Detecting eye-contact to facilitate non-contact interaction with devices

Technology #cu13348

The capability of humans to interact with devices simply by looking at them has many powerful applications. Existing approaches to achieve this level of interaction rely on continuous tracking of eye movement, but this requires special hardware such as infrared emitters and is only effective at close ranges. For many applications, continuous tracking of eye movement is not required; instead, confirmation of eye-contact with the device is sufficient. This technology is a method for detecting eye-contact, referred to as gaze locking, which can be implemented either as a real-time detector or for processing of existing images. No additional camera hardware is required, and effective detection can be performed at long ranges. This technology has many potential applications, such as increasing the effectiveness of advertisements, filtering image databases, or ensuring that everyone in a photo is looking toward the lens before the camera is triggered.

Binary gaze locking classification allows for robust and long range device interaction

This technology is effective because it does not require any specialized imaging detectors. Once an ordinary image has been acquired, a three step process of locating sets of eyes, generating a feature vector for each set, and binary classification of gaze locking is carried out. The process is robust, and can be applied to eyes with varied appearance and multiple sets of eyes within single images.

A prototype of the technology has been developed that provides accurate gaze locking detection over various distances and head tilt angles.

Lead Inventor:

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Applications:

- Image filtering based on eye-contact
- Camera triggering for photography
- Targeted advertising and analytics
- Non-contact interaction with electronic devices

Advantages:

- Does not require specialized imaging hardware
- Accurate over long ranges
- Capable of analyzing existing images

Patent Information:


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Related Publications:


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