A New Stereo Matching Approach Using Edges and Nonlinear Matching Process Objected for Urban Area

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Abstract

Automatic recognition of buildings has been in demand for efficient digital mapping process or updating of existing information in geographical information applications. It requires effective stereo matching techniques that are applicable to urban area. However conventional techniques that make use of area-based, point-based or edge-based matching cannot generate satisfactory results for urban area because of occlusion or inability of mismatching recovery. This paper proposes a new stereo matching technique, which combines edge detection and nonlinear mapping, and is based on a process called Coincidence Enhancement Method (CEM) [4]. Edge segments, obtained from edge detection and stereo matching process, are used as constraints for edge enhancement in depth map. Experiments on edge detection, edge matching, CEM and edge enhanced CEM were performed with stereo aerial imageries of urban area. The results show that the proposed approaches of CEM with edge support are efficient for improving the matching results surrounding building's boundary.