Vaibhav Ahluwalia

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LinkedIn | Experience/Project demo

Experienced Robotics Programming Engineer with a demonstrated history of working in the research and industry domains. Skilled in SLAM, navigation and Control of Autonomous mobile robots and manipulators.

SKILLS & TECHNOLOGIES

- **Application Tools & OS**: ROS & ROS2 (Gazebo, Navigation stack, Move_base_flex, MoveIt, robot_localization, flexbe_ros, base_global_planner, rtabmap, Hector SLAM, G-mapping, ORB-SLAM, ros_control, plot juggler, state machines, sensor fusion), Tensorflow, PyTorch, ONNX, Arduino IDE.
- **Programming Languages**: Embedded C/C++, XML and Python.
- **Microcontrollers and Microprocessors**: NVIDIA Jetson, Arduino UNO, MEGA, Nano, Teensy, Node MCU, Raspberry Pi.
- **Sensors:** IntelRealSense T265(Tracking), D400 series(Depth & RGBD), L515(LIDAR camera), Zed stereo camera, Zivid camera, Luxonis oak-d, RPLIDAR, LS LIDAR, and Ouster OS0-32.

EXPERIENCES

Cudatech Software & Engineering, Ankara (Remote) **Aug 2024 - April 2025**
Lead Robotics Engineer

- Developed a hardware interface for DH gripper AG95 to integrate with Elfin5 robotic arm in ROS, including MoveIt configuration package implementation.
- Integrated an autonomous mobile robot (AMR) with robotic manipulator for mobile manipulation tasks, focusing on table cleaning applications.
- Designed and implemented a table-cleaning planner using point cloud data for 3D cleaning path generation.
- Created table-cleaning executor and cleaning manager systems to oversee operations, enabling start/stop functionality and status monitoring.
- Led and managed the robotics team while maintaining hands-on involvement in technical development.

SolarCleano, Luxembourg **Oct 2023 - Apr 2024**
Robotics Engineer

- Implemented behaviors using FlexBE ROS on an autonomous solar panel cleaning robot B1A. More Info
- Developed a custom Global planner under ROS framework, adhering to the nav_core::BaseGlobalPlanner interface for move_base node.
- Developed a simulation package of the robot with Gazebo and created a Python script to generate a Gazebo world with real-world obstacle poses.

Elektronikas datorzinātņu institūts, Riga **Feb 2022 - Oct 2023**
Robotics Research Assistant

- Developed a ROS2 control package for the AR4 robotic arm, integrated with the Tiago base for mobile manipulation affiliated with the Edge Ai project.
- Conducted 3D semantic segmentation research for enhanced robotic mapping.
- Deployed 3D SLAM using Intel RealSense D415 on the Tiago base from PAL Robotics.
- Assisted in creating a robotic solution for package sorting in post offices using the UR5 robot with AI-based high precision grasp detection. Developed under the TRINITY project. Article
- Retrained a Jetson-inference mobilenet-SSD model to detect crushed bottles with 98% confidence at 30 fps, achieving autonomous navigation to the bottles.
- Implemented self-exploration using move_base and explore_lite ROS packages.

Elektronikas un datorzinātņu institūts, Riga **Feb 2021 - Jan 2022**
Robotics Programming Engineer

- Contrasted visual odometry techniques with Intel Realsense T265, D435, and Zed stereo camera, determining T265 as optimal using OptiTrack for ground truth.
- Built autonomous tracked mobile robot using NVIDIA Jetson Xavier NX, with SLAM and path planning via RTAB-MAP and move_base ROS libraries, and sensor fusion with Extended Kalman Filter.
- Published study on development and visual odometry comparison. Article, associated with the VIZTA project.

Elektronikas un datorzinātņu institūts, Riga **Sep 2020 - Feb 2021**
Robotics Internship

- Learned robotics fundamentals: degrees of freedom, kinematics, transformation matrices, robot motion, rotation matrices, quaternions, Euler angles, and mobile robotics dynamics.
- Mastered ROS: workspaces, packages, server clients, parameter servers, rosbags, SLAM, route planning, motion control, and autonomous navigation.
- Applied SLAM on Drrobot's Jaguar with RPLIDAR A1, Zed stereo camera, and RTAB-MAP ROS library, creating 2D occupancy grids and 3D maps from RGB and depth images.

Melody Hobby Center, New Delhi **Jan 2018 - Mar 2018**
IOT Internship

- Conducted IOT workshops, created an Arduino-based security system. Article

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AWARDS

- Appreciation Certificate for coordinating and conducting workshop and training on "**Digital Electronics and Robotics**".
- Certificate of excellence for "**Project exhibition and presentation on IOT**".
- Award for being a member of **Robotics and AI committee** .
- Award for coordinating the event "**Robo Rally**" in 'Techno Sapiens' technical fest of IITM .

EDUCATION

Liepaja University, Liepaja (Latvia) *Masters in Information Technology*
Sep 2019 - Jul 2021

Guru Gobind Singh Indraprastha University, New Delhi (India) *Bachelors in Computer Applications*
Aug 2016 - Jul 2019