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Predicting human decisions in a sequential planning puzzle with a large state space

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Abstract

We study human sequential decision-making in large state spaces using a puzzle game called Rush Hour. A puzzle consists of a dense configuration of rectangular cars on a 6x6 grid. Each car moves only horizontally or vertically. The goal is to move a target car to an exit. In a given state (board position), a subject (n=86) could move a car, restart the puzzle, or surrender. A move is correct if it reduces the distance (number of moves) to the goal. Using mixed-effects logistic regression modeling, we find that the probabilities of an error, a restart, and a surrender are higher with a longer distance to goal, higher mobility, and when the previous move was an error. The effects of distance to goal and mobility are consistent with tree search. As a next step, we plan to investigate the heuristics that people might use for such tree search.