An Implementation of Eye Movement-Driven Biometrics in Virtual Reality

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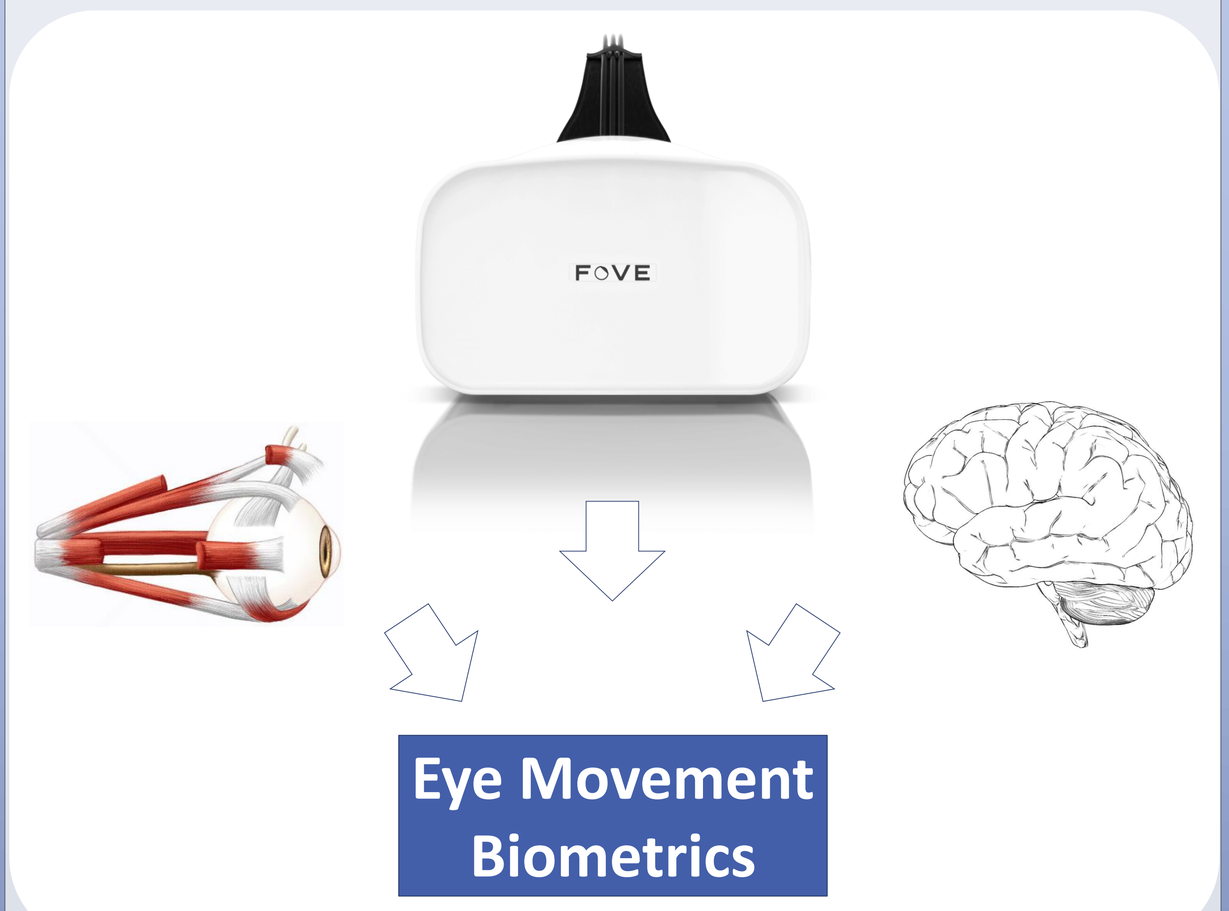
ABSTRACT

As eye tracking can reduce the computational burden of virtual reality devices through a technique known as foveated rendering, we believe not only that eye tracking will be implemented in all virtual reality devices, but that eye tracking biometrics will become the standard method of authentication in virtual reality. Thus, we have created a real-time eye movement-driven authentication system for virtual reality devices. In this work, we describe the architecture of the system and provide a specific implementation that is done using the FOVE head-mounted display. We end with an exploration into future topics of research to spur thought and discussion.



