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FaceRevelio: A 3D Face Authentication System for Smartphones with Single Front Camera

This 3D face authentication system uses a smartphone's existing camera and screen illumination to create a secure 3D face model for user verification without requiring any additional hardware.

Facial authentication mechanisms have been gaining traction as a convenient method of cell phone security. However, current systems either use traditional 2D facial recognition technologies which are vulnerable to various attacks, or they employ additional hardware which decreases the screen space and increases the resource consumption.

Researchers at Purdue University have developed FaceRevelio, a single camera 3D face authentication system for smartphones without requiring any additional hardware. FaceRevelio utilizes the smartphone screen to illuminate a user's face from multiple directions to create a 3D face model. Through comparing with preregistered 3D face models and verifying the generated light signals, FaceRevelio can authenticate the genuine user trying to unlock the smartphone. Upon conducting tests at various lighting conditions and a series of 2D spoofing attacks, FaceRevelio achieved a mean equal error rate (EER) of approximately 10%, 4%, and less than 1% against human, photo, and video attacks, respectively.

Advantages:

-Accurate 3D approach

-No additional hardware

Potential Applications:

-Cell Phone security

TRL: 3

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Category

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Robotics & Automation/3D Perception & Modeling for Automation

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