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Volume 12

Washington University
Undergraduate Research Digest

Spring 2017

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Jonathan Gross

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Recommended Citation

Gross, Jonathan, "Robotic Arm Pile Sorting" (2017). *Volume 12*. 71.
https://openscholarship.wustl.edu/wuurd_vol12/71

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ROBOTIC ARM PILE SORTING

Jonathan Gross

Mentor: Arye Nehorai

The purpose of this research project was to have a 6-axis FANUC robotic arm, in conjunction with a stationary 3D Kinect camera, pick up, then sort objects that were in a randomly oriented pile. In order to achieve this, we developed image processing algorithms in Matlab that analyzed images from the Kinect, searching for a location where the robotic arm would have a high chance of success to pick up a target object. These computer vision algorithms employed: Canny edge detection, Hough Transforms, image combination, and image filtering. After identifying this location in the Kinect image, we performed a coordinate transformation to translate these coordinates (XYZ and Roll-Pitch-Yaw) from the Kinect's coordinate system to the FANUC's coordinate system. This coordinate transformation matrix was determined using a calibration method that sampled 64 points. Once a target object was picked up, it could then be moved to a fixed position where it could be easily identified and sorted. Alternate methods such as 3D point cloud model detection, point feature matching, and object training were also tested, but proved to be infeasible.