Autonomous Vehicles LiDAR Filtering Assignment

Task Overview

In autonomous vehicles utilizing LiDARs, filtering ground and noise from point cloud data is a crucial task. Your task in this assignment is to develop a ground and noise-filtering program.

This involves processing point cloud data to remove ground and noise while preserving critical features like trees and buildings.

Bag file to be used for assignment: LiDARFilteringAssignment.bag

Objectives

Development of ground and noise filtering algorithm

- Create a program to filter out ground and noise points from point cloud data.
- This shouldn't remove any critical features like trees or buildings but should remove points corresponding to dust or other noise

ROS Package

- Prepare the ROS package to
  - Launch the developed node
  - Subscribe to the relevant topic
  - Execute filtering
  - Publish the filtered point cloud and removed points in separate topics

Documentation and Standards

- Provide well-commented and easy to follow code
- Comprehensive documentation explaining design choices

Docker Packaging

- Package the complete project within a Docker image containing all necessary dependencies
- Ensure a new user can build the project solely with the provided Docker image and documentations

Technical Requirements

- **Recommended Libraries**: PCL (Point Cloud Library), Open3D, Eigen, or similar
- **Programming Languages**: C++
- **Framework**: ROS (Robot Operating System) is recommended
- **Flexibility**: Use any additional libraries as needed

Deliverable

- **Code Repository**: Include a README giving a brief of implementation and any necessary steps to execute the provided code
- **Documentation**: Provide well-commented code and comprehensive documentation of your design choices

Additional Evaluation Criteria

- **Technical Proficiency**: Robustness of the filtering process and real-time data handling capabilities
- **Approach to the Problem**: Algorithm(s) employed, parameters selection, decisions taken, etc.
- **Code Quality and Structure**: Readability, maintainability, modularity, and adherence to coding standards

In case you have any issues or if something is not clear, please feel free to contact us.