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Automatically perceiving paths through a scene

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Abstract

We effortlessly perceive not only what is present in a scene, but what actions and outcomes are possible—such as whether an agent can reach a door or an object might fall. How the visual system infers the paths to possible goal states, while respecting environmental dynamics and constraints, remains unclear. We tested this in simple maze-like scenes using a Go/No-Go task to probe which states are perceived as “leading up to” a goal. Participants pressed a button when an image showed an agent at the maze end next to a target, without being given this verbal description. Participants produced many more false alarms when the agent was closer to the goal along the maze path. By contrast, scenes matched in Euclidean distance but requiring crossing a wall did not elicit false alarms. These findings suggest scene constraints shape perceived similarity between states, motivating extensions to richer environments and domains.