

## ABSTRACT

Youn, Jun Hee, Ph.D., Purdue University, August, 2006. Urban Area Road Extraction from Aerial Imagery and LIDAR. Major Professor: James S. Bethel

The primary subject of this thesis is an investigation into the automatic extraction of urban area roads from aerial imagery and LIDAR. Such extracted data becomes an essential component of a modern GIS system. In order to accomplish this, there is a preliminary study about the generation of a true orthophoto from aerial imagery and LIDAR height information. This is done in order to accurately fuse the data from multiple sensors and overcome the image displacements present in unrectified imagery. Next, the study area is subdivided or segmented based on homogeneity of the dominant road directions.

Each region's road candidates are selected with a proposed free passage measure. This process is called the Acupuncture method. Features around the road candidates are used as key factors for an advanced Acupuncture method named the Region Based Acupuncture method. For refining the road candidates, building and grass area thematic maps are generated and used as a blocking mask for roads. Finally, A Ribbon Snake algorithm was designed and adapted to further refine road edges, whose initial information was provided by the prior result. Quantitative evaluations of detection performance and geometric accuracy are presented.