Tracking Uncertainty During Uncertain Tracking

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Abstract

Multiple object tracking is often studied in settings where objects are largely observable. However, tracking often occurs in settings with much greater uncertainty. Objects can frequently go in and out of view, requiring us to constantly update our estimates of where things might be, and assess whether or not something new has appeared. To accomplish this, people need to rely on top-down inferences to fill in the gaps of uncertainty. To study this phenomenon, we introduce a novel "firefly tracking" paradigm, in which people need to estimate the quantity and dynamics of an unknown objects under highly sparse observations. We model human behavior on this task and demonstrate how probabilistic inference in a generative model captures human uncertainty during challenging tracking tasks.

——————————- Paper available at https://yonifriedman.com/publications/CogSci2025_Tracking-Uncertainty.pdf

In D. Barner, N.R. Bramley, A. Ruggeri and C.M. Walker (Eds.), *Proceedings of the 47th Annual Conference of the Cognitive Science Society*