Hybrid Deep Learning and FAST-BRISK 3D Object Detection Technique for Bin-Picking Application

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Abstract : Robotic arms have gained popularity in various industries due to their accuracy and efficiency. This research proposes a method for bin-picking tasks using the Cobot, combining the YOLOv5 CNNs model for object detection and pose estimation with traditional feature detection (FAST), feature description (BRISK), and matching algorithms. By integrating these algorithms and utilizing a small-scale depth sensor camera for capturing depth and color images, the system achieves real-time object detection and accurate pose estimation, enabling the robotic arm to pick objects correctly in both position and orientation. Furthermore, the proposed method is implemented within the ROS framework to provide a seamless platform for robotic control and integration. This integration of robotics, cameras, and AI technology contributes to the development of industrial robotics, opening up new possibilities for automating challenging tasks and improving overall operational efficiency.