July 2016

Identity Matters

IBIA International **Biometrics+Identity** Association

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Security of Biometric Data: Spoofing and Data Theft



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What is Biometric Spoofing?

- The use of an artificial or altered sample to defeat the security of a biometric system in order to ...
 - ... falsely match someone else's identity.
 - ... conceal one's own true identity.



Some Terminology

Spoof Detection



Liveness Detection

Presentation Attack Detection



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Examples

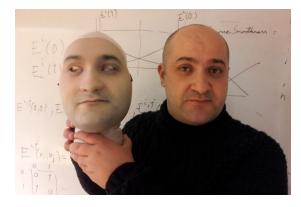


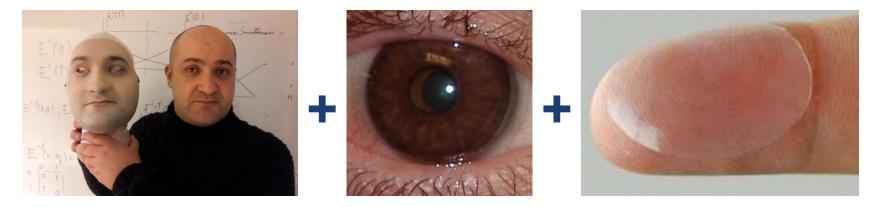




Image sources: (L): http://www.oulu.fi/infotech/annual_report/2013/cmv (M): IBIA Biometrics 101 (R): http://twik.di.uniroma1.it/pub/Interazione_av/WebHome/LezioneInterazione250310.pdf



Increasing Spoofing Difficulty



Multi-modal Biometrics



Spoof Detection

- Challenge and response
 - "Repeat the random phrase ... "
- Check temporal characteristics of the sample
 - Involuntary motion, physiological responses
- Check physical properties of the sample
 - Texture and optical characteristics



Sources of Spoof Data

- Primary sources
 - Example: face image
- Secondary sources
 - Example: latent fingerprint
- Sensor data
 - Man in the middle
 - Enrollment database



Biometric Security Architecture

- In general, biometric systems should be designed to incorporate the best security practices of functionally similar systems.
 - Encrypted databases and communications
 - Proper key management
 - Tamper resistance



Unique Considerations for Biometric Systems

- Biometric images are converted to mathematical summaries ("templates") which are then used for biometric matching.
- If templates are encrypted when stored in a database, they generally must be decrypted for matching.
- Image-to-template conversion, template decryption and template matching should occur in trusted execution environments.



Convenience and Security

- The level of security and convenience of a system are reciprocally related.
- Spoof detection adds to security and reduces the convenience level otherwise available without spoof detection.
- Vendor performance metrics should include spoof detection if offered.



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