Semi-automated Grasp Testing
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Motivation
- Running repeated grasping trials are a key component of robotic grasping research.
- Researchers are dependent on the analysis of these trials to help improve robotic grasping.
- Unfortunately, it is a time consuming process requiring a person to start and reset the grasp objects each trial.

Goal: Developed a system that will allow grasp to be tested, semi-independently of a human experimenter.

Methods

Grasping Software
- Takes in joint positions for the hand according to the grasp.
- Guides arm and hand to a position for the grasp
- Automatically grasp object until grasp is considered good
- Test grasp as many times as needed

Physical Box Design
- The object is attached with Velcro to the platform
- A Raspberry Pi interfaces with the motor controller and two stepper motors to pull the object up
- A pulley system and wedged platform ensure the object is reset correctly.

Data Collected
- Video of the entirety of each trial
- Pointclouds: 3D visualizations of the beginning, middle, and end of each grasp trial
- Torque sensors in the joints of the hand inform on the strength of each grasp

Results

Success Rates
- Small object: 80-100%
- Medium objects: 70%
- Large Objects 40%

Further Work
- Run more studies using device
- Redesign pulley system for heavier objects

Grasp: The hand is positioned over the object, and grasps.
Shake Test: The arm raises the object, and vigorously shakes.
Drop: The arm drops the object, and moves out of the way.
Reset: The box resets the object to its original position.

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Further Information
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Literature Cited