

Familiarity recognition in automated screening environments: Utilizing eye-tracking technology as an intelligence-gathering tool.

Jeffrey Gainer Proudfoot, Dr. Jay F. Nunamaker, Dr. Judee K. Burgoon, Dr. Elyse Golob
BORDERS - Department of Management Information Systems, University of Arizona, Tucson, Arizona 85721

Introduction

A significant portion of drug-trafficking and human-trafficking operations are orchestrated by complex criminal enterprises. When drug runners and human traffickers are arrested they are quickly replaced and the criminal activity continues. The reduction of illegal activity near the border is contingent upon the apprehension of criminal leaders managing these organizations. While leaders rarely pass through screening checkpoints, lower level members of their criminal enterprises frequently do. If a system existed that could recognize familiarity as individuals viewed pictures of criminal leaders' faces while passing through border checkpoints, flagged individuals could be questioned for more information.



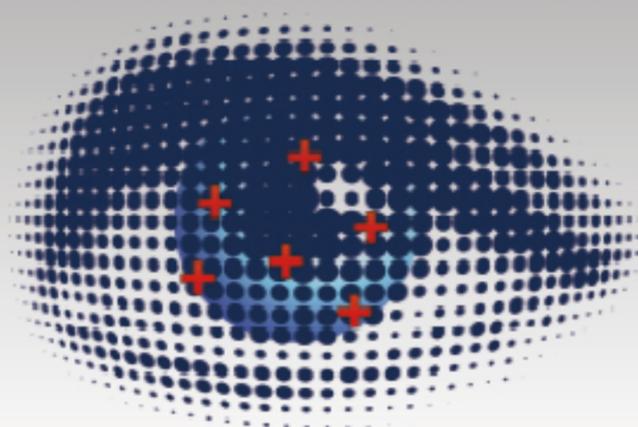
Related Research

Eye tracking systems have been utilized for a variety of purposes, one of which is identifying familiarity based on eye gaze behavior. In a recent study, researchers successfully utilized eye tracking technology to conduct a Guilty Knowledge Test (Ryan Jr, Pavlidis, Rohrbaugh, Marchak, & Kozel, 2003) to identify familiarity based on photos of manipulated objects (Derrick, Moffit, & Nunamaker, 2010). This proposal identifies a potential application of this technology in an automated-screening paradigm where individuals would view images of peoples' faces.



Methodology

To test the feasibility of this system, a repeated-measures design will be used. During the experiment, subjects will view a compilation of images while being monitored by an eye-tracking device.



A variety of control images will be displayed. To test the orienting response, altered images (an added or removed mole, tattoo, freckle, etc.) will be displayed.



Subjects familiar with the individuals in manipulated photos are likely to focus on the unfamiliar facial characteristics displayed in the photo demonstrating guilty knowledge and can thus be categorized as being familiar with that individual. At a border crossing, this technology would allow agents to identify suspects affiliated with criminal enterprises, which could result in additional intelligence regarding the leaders of these dangerous organizations.



Conclusion

I expect that subjects will focus their eye gaze on the manipulated element, or elements, of a familiar person's photograph. The results of this exploratory study will be critical in ascertaining the feasibility of using eye-tracking technology as a Guilty Knowledge Test to identify familiarity in automated screening environments. If this preliminary research is successful, additional studies will be developed to refine the system's functionality and reliability. Ultimately, it has the potential to be integrated into an automated-screening kiosk currently being developed by BORDERS researchers.



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