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presents

Emergence of Human-Robot Interaction: Altruistic Behavior Through Minimization of Prediction Error

Mon 29.04.2019 13:00 at E112, Karlovo náměstí 13, Praha 2

The emergence of altruistic behavior in infants fosters their social development and supports their involvement in our society. Altruistic tendencies, intended to benefit others with no apparent rewards, are also very useful for social robots that are designed to be used in our households. Yet, to make robots capable of learning how to help others as infants do, it is important to understand the mechanisms and motives responsible for the development of altruistic behavior. Further, understanding the mechanisms behind the early development of pro-social behavior would be a great contribution to the field of developmental psychology. To these ends, we hypothesize that infants from 14 months of age help others to minimize the differences between predicted actions and observations, that is, to minimize prediction errors. To evaluate our hypothesis, we created a computational model based on psychological studies and implemented it in real and simulated robots.



Our system first acquires its own sensory-motor representation by interacting with its environment. Then, using its experience, the system recognizes and predicts others' actions and uses this prediction to estimate a prediction error. Our experiments demonstrated that our robots could spontaneously generate helping behaviors by being motivated by the minimization of prediction errors.



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