Color, Relevance and Eccentricity Influence Detection Performance of Changes in Driving Scenes

Khondoker Usama

College of Engineering

Abstract: Background: The ability to detect sudden onset of events while driving is critical for driving safety. This study explored how factors such as color, relevance to driving and eccentricity of changes influence the detection performance of driving scenes. Method: A change detection paradigm using real-world driving scenes was used (McCarley, et al, 2004). Participants detected the only change in a pair of driving images. The changes varied in color (green, red or other colors), eccentricity (peripheral versus central), and relevance for driving (related versus unrelated). An eye-tracker monitored participants’ eye scanning patterns. Results: Behavioral and eye movement data suggested that color, relevance to driving and eccentricity all influence change detection performance of driving scenes. Changes in red were detected quicker and with fewer fixations than changes in green or other colors; Changes relevant to driving (such as appearance of a stop sign or a car) was detected significantly quicker and with fewer fixations than changes not relevant to driving (such as grass color change or onset of an advertisement post); Participants detected changes appearing in the center quicker than changes appearing in the peripheral location of the scenes. The saccadic amplitude was smaller for changes in the center than changes in the peripheral location. In summary, change detection performance is better for red, relevant and central changes (McCarley et al., 2004; Zwahlen & Schnell, 1997). Applications: This study can potentially be used to guide the design of the road and advertisement.

Faculty Sponsor: Jibo He