Modeling Human Navigation in First-Person Herding Tasks

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Abstract

Modeling human navigation and route selection in complex environments has used path planning in the past and more recently, dynamical models. The current study modeled the navigational movement trajectories of human herder agents tasked with corralling an autonomous target agent into a specified containment zone. Analyses of trajectories of participants completing a first-person herding game revealed that their movement entailed sequential (i) approach and then (ii) corral phases that were invariant to the initial location of the herder and target agents. More importantly, the trajectories of human herders could be captured using a low-dimensional environmentally coupled dynamical model. The novelty of this work is in extending the previous research in modeling navigational behaviors of humans to include moving targets that need to be manipulated into a desired position. Implications of the findings for the development of artificial agents for human-machine herding, as well as more general human-machine teaming are discussed.

In M. Goldwater, F. K. Anggoro, B. K. Hayes, & D. C. Ong (Eds.), *Proceedings of the 45th Annual Conference of the Cognitive Science Society.*