ABSTRACT

Sevgen, Eray. MSCE, Purdue University, August 2013. Road Extraction from GPS Trajectories. Major Professor: Jie Shan.

Road extraction methods generally have been conducted on remote sensing images, orthophotos, and LiDAR data sets, acquired using specific and expensive measurement instruments. An alternative data source, GPS vehicle trajectories, have started to be used for the purpose of road extraction in recent years. The major advantage of these data sets is that they do not require any specific measurement equipment, and they present the opportunity to obtain up-to date roads. Therefore, the studies that addresses road extraction from GPS trajectories have gained intensive interest in many scientific and engineering disciplines.

In this thesis, we propose a road extraction method that utilizes GPS trajectories. Our method first segments each trajectory in the data set into homogeneous sub-trajectories using the heading direction intervals, then clusters the sub-trajectory groups into similar line segments using a density based clustering method, and finally fits the roads using a non-parametric regression method. In order to evaluate the results of the proposed algorithm, quantitative and qualitative evaluation frameworks are created, through which the algorithm's performance is evaluated using two different GPS trajectory data sets: urban area and highways. The experimental results indicate that the proposed algorithm produced better results for the urban area roads in the study.