Aakash Vanmali

Robotics Software Engineer

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Profile Summary

I am currently pursuing a Master's in Mechatronics and Cyber-Physical Systems at TH Deggendorf. My interests and skills lie at the intersection of Robotics, Computer Vision and AI. I am particularly focused on integrating perception and AI to develop intelligent and adaptive robotic systems. I have hands-on experience with Python, OpenCV, ROS, and MATLAB through various academic and personal projects. I aim to apply my skills in Robotics Software Development, Computer Vision and AI-powered control systems to contribute to cutting-edge solutions in Robotics. I am actively seeking internship or working student (Werkstudent) opportunities in the fields of Computer Vision, Robotics, and AI.

Education

TH Deggendorf, Germany, M. Eng in Mechatronics and Cyber-Physical Systems 03/2024 – Present

- Average Grade: 2.0
- **Coursework:** Autonomous Systems, Advanced Robotics, Advanced Modelling and Simulation, Technologies of Additive Manufacturing, Human Machine Interfaces-VR/AR

University of Mumbai, India, B. Eng in Mechanical Engineering 06/2019 – 06/2023

- Average Grade: 1.6
- **Bachelor Thesis:** Deep Learning and Computer Vision for Self Driving Car
- **Coursework:**CAD/CAM, Industrial Electronics, Automation and Artificial Intelligence, Python Programming

Experience

Computer Vision Intern, JSW Steel Ltd. - Mumbai, India 08/2023 – 12/2023

- Employed video analytics techniques to evaluate steel industry-specific use cases.
- Developed and implemented a project aimed at accurately measuring gas consumption in the steel industry using non-contact methods, eliminating inaccuracies caused by flowmeter choking.
- Utilized Computer Vision and Convolutional Neural Networks to analyze images and determine the volume of flame flared from flare stacks.
- Leveraged Docker for packaging the solution into an end-to-end application, ensuring seamless deployment and integration.
- **Skills:** Computer Vision, Convolutional Neural Network, Docker, OpenCV, Tensorflow, Pandas

Technical Projects

Chain Wheeled Mobile Robot with IR Camera for Object Identification Project Link

- Developed an autonomous robot with an IR camera for object identification. Designed a CAD model using Autodesk Fusion 360, converted it into a URDF file, and integrated it with Gazebo; added plugins for the camera sensor, LIDAR sensor, and skid steering mechanism; implemented autonomous driving using LIDAR data and object identification via the OpenCV and SIFT algorithm; created a custom Gazebo world for testing; executed the project using ROS.
- Tools Used: ROS, SLAM, Computer Vision, Gazebo, Python

Color Sorting Robotic Arm using MATLAB Project Link

- Designed and analyzed a robotic arm capable of sorting objects based on color. Programmed the robotic arm using MATLAB Simulink and its libraries to sort red, green, and blue cube-shaped objects into separate piles; integrated mechanical design, image processing, and a vacuum gripper to achieve accurate sorting. Demonstrated the integration of image processing, robotics, and control systems.
- Tools Used: MATLAB Simulink, Image Processing Toolbox, Robotics Toolbox, Computer Vision.

Deep Learning and Computer Vision for Self-Driving Cars Bachelor Thesis

- Demonstrated the role of artificial intelligence in the development of autonomous vehicles. Utilized the Udacity Simulator for simulating autonomous driving, achieving 93 percent simulation accuracy and 95percent training accuracy. Implemented a lane detection algorithm to accurately detect lanes in images and videos for robocar. Implemented a traffic sign classifier using a Convolutional Neural Network with an accuracy of 83 percent. Implemented an object detection algorithm capable of identifying people, traffic lights, and cars in test videos
- Tools Used: Python, OpenCV, TensorFlow, CNN, Udacity Simulator

Other Projects

AI-Optimized PID Controller for Furnace Temperature Project Link

Robot Path Planning using A* and RRT Project Link

LIDAR Sensor Data Analysis and Object Tracking Project Link

Languages

German	A2 – Elementary proficiency
English	C1 – Advanced professional proficiency

Technical Skills

Languages: Python, MATLAB
Libraries & Tools: OpenCV, ROS, Simulink, SolidWorks, Gazebo, Git, TensorFlow, PyTorch
Frameworks & Platforms: GitHub Actions, Jira, OpenAI API, MS Office (Excel, PowerPoint)
Domains: Computer Vision, Deep Learning, Reinforcement Learning, AI in Robotics.

Soft Skills

Analytical Thinking, Innovation Driven Mindset, Creative Problem-Solving, Cross-functional Collaboration, Highly Adaptable in fast-paced environments

Training and Certifications

- **Machine Learning for All** – Coursera, 2021
- **Introduction to Artificial Intelligence** – Coursera, 2021
- **Python for Everybody Specialization** – Coursera, 2021

Extracurricular Activities

- **AI Head**, Google Developer Student Club – Led AI sessions and projects, 2021–2022
- **Club Head**, AI and Mechatronics Club – Organized robotics competitions and tech talks, 2021–2022

Hobbies

- Coding, Table Tennis, Reading, building side projects