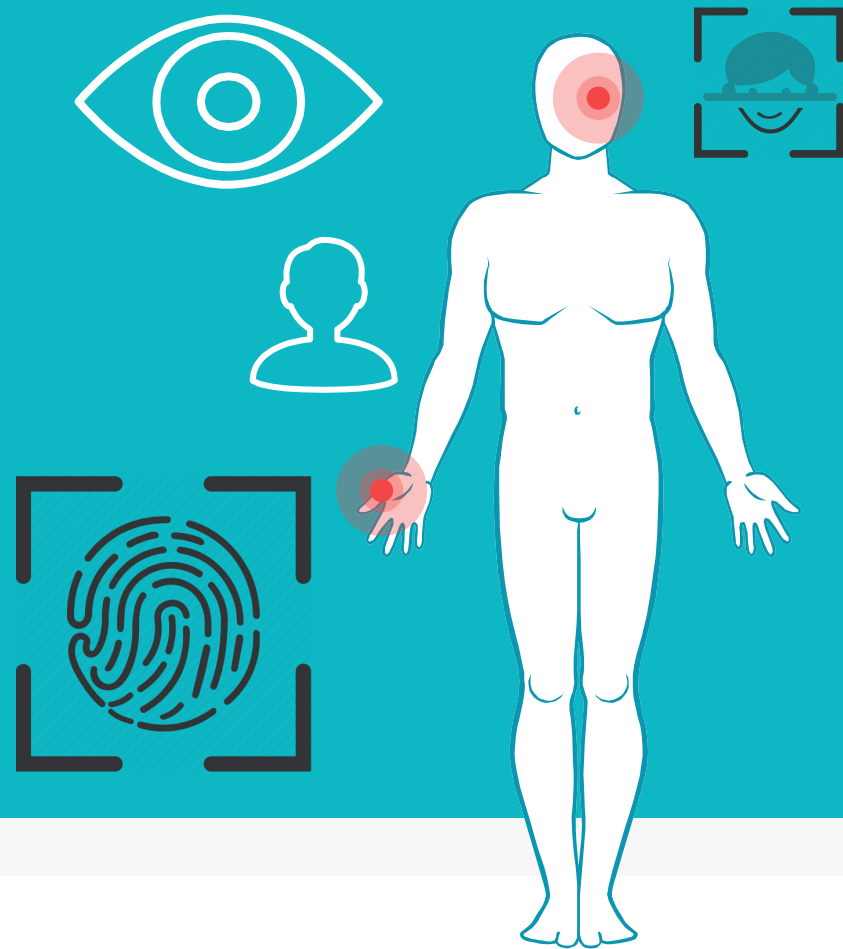


BIS4857 Internet Security

BIOMETRICS

Security Systems

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What is Biometric Security System?

What is Biometric System?



Biometric

- ▶ come from the Greek words
 - ▶ “bio” (life),
 - ▶ and “metric” (to measure)
- ▶ Is unique physical and logical characteristics or traits of human body

Biometric System

- ▶ Will collect all those biometric data and store in order to use for verifying personal identity.

Seven Biometric System Criteria



Uniqueness

- ▶ The priority one requirement for biometric data
- ▶ Indicate how differently and uniquely the biometric system will be able to recognize each user
- ▶ DNA

Universality

- ▶ Unique characteristics of each person in the world, which can't replicated
- ▶ Retinal and Iris

Seven Biometric System Criteria



Permanence

- ▶ Every single characteristic or trait which is recorded in the database
- ▶ and needs to be constant for a certain period.
- ▶ Age of the user

Collectability

- ▶ To verify their identification, allow to collection of each characteristics and trait in the system

Seven Biometric System Criteria



Performance

- ▷ Outlines how well the security system works
- ▷ Accuracy and robustness

Acceptability

- ▷ Choose fields in which biometric technologies are acceptable

Circumvention

- ▷ decide how easily each characteristic and trait provided by the user can lead to failure during the verification process.
- ▷ DNA is most difficult to failure

Evolution of Biometric Security Systems

Evolution of Biometric Security System



- ▶ One of the oldest and most basic characteristic of recognition is face.
- ▶ Since beginning of civilization, human had uses faces to identify known and unknown individuals.

Evolution of Biometric Security System



- ▶ During 1858, the first systematic capture of hand images for identification
 - ▶ Recorded handprint of employees to distinguish employee's claim of payday

- ▶ During 1960, the first semi-automatic face recognition system
 - ▶ System required the features as eyes, ears, nose and mouth on photograph

Evolution of Biometric Security System



- ▶ During 1986, Iris can be used for identification,
 - ▶ which develop an algorithm to automate identification of the human iris.
- ▶ During 1991, the face detection was pioneered,
 - ▶ by using eigenfaces techniques, the residual error could be used to detect faces in images.

