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Booklets

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Title: User interface Design and object segmentation applied to Autominy platform

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Overview

This work proposes to design and implement a user interface to the Autominy platform.

For the development of the user interface, a framework called KivyMD based on the Python language was used. As far as the segmentation code is concerned, The Point Cloud Library (PCL) is a library which facilitates the management of a large amount of point cloud processing.

Introduction

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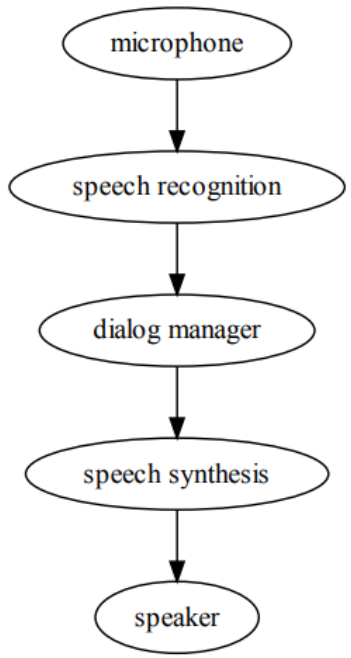
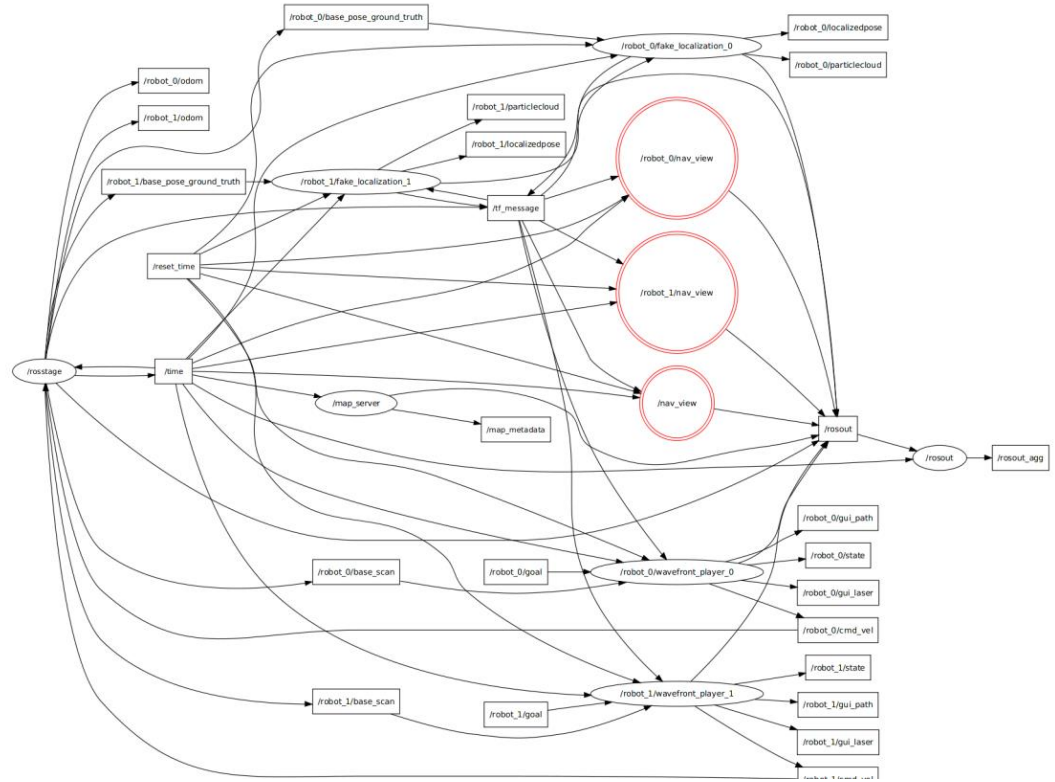
Due to the complexity of Autominy’s control executing commands typed in a terminal, it is necessary to create a user interface to enhance the experience using this platform.

In addition, within other problems to solve, perception represents an important challenge. (BORGES-MONSREAL et al., 2021.) used the Intel D435 Camera to apply artificial vision methods for achieving autonomous navigation without obstacles. Therefore, it is proposed a different process for identifying objects using the point cloud data from the Depth Camera.



