Segmentasi Manusia Dari LiDAR 2D Menggunakan Metode DBSCAN

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Abstract

Human Segmentation from 2D LiDAR point cloud data has its own challenges in indoor environments due to the difficulty in identifying the data directly. This research proposes a segmentation method using the DBSCAN (Density-Based Spatial Clustering of Application with Noise) algorithm to cluster human objects from the resulting point cloud data. DBSCAN effectively clusters data by handling variability in object shapes and noise without requiring the determination of the number of clusters. The test results identified three main clusters: Cluster 0 with more regular data distribution, Cluster 1 with more concentrated mean_x and mean_y values, and Cluster 2 with higher mean_y distribution and larger standard deviation. The results also showed that human objects were grouped into the same cluster. However, objects like chairs were segmented into the same cluster due to similar features. Additionally, the cluster quality evaluation using the Silhouette Score and Davies-Bouldin Index, which yielded scores of 0.700 and 0.439 for DBSCAN, respectively, indicates that this algorithm provides competitive segmentation despite the presence of noise. The method used shows potential for segmenting human objects in indoor environments using 2D LiDAR, although further refinements are needed to address the ambiguity of non-human objects with similar features.

Keywords: 2D LiDAR, DBSCAN, Point Cloud Data, Segmentation.