



## A NOVEL GRID INTERSECTION POINT DETECTION AND MATCHING METHOD IN THE BINOCULAR PULSE MEASUREMENT SYSTEM

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*Abstract- To improve the accuracy of binocular 3D image reconstruction, the grid-pattern structure lines are printed on the detected objects and the grid lines intersection points are adopted as feature points and primitives in matching process. In this paper, a novel method for detecting the intersection points of the grid lines based on image segmentation and ridge line fitting is proposed. Firstly, the set of line segments on the border of the grid lines are extracted using the Canny edge detector and Hough transformation. Then, the global structure parameters are acquired through cluster analysis. Secondly, the grayscale image is divided into several detection regions (each of which includes one intersection point to be detected) in accordance to the obtained global structure parameters and the intersection points in the detection regions are accurately located using the ridge line fitting method. Finally, the intersection points in the left and right images are matched based on their distributions. To examine the detection performance of the proposed method, experiments have been conducted on actual and polluted images, respectively. The experimental results have demonstrated that the recognition ratio of the intersection points by the proposed ridge line fitting-based method is as high as 100%, the false positive ratio is 0 and the matching accuracy is up to 100%. Compared with the results obtained using traditional methods, the proposed method detection results are characterized by high accuracy, stability, uniqueness and invariability. Hence, the proposed method can meet the demands of 3D image reconstruction.*

**Index terms:** Grid image, intersection point detection, image segmentation, ridge line fitting, global feature, cluster analysis.