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## Title

Hybrid Cognitive Agents: Dynamical Modeling of the Intelligent Behavior of Animals and Robots

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## Abstract

To facilitate the construction and analysis of animal-robot systems, we propose to model animals and robots on equal footing: as hybrid cognitive agents. This modeling uses Aaron's framework for intelligent behavior modeling, where goal-directed behavior of embodied agents emerges from closed-loop interactions with the environment, including other agents. The relevant physical and cognitive components of the agents' systems are represented and integrated in a unifying dynamical system model, in order to underwrite reactive processes, deliberative processes, and learning. By treating both fish and robots as hybrid cognitive agents, we can model their behavioral interactions explicitly as the on-going consequence of internal states such as goals and intentions.