Automated spoof-detection for fingerprints using optical coherence tomography

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Abstract

Fingerprint recognition systems are prevalent in high-security applications. As a result, the act of spoofing these systems with artificial fingerprints is of increasing concern. This research presents an automatic means for spoof-detection using optical coherence tomography (OCT). This technology is able to capture a 3D representation of the internal structure of the skin and is thus not limited to a 2D surface scan. The additional information afforded by this representation means that accurate spoof-detection can be achieved. Two features were extracted to detect the presence of (1) an additional thin layer on the surface of the skin and (2) a thicker additional layer or a complete artificial finger. An analysis of these features showed that they are highly separable, resulting in 100% accuracy regarding spoof-detection, with no false rejections of real fingers. This is the first attempt at fully automated spoof-detection using OCT.