Aamish Hussain

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EDUCATION

Technische Universität Dortmund, Germany
M.Sc. Automation and Robotics,
Specialization: Cognitive systems
Aug 2024

National University of Science and Technology, Pakistan
Bachelor of Engineering,
Mechatronics Engineering, 2017
Specialization: Robotics and Control

SKILLS

Computer Vision, Machine Learning, Mobile Robots, SLAM, Sensor fusion, Point Clouds, Reinforcement Learning, Robot Navigation, Data Analysis , Software Testing

> Computing Tools

ROS, Docker, Git, Gazebo , Pytorch, Numpy, Open3D, OpenCV, Solidworks, Proteus, Linux, Simulink, Jupyter

> Languages

Python, MATLAB , C/C++ , Bash, LaTeX

> Hardware

Nvidia Jetson Nano, Arduino, Livox LiDARs, RGB-D sensors, Linear Actuators, NEMA Stepper Motors

AWARDS

Runner up TU Start-Up Week 2023
Best Senior Project, NUST 2017
NUST Merit Scholarship – 2015-17
Runner up – FICS 2017

LANGUAGES

English – business fluent, C1
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Urdu, Punjabi – Native
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German – B1
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Fraunhofer Institute for Material Flow and Logistics (IML) 06-2023 – Present
Working Student – Robotics and Cognitive Systems Department
Dortmund, Germany

- Designed, implemented and tested vision based volume estimation pipeline for logistic goods and warehouse transport loads.
- Integrated Foundation Image Segmentation models and photogrammetry techniques for 3D data segmentation.
- Designed and built a custom dataset for vision based volume estimation, integrating multiple data sources and generating empirically testable scenarios for volume estimation. Participated in literature review for utilization of 3D SLAM in volume estimation tasks.
- **Tools/Exposure:** OpenCV, Open3D, pytorch, Bash, python, 3D SLAM, Poinclouds, Gazebo, Git, ROS, Statistical Analysis

Communication Networks Institute, TU Dortmund 09-2022 – 08-2024
Working Student - WHF
Dortmund, Germany

- Designed and Implemented a custom simulation environment for training and evaluating robot navigation tasks using Reinforcement Learning. The simulation focused on potential network disconnectivity scenarios faced by rescue robots.
- Implemented Reinforcement Learning agent training stack that integrated multiple algorithms, different network architectures and varied environment configurations.
- Evaluated the trained agents on unseen environments.
- **Tools/Exposure:** Reinforcement Learning, Gymnasium(gym), Rllib, Stable Baselines 3, pytorch, neural networks, tensorboard, obstacle avoidance, software testing, computer vision, Linux, python

Independent Project Work 09-2018 – 05-2019

- Mechanical and Electrical Design a low-cost smart watch aimed for new users.
- Prototyped its core functionality with BLE, CAD and assembly.
- Integrated Sensors and actuators, and digital display functionality

NUST College of Electrical and Mechanical Engineering 08-2017 – 07-2018
Research Assistant – Department of Mechatronics
Rawalpindi, Pakistan

- Implementation of Visual Odometry for human and robot arm synchronization
- Modeling and Simulation of the robotic arm in Solidworks
- Development of GUI and literature review participation

ACADAMIC AND COMMERCIAL PROJECTS

10-2021
06-2022

Race against the machine – demonstrated 5G teleoperation of race cars

- Modified **ORB SLAM 3** for integration to the existing code base for **self driving**. Utilized **ROS** in **C++** to write nodes**.** Used **Docker** for the platform-agnostic solution.
- Contributed to **path following** set-up by utilizing a modified pure-pursuit algorithm written in python**.** Tested the approaches in the simulated environment in **gazebo** and **RVIZ.**

09-2016
09-2017

Slurry Deposition Printer for Asperous Surfaces

- Developed a **3D printe**r capable of printing on objects having different sizes, shapes, and surfaces.
- Contributed to the development of user control GUI using **QT** and **python**.
- Developed a system that takes an image and converts it into **vector graphics**, is manipulatable in **GUI**, and then can be converted into g-codes for GRBL and at the end, into CNC instructions