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Visualizing Motion Traces Enhances Pursuit Detection in Dynamic Scenes

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Abstract

Detecting dynamic spatial relationships, such as pursuit, can be cognitively demanding (Scholl & Gao, 2013). Research has identified visual cues that influence pursuit detection, including the distance between the pursuer and the target (Meyerhoff, Schwan & Huff, 2014) and the number of objects in a scene (Gao, Baker, et al., 2019; Kon, Khemlani & Lovett, 2024). We turn to data visualization research to explore techniques to improve pursuit detection in dynamic scenes. For example, displaying trajectory histories can aid processing by reducing cognitive load (Heer & Robertson, 2007). We conducted a study in which participants viewed visualizations of six moving dots, either with or without trace lines, and determined whether one dot was chasing another. Preliminary findings suggest that trace lines improve the speed and accuracy of pursuit detection. Our results bridge visualization and vision science, suggesting that trace lines might enhance pursuit detection by providing less transient shape-based visual cues.

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