

ROBUST POSE ESTIMATION OF RANDOMLY STACKED RIGID OBJECTS THROUGH VIRTUAL SPACE MODELING AND SIMULATION

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ABSTRACT: Random Bin Picking (RBP) is an important problem in industrial automation, particularly for flexible production line. Since there is no close-form description of the stacking and occlusion situation of parts, the robustness of object pose estimation becomes a challenging issue. Designing a general strategy is even more difficult under the uncertainty of sensor noise and ambient conditions. In this paper, we propose a virtual-space modeling approach to RBP. The virtual space considers the sensor noise and physical models of the environment to render imperfect observations. It enables us to perform individual feature analysis on these observations and obtain prior information associating salient features to view angles. Simulation results show that such a framework can potentially improve the online pose estimation performance for RBP.

Keywords: random bin picking, pose estimation, depth sensor, point cloud.