Problem description:
A new generation of compliant robotic manipulators (e.g. Franka Emika Panda) allows safe physical collaboration with humans. These robots lend themselves to applications such as service, rehabilitation or elderly care, where humans and robots are required to interact physically. To be helpful for the human these robots should be able to find and grasp objects in its surrounding.

There are plentiful approaches to this issue, mainly based on precise prior knowledge of the objects geometries and appearance [1]. In this work, we want to take a new approach, which should be more reliable and flexible facilitating the latest technologies of the areas of deep learning and computer vision. In detail Mask R-CNN [2] or Faster R-CNN [3] should be used for object detection and GPD [4] [5] for generic grasp position detection.

Tasks:
- Literature research and documentation.
- Enhance a data generator for creation and annotation of images.
- Improve Mask R-CNN to generate masks of better quality.
  - Add depth information to training dataset.
- Train neural networks to generate mask and get point clouds of objects based on object mask and depth camera.
- Combine GPD and evaluate the approach on the real system.

Bibliography: