Abstract

In general, face spoofing attacks deals with printing artifacts, electronic screens and ultra-realistic face masks or models. This paper proposes a liveness detection method based on diffusion speed. Diffusion speed of a single image is calculated as the difference of the original images and diffused images at each pixel. Face spoofing method based on diffusion speed does not require any user involvement and works with a single image. The key aspect of the proposed method is based on the difference in the illumination characteristics of live and fake faces. To solve the nonlinear, scalar valued diffusion equation, AOS (Additive Operator Splitting) approach, together with TDMA (Tri-Diagonal Matrix Algorithm) is applied. The local pattern of the diffusion speed is calculated at each pixel position (Local Diffused Patterns) and fed to linear Support Vector Machine for classification. Proposed approach performs well against the diverse malicious attacks, face display media (screen / paper) & varying illuminations and gives 90.83% accuracy.


Index Terms

Computer Science

Pattern Recognition
Keywords

Spoofing, diffusion speed, local diffused pattern, face liveness detection, Additive Operator Splitting, Tri-Diagonal Matrix Algorithm