FEATURES

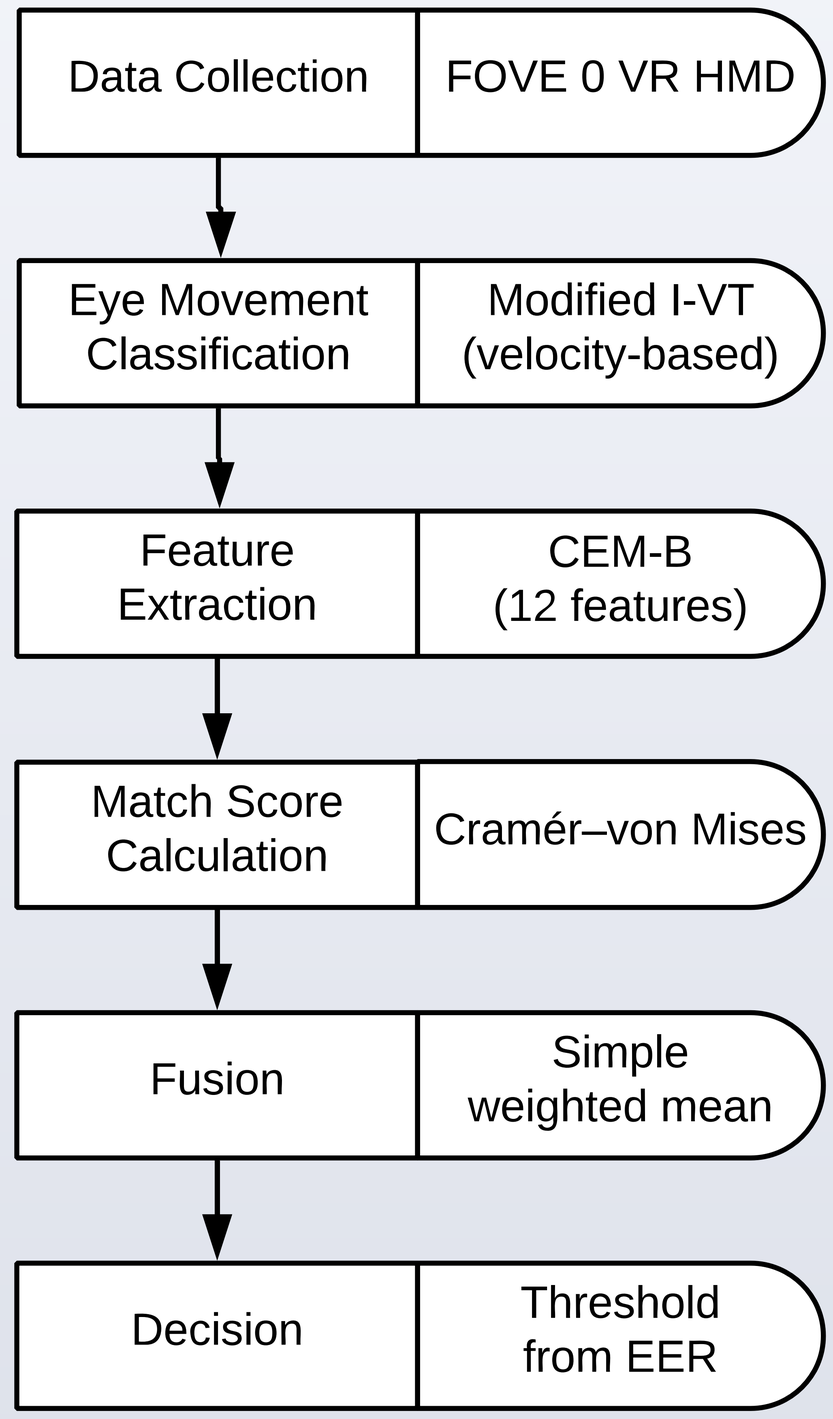
Fixation features:

1. Start Time
2. Duration
3. Horizontal Centroid
4. Vertical Centroid

Saccade features:

1. Start Time
2. Duration
3. Horizontal Amplitude
4. Horizontal Velocity, Mean
5. Horizontal Velocity, Max
6. Vertical Amplitude
7. Vertical Velocity, Mean
8. Vertical Velocity, Max

PROCESS



FUTURE WORK & CHALLENGES

- Classifying 3D eye movements, especially vergence
- Finding and employing temporally persistent features
- Identifying the most efficient set of stimuli
- Testing on a large and diverse subject pool

ACKNOWLEDGEMENTS

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