Public Abstract
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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.