Practical course robotics project proposal

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Goal

Robust grasping of unknown objects is a problem at the heart of many tasks in the field of robotics. Our main goal is to setup a framework which extracts robust grasp poses from RGBD-Images.

Problems and methods

This section gives an overview over the general problems of the objective and the methods we will use to overcome these difficulties.

- Problems:
  - Localization of objects.
  - Localization of robust grasp points.
- Methods:
  - Robot control using *rai* framework
  - Sampling of grasp candidates using a grasping policy (e.g. *CrossEntropyRobustGrasping-Policy*[1])
  - evaluation of grasp candidates with pretrained *GQCNN*[2]
  - localization of objects using bounding boxes (if necessary)

Milestones

Table 1: Timeline

16.05.19	Basic setup, process RGBD images from Baxter/PR2 with GQCNN
23.05.19	Grasp object with default grasping policy
06.06.19	Tune control, recalculate online if object moves
13.06.19	Experiment with different grasping policies

[1] `https://github.com/BerkeleyAutomation/gqcnn/blob/a0930e9d2fef3c930c41dd91cde902d261348fbe/gqcnn/grasping/policy/policy.py#L627`

[2] `https://github.com/BerkeleyAutomation/gqcnn`

Requirements

- Baxter
- PR2
- Optional: machine with GPU for further training. We can also bring our own desktop pc.
- Details about camera intrinsics
- RAI framework running on machines with nvidia graphics card (but this problem might be related to the newest nvidia-driver.)