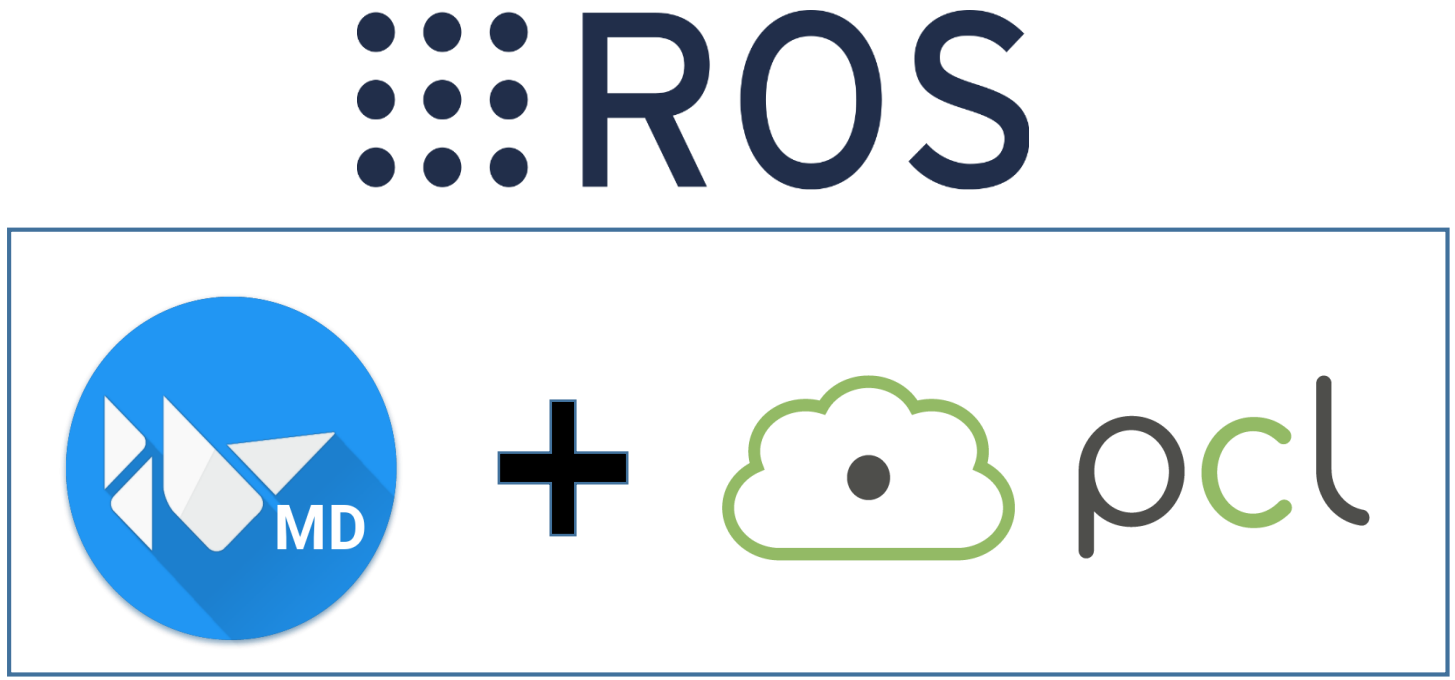


(Quigley et al., 2009)

Methodology

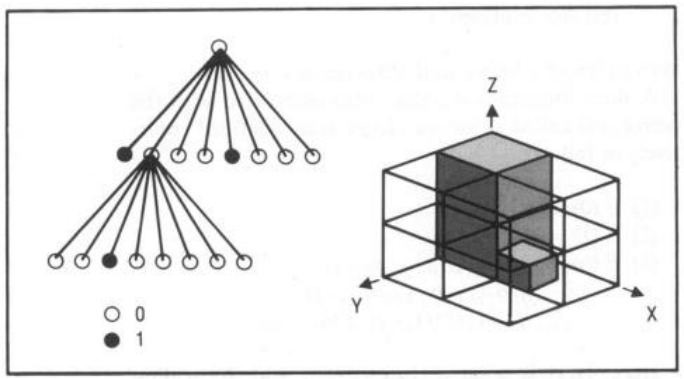
KivyMD is a framework for app development using Python, so the integration with ROS commands is an ideal option.

Point Cloud Library (PCL) uses C++ as a principal language, when compiling this package, a ROS node is created which will induce a process using three-dimensional planar segmentation methods


