Semantic Perception and Mapping for Knowledge-enabled Service Robotics

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Abstract

Consider a robot that is to act as a household assistant in an unknown kitchen environment. This robot has to acquire and use knowledge about where the task-relevant objects, such as the dishwasher and the oven are and how the robot can act on them. A recent advent of smart devices (e.g. smart phones) and high-quality-low-cost sensors (e.g. Kinect) provides us with the affordable resources for the robot which link sensory information to the robot's knowledge base and high-level deliberative components. Resources like this allow the general-purpose service robots to e.g. query information from world wide web, seek help from remote experts through shared autonomy interfaces[1] and to act independently and safely in human living environments.

In this hands-on workshop we will identify key problems and solutions by narrowing down the definition of semantics, we will discuss what is the representative end world model as a result of semantic mapping, single out the optimal sensors, consider static vs. dynamic aspects of environment modeling and finally address the life-long learning in order to leverage not only the sensor data but also from human living patterns and behaviors. The workshop will feature excellent talks from researchers from academia as well as industry, live demonstrations, poster session and a working session with an aim to standardize some fundamental concepts in semantic mapping. We plan to build upon the series of related events at previous IROS, ICRA and RSS conferences.

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[1]http://pr2-remotelab.com/doku.php