Han, Baoling; **Zhu, Ying**; **Luo, Qingsheng**; **Xu, Bo**; **Zhang, Tian**
3D reconstruction method based on contour features. (English) Zbl 1374.94132
J. Beijing Inst. Technol. 25, No. 3, 301-308 (2016).

Summary: To guarantee the accuracy and real-time of the 3D reconstruction method for outdoor scene, an algorithm based on region segmentation and matching was proposed. Firstly, on the basis of morphological gradient information, by comparing color weight gradient images and proposing a multi-threshold segmentation, scene contour features were extracted by a watershed algorithm and a fuzzy c-means clustering algorithm. Secondly, to reduce the search area, increase the correct matching ratio and accelerate the matching speed, the region constraint was established according to a region's local position, area and gray characteristics, the edge pixel constraint was established according to the epipolar constraint and the continuity constraint. Finally, by using the stereo matching edge pixel pairs, their 3D coordinates were estimated according to the binocular stereo vision imaging model. Experimental results show that the proposed method can yield a high stereo matching ratio and reconstruct a 3D scene quickly and efficiently.

MSC:

94A08 Image processing (compression, reconstruction, etc.) in information and communication theory

Keywords:

gradient map; watershed algorithm; fuzzy c-means clustering algorithm; region constraint; contour matching; 3D reconstruction

Full Text: DOI