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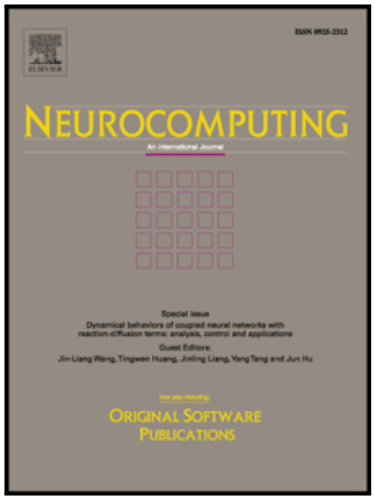

Towards Lifelong Assistive Robotics: A Tight Coupling between Object Perception and Manipulation

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Towards Lifelong Assistive Robotics: A Tight Coupling between Object Perception and Manipulation

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Abstract

This paper presents an artificial cognitive system tightly integrating object perception and manipulation for assistive robotics. This is necessary for assistive robots, not only to perform manipulation tasks in a reasonable amount of time and in an appropriate manner, but also to robustly adapt to new environments by handling new objects. In particular, this system includes perception capabilities that allow robots to incrementally learn object categories from the set of accumulated experiences and reason about how to perform complex tasks. To achieve these goals, it is critical to detect, track and recognize objects in the environment as well as to conceptualize experiences and learn novel object categories in an open-ended manner, based on human-robot interaction. Interaction capabilities were developed to enable human users to teach new object categories and instruct the robot to perform

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