URBAN ROAD TRACKING BY FUSION OF SVDD AND REGION ADJACENCY GRAPHS FROM VHR IMAGERY

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ABSTRACT:

Road surfaces are seriously disturbed by a variety of noises on the very high resolution (VHR) remotely sensed imagery in urban areas, e.g., abrupt geometric deformation and radiometric changes caused by sharp turning, shadows of tall buildings, and appearance of vehicles, which leads to frequent failures for most of current road tracking methods. In this paper, a semi-automatic method is proposed for urban road tracking on VHR imagery. Initially, a human operator inputs three seed points on a selected road, and then necessary information, such as road direction, road width, start point, and a reference template, is automatically derived. The automatic tracking is consequently triggered. During the process, the reference template is moved to generate several target templates. For each target template, a binary template is derived by classifying the target template using support vector data description (SVDD). Subsequently, region adjacency graphs (RAG) is used to eliminate the small disturbing features on the road surfaces in each binary template, which is helpful to search the optimal road centerline points. The above tracking process is repeated until a whole road is completed. Two VHR images were used for the test. The preliminary results show that our method can extract roads more robustly than existing least-squares template matching method in urban areas.

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