Ayushman Choudhuri

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Education

RWTH Aachen University — **Germany**
MSc. Robotic Systems Engineering — *Oct 2021 – Oct 2024*

Manipal University — **India**
B.Tech Mechanical Engineering — *Aug. 2014 – June 2018*

Technical Skills

Programming: Python, C++, C
Frameworks & Libraries: ROS, Pytorch, Numpy, Pandas, OpenVINO ,ONNX, Tensorflow lite, OpenCV, PCL
Developer Tools: Git, Docker, VS Code, Conda, CMake, Gazebo, RViz
Operating Systems: Linux(Ubuntu), Windows
Languages: English (C2), German (A2)

Work Experience

Working Student - Computer Vision and Robotics — **March 2023 – Present**
Schmiede.one GmbH (Innovation lab of the Grimme group) — *Düsseldorf, Germany*

- Currently working on the quantization (PTQ/QAT) and deployment of object detection models (YOLO) using TensorRT for NVIDIA Jetson Platforms.
- Model exploration and training for object detection tasks in agricultural scenarios.

Intern - Computer Vision and Robotics — **August 2023 – February 2024**
Schmiede.one GmbH (Innovation lab of the Grimme group) — *Düsseldorf, Germany*

- Spearheaded the development of stereo vision-based 3D object detection for Grimme autonomous harvesters.
- Conducted model benchmarking on custom datasets and hardware performance profiling of SOTA object detection models for agricultural scenarios.
- Used model quantization methods to achieve a 5x increase in object detection inference speed using ONNX and HailoRT for the Hailo8 processor attached to an x86 host edge computer.
- Guided the development of a custom dataset for image segmentation tasks required for field row navigation tasks for autonomous harvesting.

Graduate Student Research Assistant — **March 2023 – August 2023**
RWTH Aachen University — *Aachen, Germany*

- Developed a perception pipeline for safe mobile robot operation in construction environments with a focus on stereo vision-based 3D object detection and LIDAR point cloud compression.
- Designed and deployed a closed-loop LIDAR tilt system to increase the vertical field of view by 100% for close-range applications. The ROS package was developed using C++ and deployed on an NVIDIA Jetson Xavier platform.
- Conducted literature research and documented the existing object detection models as well as point cloud compression methods.

Software Developer - C++ **May 2020 – May 2021**
Synedyne Systems *Bangalore, India*

- Developed and implemented a machine learning-based calibration algorithm (C++) on an edge device for payload estimation of a self-loading cement mixer truck.
- Achieved a weight estimation accuracy of 98.5% with a maximum payload of 800 Kg.

Research Assistant - Robotics **July 2019 – April 2020**
Indian Institute of Science *Bangalore, India*

- Designed and developed control software (C/C++) and a robotic test bed for precise liquid dispensing for composite manufacturing at the Department of Aerospace Engineering.
- Achieved an accuracy of up to +/- 10 microliters using a MEMS-based flow sensor.

Robotics Systems Engineer **July 2018 – July 2019**
Agilebot Automation *Bangalore, India*

- Worked on a AS/RS robotic system design for automating processes in medium and large scale warehouses.
- Developed the chassis and frame design for a pick and place autonomous rover module for medium scale warehouses.

Projects

- **Master Thesis: Explainable Multimodal 3D Object Detection for Autonomous vehicles**
- **Domain Adaptation for Lidar Object Detection in Autonomous Vehicles**
- **TerraWatch: Multimodal AI for Deforestation Detection and Analysis**

Hackathons

- **TUM.ai Hackathon 2024** | Github Link
  Developed a multimodal AI system to detect and analyse deforestation from satellite images.
- **TUM.ai Hackathon 2023** | Github Link
  Developed an LLM-based AI consultant, tailored for the German Automotive Mittlestand.
- **Fraunhofer ICNAP Hackathon 2022**
  Developed a Time Series Classifier of Engine Data using Transformers. Won the 3rd place
- **RWTH Hackmining Hackathon 2022**
  Developed an automatic wear monitoring system using sensor data from a Komatsu 550t excavator.