Intention Inference in a Dynamic Multi-Goal Environment

Desmond Ong
National University of Singapore, Singapore, Singapore

Marie Therese Quieta
Institute of High Performance Computing, Singapore, Singapore

Fernando Basura
Institute of High Performance Computing, Singapore, Singapore

Abstract

Navigating the social world relies upon the human capacity for mentalizing, or attributing intentions to social agents. Unfortunately, currently available commercial robots still lack such awareness of human intentionality. Building upon recently-proposed Bayesian models of Theory of Mind (ToM), we propose a ToM model that can handle intention inference in dynamic, fast-changing environments like a hospital, where staff have to attend to objectives and emergencies as they arise. Our model infers and maintains a distribution over possible intentions, and uses the posterior predictives to forecast future trajectories, which is essential for robot motion planning. We show that our model performs excellently at inferring the intentions and trajectories of human players controlling a nurse agent in a simulated environment. This work lays the foundation for robots that can co-work with humans in dynamic, social environments with high-stake goals.