

Abstract

Modern technologies including GPS and LiDAR have made abundant amount of data available for processing and knowledge discovery. With increasing processing power and cheaper memory, data storage and processing is witnessing enormous growth. The central idea of this thesis is segmentation of point cloud for object discovery and subsequently, precise position estimation. In this study data clustering techniques are implemented in increasing order of their sophistication and performances. Results of these clustering techniques have further been used for precise position estimation of objects. For clustering purpose, partition and density based clustering methods are used. This clustering process is followed by position estimation through parametric implementation of Bayesian filters. Results prove the potential of Block Sequential K-means algorithm and Expectation Maximization algorithm for Gaussian mixture for real time on-line data processing. Kalman filter used for position estimation has provided significantly accurate position estimates. Findings of the study open scope for further studies on moving and non-moving objects differentiation, and object shape identification.

Key words: LiDAR, Point Cloud, Position Estimation, Clustering, Bayesian, Block Sequential K-means, Expectation Maximization, Gaussian Mixture, Kalman Filter.