

## RGB-D SLAM Algorithm Based on pixel level Dense Depth Map

**Authors :** Hao Zhang, Hongyang Yu

**Abstract :** Scale uncertainty is a well-known challenging problem in visual SLAM. Because RGB-D sensor provides depth information, RGB-D SLAM improves this scale uncertainty problem. However, due to the limitation of physical hardware, the depth map output by RGB-D sensor usually contains a large area of missing depth values. These missing depth information affect the accuracy and robustness of RGB-D SLAM. In order to reduce these effects, this paper completes the missing area of the depth map output by RGB-D sensor and then fuses the completed dense depth map into ORB SLAM2. By adding the process of obtaining pixel-level dense depth maps, a better RGB-D visual SLAM algorithm is finally obtained. In the process of obtaining dense depth maps, a deep learning model of indoor scenes is adopted. Experiments are conducted on public datasets and real-world environments of indoor scenes. Experimental results show that the proposed SLAM algorithm has better robustness than ORB SLAM2.

**Keywords :** RGB-D, SLAM, dense depth, depth map

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