ABSTRACT

Localization System on Closed Environment Using Feature Detection Based on RP-Lidar 360^0 Laser Scanner A1M1

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Ability to recognize position and state of environment condition is a necessary skill that must be met in order a robot able to operate optimally in the new environment. Information about robot's position and it's surrounding needed for monitoring or controlling robots remotely.

The method proposed for the localization system is by using feature detection to detect keypoints/landmark as a point of comparison between the RP-Lidar result against the initial information. RP-Lidar's result visualized to obtain information about the presence or absence of a special features on the tested environment. Detected keypoints is in form of corners. Detected keypoints will be extracted based on its angle and position value. Benchmarking process between extracted keypoints (descriptors) with descriptors that are in initial condition is using the concept of region growing on the ROI (Region of Interest). Estimated position is obtained based on the calculation of descriptors translation and rotation to the midpoint of descriptors.

Localization system is done by matching features between descriptors on sensor results with four descriptors on that exist on testing environment (50cm x 70cm rectangle). Estimation of room shape is obtained with 11.9845mm average error and 6.3145 deviation.

Keywords: RP-Lidar 360 degree 2D laser scanner A1M1, localization, keypoints, feature detection, feature matching.