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Title: Goal inference through action and affordance understanding for activating helping behavior

Abstract:

Young infants help others even in novel situations without any explicit request or expected reward. Although the underlying mechanism of this altruistic behavior is not known, it was hypothesized that infants try to minimize the prediction error they estimated for others' goals by actively involving in goal completion. In this talk, I will present our robot system that exploits its own (previously learned) sensorimotor control and prediction mechanisms in detecting others' actions, predicting the involved objects, estimating other's goals, and finally achieving the goals with their own means. In detail, the robot, in monitoring mode, works as a continuous predictive machine that hypothesizes about the target object and the type of demonstrated action through reasoning over the observed execution trajectory and taking into account the affordances provided by the object(s). Then, it predicts the consequence of the detected action on the corresponding object(s), and encodes it as a goal. In case the goal is not achieved within the predicted time interval, the robot leaves observation mode, and engages with the scene to achieve the goal itself. The goal is represented in a hierarchical manner, storing object identity related information in lower levels and encoding more abstract representations in higher levels. Using its own behavior repertoire and based on available objects and their affordances, the robot finally is able to make interesting and intuitive plans to help completion of the inferred goals of others.