

AUTOMATED VECTOR-VECTOR AND VECTOR-IMAGERY GEOSPATIAL CONFLATION

Wenbo Song

Dr. James Keller, Dissertation Supervisor

ABSTRACT

With the rapid advance of geospatial technologies, the availability of geospatial data from multiple sources has increased dramatically. Integration of multi-source geospatial data can provide insights and capabilities not possible with individual datasets. However, multi-source datasets over the same geographical area are often disparate and do not match well with each other. Accurately integrating geospatial data from different sources is a challenging task. In this dissertation research, we proposed a set of innovative geospatial conflation algorithms to attack the multi-source geospatial integration/conflation problem. We developed a novel snake-based approach to conflate two vector road datasets which has several benefits over traditional conflation methods. Since feature matching is one of the most crucial subtasks of conflation, we proposed a new relaxation labeling-based point matching algorithm to provide an elegant and well-motivated solution to the conflation problem. For the vector-to-imagery conflation, we presented a comprehensive approach by integrating several vector-based and image-based algorithms including spatial contextual signature extraction, road intersections and terminations extraction, relaxation labeling-based point matching, piecewise rubber-sheeting transformation, and snake-based refinement. Finally we extended our road conflation approach to digital parcel map to make it consistent with high-resolution imagery. The experiments on real world geospatial datasets showed excellent results.