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Cognitive Models as Simulators: The Case of Moral Decision-Making

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Abstract

To achieve desirable performance, current AI systems often require huge amounts of training data. This is especially problematic in domains where collecting data is both expensive and time-consuming, e.g., where AI systems require having numerous interactions with humans, collecting feedback from them. In this work, we substantiate the idea of cognitive models as simulators, which is to have AI systems interact with, and collect feedback from, cognitive models instead of humans, thereby making their training process both less costly and faster. Here, we leverage this idea in the context of moral decision-making, by having reinforcement learning (RL) agents learn about fairness through interacting with a cognitive model of the Ultimatum Game (UG; Nobandegani, Destais, & Shultz, 2020), a canonical task in behavioral and brain sciences for studying fairness. Interestingly, these RL agents learn to rationally adapt their behavior depending on the emotional state of their simulated UG responder.