Extraction of Road Edge Lines from High-Resolution Remote Sensing Images Based on Energy Function and Snake Model

Authors : Zuoji Huang, Haiming Qian, Chunlin Wang, Jinyan Sun, Nan Xu

Abstract : In this paper, the strategy to extract double road edge lines from acquired road stripe image was explored. The workflow is as follows: the road stripes are acquired by probabilistic boosting tree algorithm and morphological algorithm immediately, and road centerlines are detected by thinning algorithm, so the initial road edge lines can be acquired along the road centerlines. Then we refine the results with big variation of local curvature of centerlines. Specifically, the energy function of edge line is constructed by gradient feature and spectral information, and Dijkstra algorithm is used to optimize the initial road edge lines. The Snake model is constructed to solve the fracture problem of intersection, and the discrete dynamic programming algorithm is used to solve the model. After that, we could get the final road network. Experiment results show that the strategy proposed in this paper can be used to extract the continuous and smooth road edge lines from high-resolution remote sensing images with an accuracy of 88% in our study area.

Keywords : road edge lines extraction, energy function, intersection fracture, Snake model
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