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DETECTION AND POSE ESTIMATED GRASPING OF AN INDUSTRIAL ROBOT IN BIN PICKING OPERATIONS

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Abstract

The technique used by a robot to grab objects that are randomly placed inside a box or a pallet is called bin picking. Bin picking has evolved greatly over the years due to tremendous strides empowered by advanced computer vision technology, software development and gripping solutions. However, the creation of a versatile system, capable of collecting any type of object without deforming it, regardless of the disordered environment around it, remains a challenge. In this thesis a solution for this problem that is based on learning the appearance model using convolutional neural networks (CNN) is proposed. By synthetically combining object models and backgrounds of complex composition and high graphical quality, we are able to generate photo realistic images with accurate annotated 3D pose for all objects in our custom created dataset. Using this network, we can estimate the object poses with sufficient accuracy for real world semantic grasping in a cluttered bin by real robot.

Keywords: convolutional neural networks, pose estimation, computer vision, cluttered bin, synthetic data

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