SANKET KHULLAR

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Versatile mechanical engineer having hands on experience in control of autonomous and robotic systems. Two years of work experience in the aviation industry. Project experience includes sensor fusion, control system design, PID Controller synthesis.

EDUCATION

Texas A&M University– College Station, TX ***August 2022 – May 2024***

Master of Science in Mechanical Engineering, ***GPA: 4.0*** | Continuing student fellowship

- **Relevant Coursework:** Robotic perception; Robotics and spatial intelligence; Dynamics and controls of autonomous vehicles; Pattern recognition and machine Learning; Mechanics of robotic manipulators; Control system design; Linear algebra; CAE.

Punjab Engineering College (Deemed to be University)– Chandigarh, India ***August 2016 – July 2020***

Bachelor of Technology in Mechanical Engineering, ***GPA: 4.0, Rank: 1/120***

SKILLS

- **Languages and Software:** MATLAB, ROS, C++ (basic), Python (Object Oriented, Pandas, NumPy, SciKit-Learn, Matplotlib, SciPy, PyTorch), SQL, MS Excel, TIBCO Spotfire, Palantir Foundry, Amazon Web Services (AWS), SolidWorks.
- **Modelling Skills:** Computer Vision, PID Controller Synthesis, Sensor Fusion, GD&T, Extended Kalman Filter, Linear Regression, CART, Logistic Regression, Linear Discriminant Analysis, Neural Networks, Random Forest, SVMs, k-means clustering, Control Matching, Principal Component Analysis, Exploratory Data Analysis (EDA), Big Data Analysis.

PROFESSIONAL EXPERIENCE

CNH Industrial ***May 2023 – August 2023***

Performance Controls Intern; Guidance Controls; Burr Ridge, Illinois

- **Sensor Fusion for Vision Systems and GPS Localization:** Developed a robust algorithm utilizing Monte Carlo Localization (Particle Filter) to accurately transform vision data to global coordinates, enabling seamless fusion with GPS measurements.
- Transformed data from the lidar and camera system on speciality tractors to the global frame of reference, achieving an average localization accuracy of 0.5 meters and improving accuracy by 60% compared to GPS guidance alone.
- Implemented the Pure Pursuit control algorithm for accurate a-priori path tracking using the localization output.

Texas A&M University, Advanced Robotics Lab ***November 2022 – May 2023***

Research Assistant; College Station, Texas

- **3D printing using articulated robots:** Implemented motion planning for a 6DOF Yaskawa GP50 robot using ROS and Python, with the goal of using the motion plan for 3D printing concrete structures.
- Created ROS nodes to calculate joint angles and end effector positions, and successfully demonstrated the feasibility of using the motion plan for construction tasks; Developed expertise in robotics and programming through this project.
- Created interactive moveit python interface for Yaskawa GP50 in ROS to `execute desired trajectories in real time.

United Airlines ***November 2020 – July 2022***

Analyst-Data Scientist; Analytics, and Innovation; Gurugram, India

- **Explorer Demand Generation (EDGE):** Generated $65M in incremental revenue for the American market by creating personalized machine learning-based offers, designed to produce incremental customer behaviour.
- Predicted customer's no of flights, and dollar amount spent during the campaign period deploying a gradient-boosted regression model; Accomplished an accuracy of 82% and 76% respectively.
- Designed a live performance tracking dashboard to track and compare the performance of previous and ongoing deployments for EDGE; Reduced performance reporting turnaround time by 20%.

ACADEMIC PROJECTS

Autonomous Vehicle Control in Urban Environment ***October 2023 – December 2023***

- Developed a control system for autonomous vehicles using CARLA Simulator; Implemented A* algorithm for efficient route planning and combined PID controller with Pure Pursuit for accurate navigation.
- Achieved 95% path following accuracy in complex urban simulations, demonstrating effective real-world application potential.

Lidar-Based People Detection and Tracking System ***October 2023 – November 2023***

- Developed a real-time pedestrian detection and tracking system using ROS2, integrating lidar sensor data to identify and monitor people movement; Implemented robust algorithms for dynamic obstacle differentiation and Euclidean clustering, publishing results through sensor_msgs/PointCloud and example_interfaces/Int64 messages.
- Engineered a multi-node ROS2 architecture for sensor data processing and visualization. Created a custom launch file orchestrating sensor playback, data recording, and node coordination; Achieved a detection and tracking accuracy of 94%.

SLAM using a Two-Wheeled Robot ***September 2022 – December 2022***

- Designed a custom network of ROS nodes for localization with high-precision pose estimation of a 2-wheeled robot in a simulated Gazebo world using the Extended Kalman Filter.
- Implemented a perception and path planning algorithm for frontier-based greedy exploration, ensuring a complete occupancy grid map of environment in the least possible time.

LEADERSHIP POSITIONS AND AWARDS

- **CNH Industrial:** Intern of the month award for building robust localization algorithms for the guidance controls team.
- **United Airlines:** Awarded with the Analyst of the Quarter (AOQ) award for building high-accuracy machine learning models.