Kaushik P

+91 8792478343 | Email | LinkedIn | GitHub | Twitter

SUMMARY:

Robotics Engineering student with expertise in ROS 2, prototype development, and lab testing, specializing in the system-level integration of mechanical, electronics, firmware, and autonomy modules. Dedicated to bridging advanced research with real-world industrial applications through CAD, MATLAB, and comprehensive data analysis.

TECHNICAL SKILLS:

- **Programming Languages:** Python, C, C++, MATLAB, Simulink, LabView
- **Robotics s Simulation:** ROS/ROS2, Gazebo, Robo Analyzer, RobotStudio
- **Design Tools:** Autodesk Fusion 360, CATIA, Hydraulics (Festo), Pneumatics, Raspberry PI, Arduino
- **Manufacturing s Prototyping:** PLC, CNC programming and operation, Mechanical Tools

EXPERIENCE:

Deep Learning for Video Event Recognition and Text Generation | NITK, Surathkal Jun 2025 - Aug 2025

- Built video event recognition and captioning system, achieving high-quality natural language descriptions by integrating YOLO, InsightFace, EasyOCR, and LLMs, enabling time-aligned narration of any event (basketball matches) and real-world human activities.
- Implemented a general-purpose human activity model utilizing YOLO-Pose for key point estimation and a GPT-2 to describe everyday actions without specialized training datasets
- Designed an LLM-based caption generation module using LangChain and Groq (LLaMA 3.1 8B), producing structured JSON captions with precise timestamps and rendering final outputs using OpenCV and MoviePy.

PROJECTS:

Development of a Vision-Guided Fallen Fruit Collection Robot for Orchard Health Monitoring Ongoing

Tech Stack: Python, C++, ROS2, YOLO11n, Raspberry Pi. Fusion 360, 3D Printing, Visual SLAM, Gazebo

- Led the system-level integration of the perception pipeline on a Raspberry Pi 5 with low-level actuator control on an Arduino Uno.
- Developed and deployed a custom YOLO11n model to perform real-time object detection and classification, achieving a mean average precision of 89.1%.
- Mapped 2D pixel coordinates to 3D real-world coordinates using a Homography Matrix to calculate precise geometric inverse kinematics for a 3-DOF robotic manipulator.
- Implemented Monocular Visual SLAM for precise autonomous mapping and navigation, optimizing the system to operate effectively without LiDAR hardware
- Designed and validated the mechanical architecture and coordinate transforms within Gazebo and RViz simulation environments prior to real-world deployment.

Design of C-Arm for Scanning Application

Tech Stack: Fusion 360, MATLAB Sept 2025 - Nov 2025

- Designed a multi-angle robotic scanning mechanism in Fusion 360, translating complex mechanical requirements into a compact, deployable model.
- Developed forward and inverse kinematic models using DH parameters in MATLAB to ensure precise, controlled joint positioning.
- Applied Jacobian matrix analysis for smooth velocity control and singularity detection, demonstrating advanced control algorithm capabilities highly transferable to underwater ROV manipulator arms.

EDUCATION

Nitte University, NMAMIT | Bachelor's Degree in Robotics and Artificial Intelligence Aug 2022 – July 2026