

BURG

Abstract

Benchmarks for UndeRstanding Grasping

Grasping rigid objects has been reasonably studied under a wide variety of settings. The common mean is to ask the robot to hold an object for a few seconds. This is not enough. To obtain a deeper understanding of grasping, we propose (1) a task-oriented part-based modelling of grasping and (2) BURG - our castle* of setups, tools and building around an objective benchmark protocol.

The idea is to boost grasping research by focusing on complete tasks. This calls for attention on object recognition, essential to know how and where the gripper can grasp given the manipulation constraints imposed by the environment. To facilitate knowledge transfer to novel objects, across different sources (virtual/real data) and grippers, we propose a scalable system. The part-based approach naturally extends to deformable objects for which the recognition of parts, regardless of the object actual deformation, is essential to get a tractable manipulation problem. This way we can deal easier with environmental constraints that are detected and used to facilitate grasping.

Regarding benchmarking of manipulation, so far robotics suffered from uncomparable grasping and manipulation benchmarks that cover only the object detection aspect. Object sets are difficult to get, not extendible, and neither scenes nor setups are replicable. There are no common tools to solve the basic needs of setting up replicable scenes or reliable setups. Hence, with the BURG benchmark we propose to focus on community building through enabling and supporting performance evaluation, including collecting data and feedback from different laboratories for studying grasping on different robot embodiments. We will develop a set of repeatable scenarios spanning different levels of quantification, from the choice of the objects, tasks and environments. Examples include fully quantified settings with layered environments, deformable objects and environmental constraints. The benchmark will include metrics defined to assess the performance of low-level primitives (object pose, grasp point and type, collision-free motion) as well as manipulation tasks (e.g. assembling, packing, handover, folding) requiring ordering as well as common sense knowledge for scene understanding.

* Burg [bʁk] f <Burg; Burgen>; German: castle, stronghold, fortress

(2017)

Object recognition and manipulation by robots: Data sharing and experiment reproducibility (ORMR)

Partnership & Contact

BURG starts in April 2019, lasts 36 months and involves the partnerships below. The financial support of CHIST-ERA is about 964 933 €.

Partnership

Technische Universität Wien	Austria
Agencia Estatal Consejo Superior de Investigaciones Científicas	Spain
Italian Institute of Technology	Italy
University of Birmingham	United Kingdom

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