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A computer mouse-based throwing task to study perceptual-motor skill learning in humans and machines

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Abstract

Perceptual-motor tasks offer redundant solutions to achieve a goal. However, not all solutions are equally robust to error-producing noise or variability and thus, skill learning can be viewed as a search process to identify behaviors that are error-tolerant. Throwing a ball to hit a target is one such example of a complex perceptual-motor skill that has been studied in the laboratory via the virtual "skittles" task, a simplified 2D task involving throwing a tetherball around a pole to hit a target. We implemented the task as a Unity3D environment (code here: https://github.com/ShortFox/SkittlesTaskEnvironment/) which enables participants to complete the task with a computer mouse and replicated key findings from previous research. Our implementation allows for remote data collection and can serve as a pedagogical tool to teach concepts in skill acquisition. Future work will use this task to explore human versus machine skill acquisition by leveraging Unity's MLAgents reinforcement learning package.

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