ROS
MD
pcl

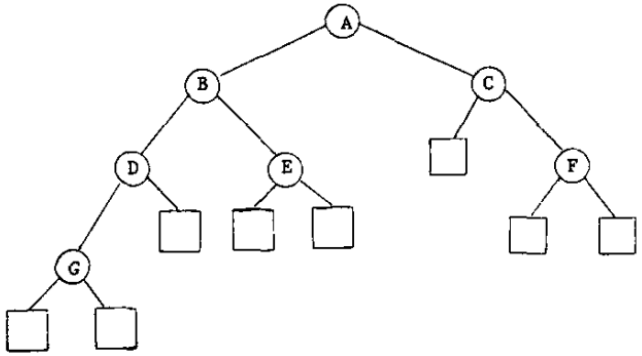
Planar segmentation methods

Octree Method



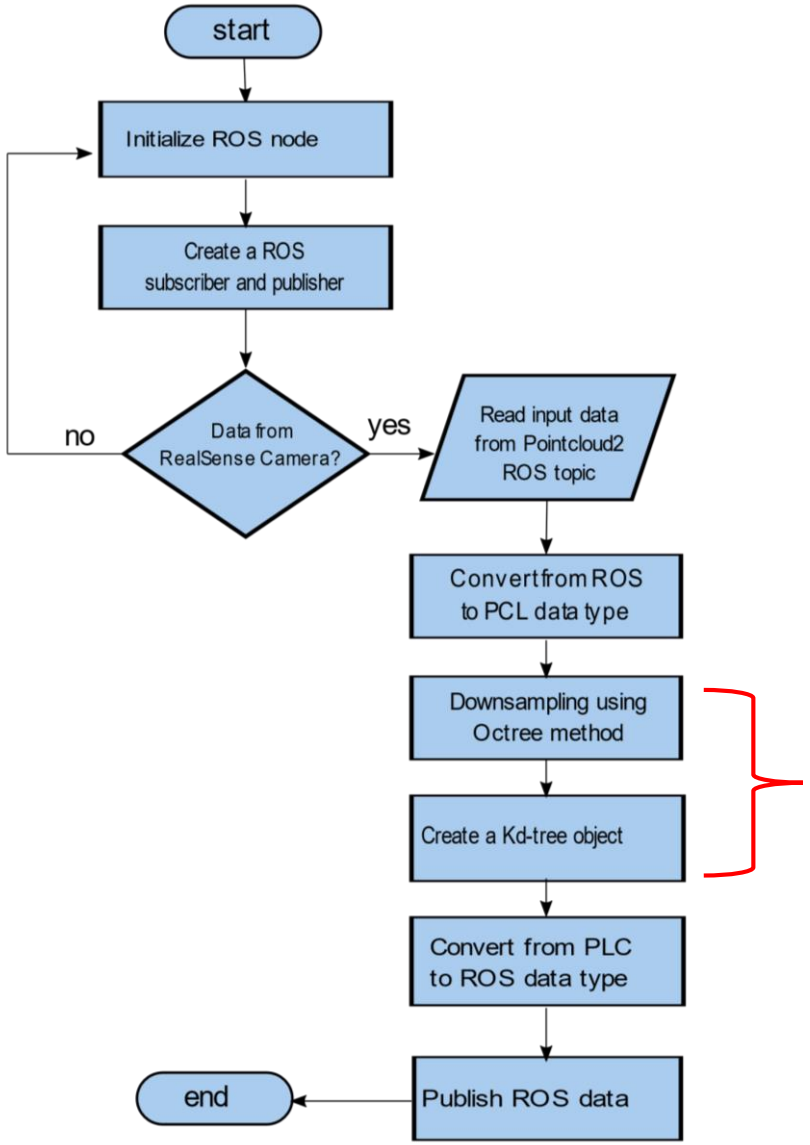
(Yamaguchi,et al. 1984)

KD-tree



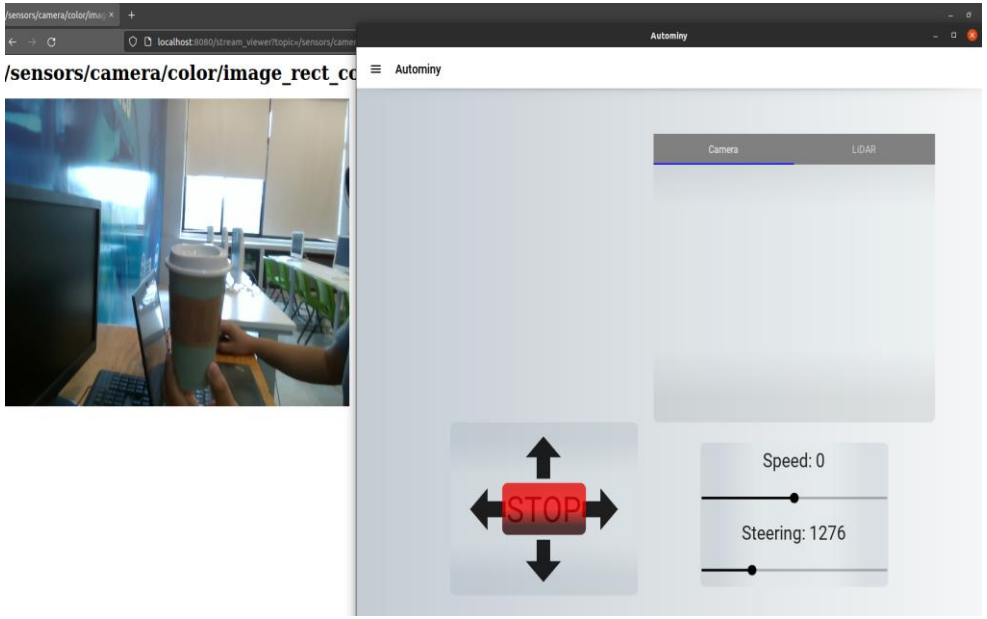
(Kraus, Piotr et al. 2008)