TYPES of Biometric Security Systems

TYPES of Biometric Security Systems

Fingerprint Recognition



Face Recognition



Iris Recognition



Hand Geometry



Voice Recognition



Signature Verification

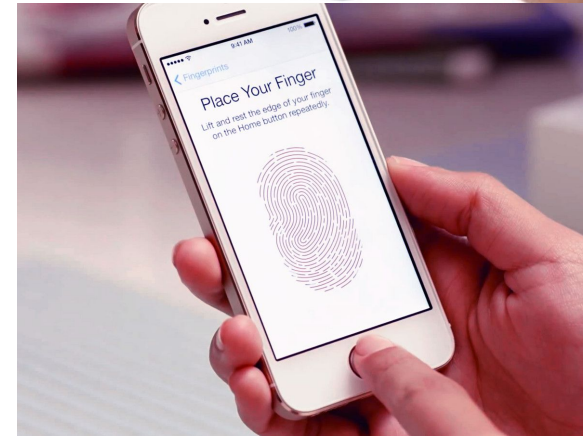


FINGERPRINT RECOGNITION

Recognizes patterns on the fingerprint
e.g. arches, whorls, and loops

- ▶ Most widely-used method
- ▶ Ergonomic, easy to use
- ▶ Can make mistakes when the finger skin is dry or dirty

Uses: door locks, mobile phones



FACE RECOGNITION

Recognizes features of the face e.g. eyes, nose, cheekbones, jaw edges

- ▶ Can scan static images
- ▶ Change in facial features
- ▶ Privacy abuse

Uses: airport security, criminal identification



IRIS RECOGNITION

Recognizes patterns in the iris
e.g. rings, furrows, and freckles

- ▶ Accurate and very fast
- ▶ Intrusive
- ▶ Expensive

Uses: airport security, border security, facility access control

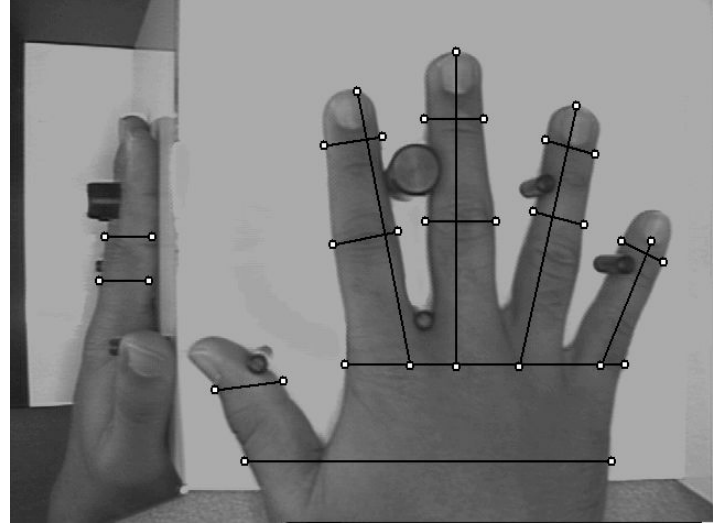


HAND GEOMETRY

Recognizes by width of fingers, width and thickness of palm

- ▶ Non-intrusive
- ▶ Relatively small storage
- ▶ Requires special hardware

Uses: industrial environments, welfare agencies, immigration facilities



VOICE RECOGNITION

Recognizes by voice
e.g. pitch, speech patterns, speed

- ▶ Non-intrusive, popular
- ▶ Voice variation
- ▶ Background noise

Uses: access control, banking,
government offices

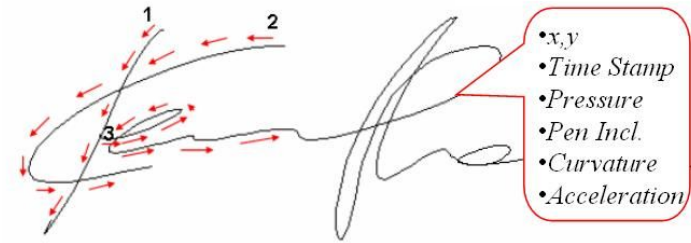


SIGNATURE VERIFICATION

Recognizes by signature
e.g. letter size, angles, strokes

- ▶ Easy to gather
- ▶ Non-intrusive
- ▶ Inconsistent signing

Uses: financial transactions, e.g.
purchasing with credit card



ADVANTAGES of Biometric Security Systems

ADVANTAGES of Biometric Security Systems

- ▶ Accurate Identification
- ▶ Difficult to forge or steal
- ▶ Convenient
- ▶ Reduce costs



Biometric Security Systems Issues and Concerns

Biometrics Issues and Concerns

- ▷ Privacy issues
- ▷ Ethical issues
- ▷ Technical issues



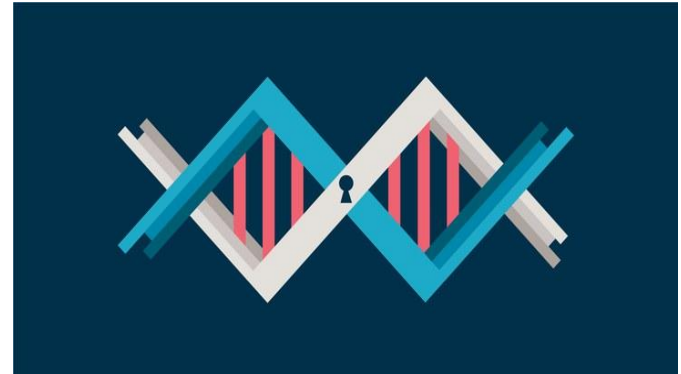
Privacy Issues

- ▶ Biometric data contains information acquired from individuals
- ▶ The place where biometric data is recorded



Ethical Issues

- ▶ User acceptance
- ▶ Concern the usefulness of some biometric devices



Technical Issues

- ▷ Concern the eye recognition
- ▷ Concern the voice recognition
- ▷ Software support



Future of Biometric Security Systems

Future of Biometric

- ▶ An Increase in Iris Scanning Within Security-Needy Industries
- ▶ Biometric Deployments in E-Commerce Will Skyrocket
- ▶ Wearables and IOT
- ▶ The Emergence of Smartphone Behavioral Biometrics





THANK
YOU!