony Optimization for 10% faster search times, integrated YOLOv5 for 95% accurate human detection, and developed a computer vision module with 75% accuracy for object detection.

STEM VOLUNTEERING

Technical Judge: FIRST Robotics Competition (District, State, and World Championship levels), 2024-Present

Technical Judge: IGVC 2025 (Intelligent Ground Vehicle Competition) - Oakland University, MI

Technical Judge: Robofest 2025 - Lawrence Technological University, MI