
A graspable object dataset constructed with the iCub humanoid robot’s camera

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Abstract

In this technical report, we present the detailed description of a new dataset constructed with the iCub humanoid robot platform and a motorized turntable. To construct a rotation-invariant dataset, we selected 50 different graspable objects. With the robot camera, we captured images of an object performing a full rotation in steps of approximately 5 degrees. In total, we collected 3600 color images of 50 objects (72 per object).

1 Introduction

To construct a new dataset via a robot platform, we followed similar acquisition procedures used for the Columbia Object Image Library (COIL-100)[1]. The dataset contains 72 unprocessed color images for every object (3600 in total). The objects were selected to be graspable by a robotic hand. Figure 1 shows one of the objects and some of its poses captured by the iCub robot’s camera. We make the image dataset publicly available to other researchers¹. Since our ongoing studies rely on this image dataset, the repository will be continuously updated.

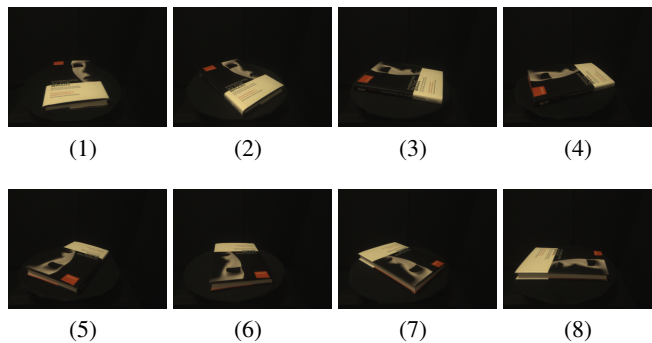


Figure 1: The selected object and in different poses.

2 Hardware setup and image Acquisition

The acquisition setup consists of the iCub humanoid robot and a motorized turntable. The setup can be seen in Figure 3. The data acquisition procedure begins with placing an object on the turntable; the object is, then, rotated by approximately 5 degrees while capturing an image with the iCub’s

¹The repository for the dataset and related source code: www.github.com/muratkirtay/icub-camera-dataset

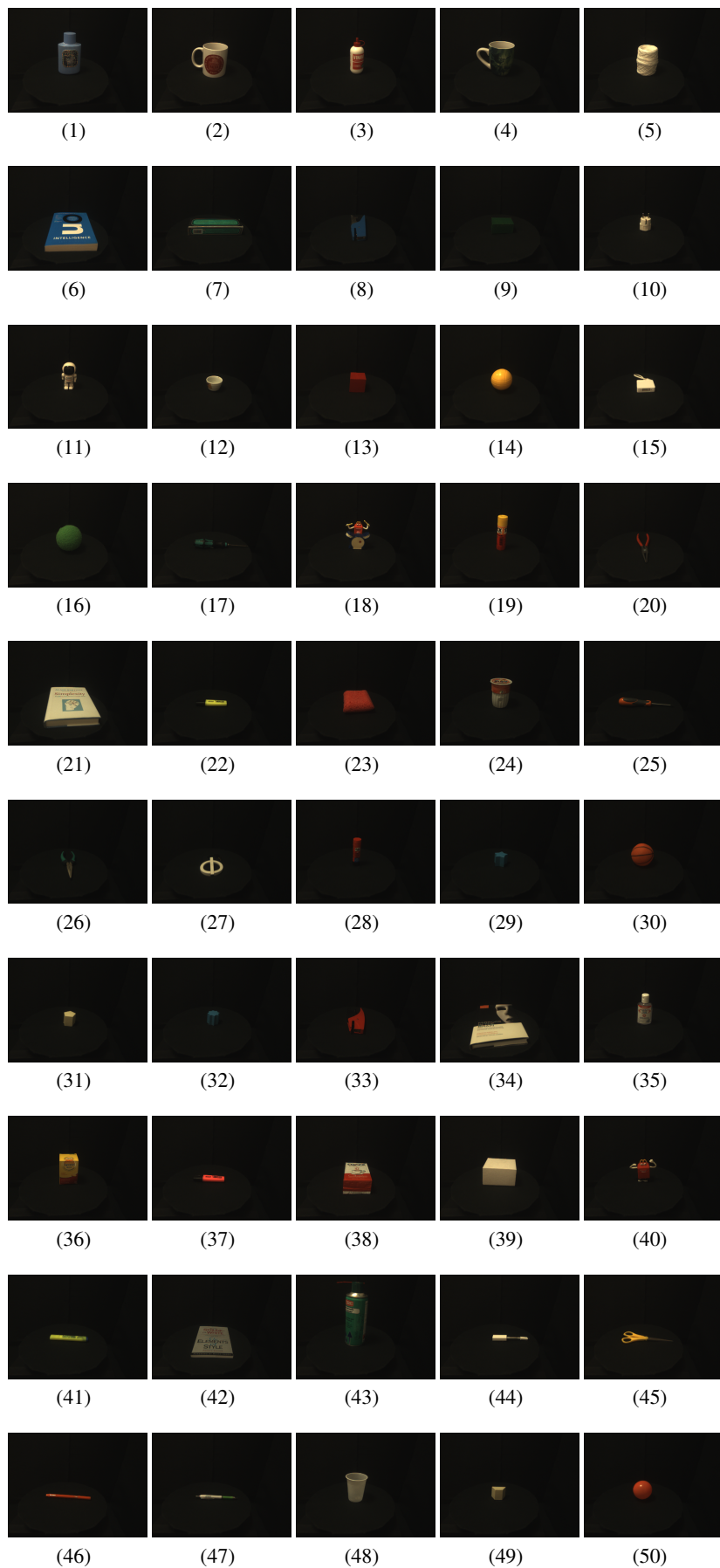


Figure 2: Collected images that captured from robot's camera at initial pose

camera located in the left eye of the robot. The Yet Another Robot Platform (YARP) middleware and its Python binding were used to capture raw image data (RGB pixel matrices). The obtained data were converted to the PNG format. This procedure was repeated until the turntable completes a full rotation. The same process is repeated automatically for each object in the dataset. At the end of this acquisition procedure, we captured 3600 color images (with the size of 640x480) and selected samples from the dataset are shown in the Figure 2.

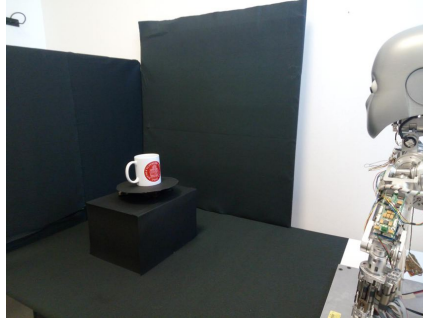


Figure 3: Experiment setup: iCub and motorized turntable

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References

- [1] S. A. Nene, S. K. Nayar, and H. Murase, "Object image library (coil- 100)," Tech. Rep., 1996.