Clustering algorithm Development



Planar segmentation methods

Results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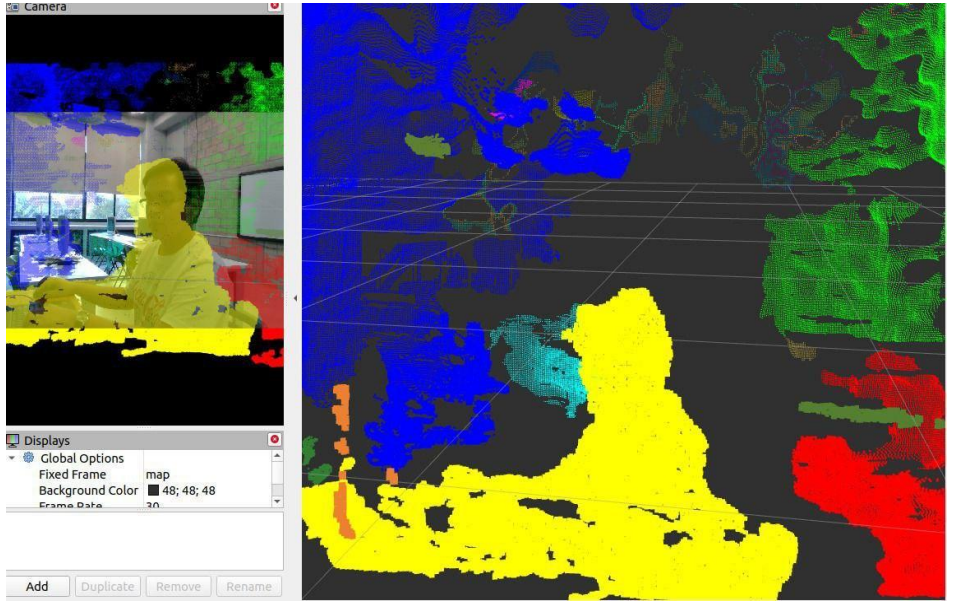
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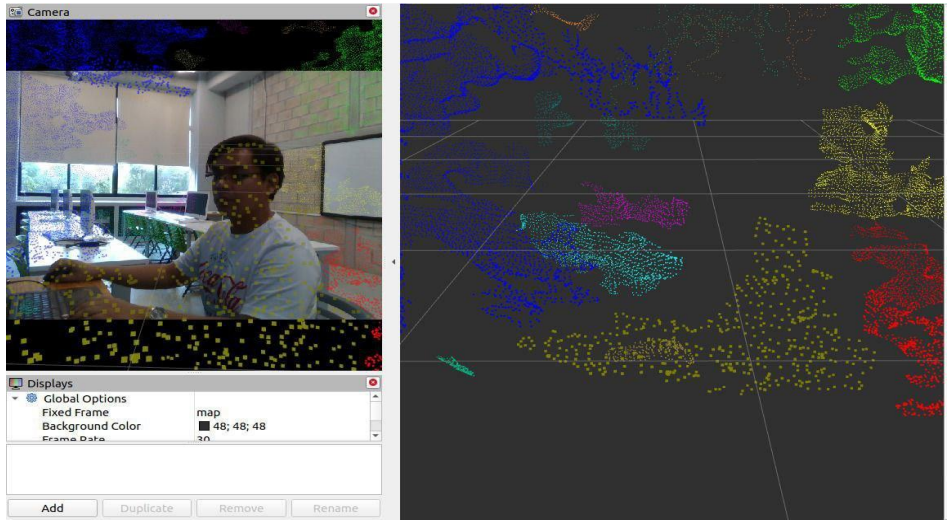
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Background Color
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Add
Duplicate
Remove
Rename

Conclusions

To summarize, a graphical user interface was created using a framework called KivyMD, in which one ROS command is sent via ROS nodes. The user can watch in real time what the Autominy’s camera is streamed via web server.

In addition, a clustering algorithm was implemented to enhance the perception of the robot, and to implement a different method instead of the camera. The Point Cloud Library was used for this work and implemented to ROS. Techniques of Downsampling and Kd-Tree were executed.

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