Road Extraction Assisted by Laser Data

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Abstract

How to make road extraction automatically remains a great challenge up to now. Published researches show that existing approaches are partly available for dealing with shadowed parts of roads especially to rural roads. In this paper, a new approach is proposed to apply laser range data to automatically extract urban roads from digital images. The extraction process is composed of three steps. The first step is working on laser images, where parameters like height and edges of high objects are obtained from the original laser images. At the same time, a new concept called "associated road line (ARL) graph" is developed to assist the road extraction from digital images. The second step deals with digital images, where road edges are obtained through Canny operator. The result proved that ARL graph is a homeomorphous mapping of real road line (RRL) graph. The gaps between segments of RRL are bridged through parts of its ARL through topological transformation. Finally, the shadowed parts of RRL are reconstructed with the help of spline approximate algorithm. The preliminary result proved that this approach is effective and has a potential advantage for efficient extraction of roads from complex patterns of urban road network.