

Finding Objects in Cluttered Scenes for Home Robotics

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We want computers and robots to observe us and know who we are and what we are doing, and to understand the objects and tasks in our world, both at work and in the home. We have built systems that enable mobile robots to find objects using visual cues and learn about shared workspaces.

We've demonstrated these abilities on Curious George, our visually-guided mobile robot that has competed and won the Semantic Robot Vision Challenge at AAIL (2007), CVPR (2008) and ISVC (2009), in a completely autonomous visual search task. In the SRVC visual classifiers are learned from images gleaned from the Web. Challenges include poor image quality, badly labeled data and confusing semantics (e.g., synonyms). Clustering of training data, image quality analysis, and viewpoint-guided visual attention enable effective object search by a home robot. But there remain many interesting challenges because objects are hidden by others and can only be seen from some viewpoints. We will discuss how to reason about viewpoint and recognition in cluttered scenes, using standard images and range data from the Kinect sensor.

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