When vision loses its "grip" on tracked objects: Lessons from studying gaze-to-item dynamics

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Abstract

We use a unique gaze-to-item analysis to study when vision "loses its grip" on tracked objects. Important insights can be gained by looking at spontaneous tracking failures and those that occur during uninterrupted vs. interrupted tracking (such as when we blink our eyes or objects overlap each other). We generate an explicit trace of eye-movement paths and each of the eight item positions recorded over the course of each of (138–5 sec) multiple object tracking (MOT) trials. Temporal profiles of scan- and item-paths, help identify sources of tracking failures obscured by the aggregated accuracy measures typically recorded at the end of each trial. We show tracking failures from object crowding, and subsequent gaze-switching from targets to non-target items. We also show how spontaneous switching across tracked objects is common, and does not impair tracking accuracy (See *Elfanagely et al.*, VSS 2011). Finally, we show when object tracking is disrupted briefly (<1 sec), our gaze continues to remain close to those items tracked just prior to their disappearance (See *Alley et al.*, VSS 2011). Because we have tested conditions where gaze and attention are correlated, scan path patterns are easily understood in terms of gaze and attentional indexing as two systems coordinating to effectively track objects.

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