University of Zurich[UZH]

Department of Economics – Neuroeconomics Seminar

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Intrinsically Motivated Intelligence

While most theories of behavior assume that animals maximize rewards, much of natural behavior, such as curiosity and play, is intrinsically originated, with no reference to extrinsic tasks. In AI, extrinsic reward maximization has been successfully used to train agents to perform specific tasks, but without additional internal signals that promote exploration and curiosity, learning is slow, or even halts, due to reward sparsity. In this talk, I will introduce the maximum-occupancy-principle (MOP), an intrinsic motivation signal that adopts as principle the diversity and variability of natural behavior. By maximizing the occupancy (entropy) of action-state paths, agents endowed with MOP can generate all sorts of behaviors in a close-loop, open-ended manner, solely shaped by terminal states and cognitive and body limitations. MOP behaviors spontaneously and dynamically reorganize into goals and subgoals. Applied to neural networks, MOP is shown to promote the visitation of the full repertoire of activity patterns, with no dynamical collapse to a few of them. I will also talk about some preliminary results on how intrinsic motivation can explain some common neuroeconomic biases. All in all, MOP provides the first open-ended generative model of behavior in embodied agents.