

## PointNetLK-OBB: A Point Cloud Registration Algorithm with High Accuracy

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**Abstract :** To improve the registration accuracy of a source point cloud and template point cloud when the initial relative deflection angle is too large, a PointNetLK algorithm combined with an oriented bounding box (PointNetLK-OBB) is proposed. In this algorithm, the OBB of a 3D point cloud is used to represent the macro feature of source and template point clouds. Under the guidance of the iterative closest point algorithm, the OBB of the source and template point clouds is aligned, and a mirror symmetry effect is produced between them. According to the fitting degree of the source and template point clouds, the mirror symmetry plane is detected, and the optimal rotation and translation of the source point cloud is obtained to complete the 3D point cloud registration task. To verify the effectiveness of the proposed algorithm, a comparative experiment was performed using the publicly available ModelNet40 dataset. The experimental results demonstrate that, compared with PointNetLK, PointNetLK-OBB improves the registration accuracy of the source and template point clouds when the initial relative deflection angle is too large, and the sensitivity of the initial relative position between the source point cloud and template point cloud is reduced. The primary contribution of this paper is the use of PointNetLK to avoid the non-convex problem of traditional point cloud registration and leveraging the regularity of the OBB to avoid the local optimization problem in the PointNetLK context.

**Keywords :** mirror symmetry, oriented bounding box, point cloud registration, PointNetLK-OBB

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