Robot Learning Workshop

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David Held

Robotics Institute,

Carnegie Mellon University

Perceptual Robot Learning

Robots today are typically confined to operate in relatively simple, controlled environments. One reason for these limitations is that current methods for robotic perception and control tend to break down when faced with occlusions, viewpoint changes, poor lighting, unmodeled dynamics, and other challenging but common situations that occur when robots are placed in the real world. I argue that, in order to handle these variations, robots need to learn to understand how the world changes over time: how the environment can change as a result of the robot's own actions or from the actions of other agents in the environment. I will show how we can apply this idea of understanding changes to a number of robotics problems, such as object segmentation, tracking, and velocity estimation for autonomous driving as well as perception and control for various object manipulation tasks, including transparent, reflective, and deformable objects. By learning how the environment can change over time, we can enable robots to operate in the complex, cluttered environments of our daily lives.