Arm Kinematics with real-time depth vision feedback

Problem Statement: Given a robot arm that is capable of picking up objects based upon known X,Y,Z coordinates, need ability for the robot to compensate for servo tolerance / errors with continual vision & depth feedback. The solution needs to run real-time (2-5 fps), in order to guide the robot hand to the object.

Target Product: Humanoid robot able to pick up objects and bring to humans (examples include recovering patients and elder care)

Resources: Intel will provide new Intel® RealSense™ depth cameras for this project, and parts for building a robot arm (to be returned after the project).

Suggested Approach: Desired solution would use a depth camera to provide real-time feedback / hand adjustment to align better with object. Work would use ROS (Robot Operating System) "Move-it" Library, and may optionally include providing feedback / improvements to the open source ROS libraries. PCL (Point Cloud Library) is recommended be used for determining the current hand position relative to the object to pick up.

Options: Step one might be to build the arm. Intel could provide an Arm for this work, or if students wanted to build the arm for this, Intel could loan servos and materials to build the arm under Intel specifications (Arm would be returned back to Intel at the end of the project).

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