

Overview

A. BlueZign

replace "legal paper" with electronic documents



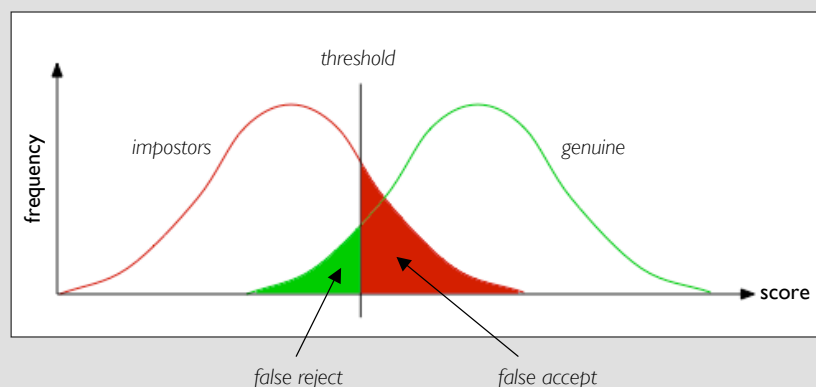
B. Biometrics

basics, technologies, identification vs. verification, biometrics and smart cards



B. Biometrics: Basics

- Being a password rather than remembering one
 - *passwords are either short and easy to guess or long and difficult to remember*
- Biometrics do not provide an exact match
 - *people change over time (e.g., mood, aging, injuries, illness)*
 - *sensor inconsistency (e.g., dirt, ambient conditions)*
- Biometrics errors
 - *false accept rate*
 - *false reject rate*



B. Biometrics: Technologies

| | false rejects | false accepts |
|---------------|---------------|------------------|
| fingerprint | 3-7 in 100 | 1-100 in 100k |
| face | 10-20 in 100 | 100-10k in 100k |
| voice | 10-20 in 100 | 2k-5k in 100k |
| iris | 1-10 in 100 | 1 in 14 trillion |
| hand geometry | 1-10 in 100 | 1 in 100 |
| signature | 3-10 in 100 | 1 in 100 |

B. Biometrics: Identification vs. Verification

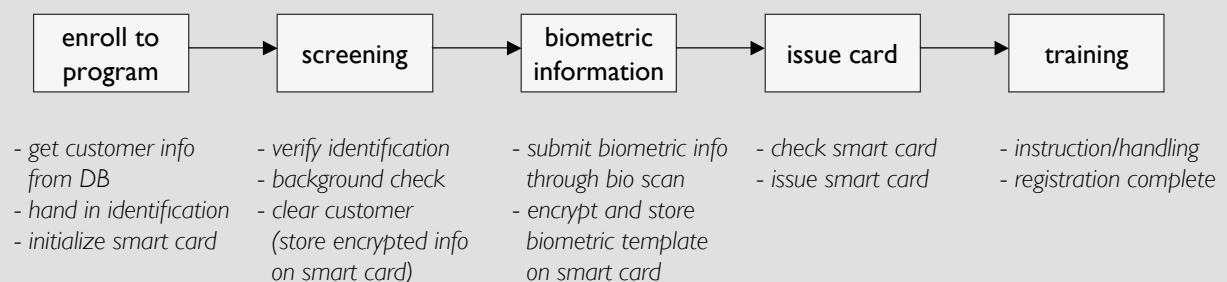
- Identification: Who is this person?
 - *1:n search*
 - *depends on a database*
 - *scalability depends on false match rate*
 - *database maintenance costs*
- Verification: Is this person who he says he is?
 - *1:1 search*
 - *can be a local comparison (e.g., from a secure token)*
 - *highly scalable*
 - *token maintenance costs*

B. Biometrics: What the People Say...

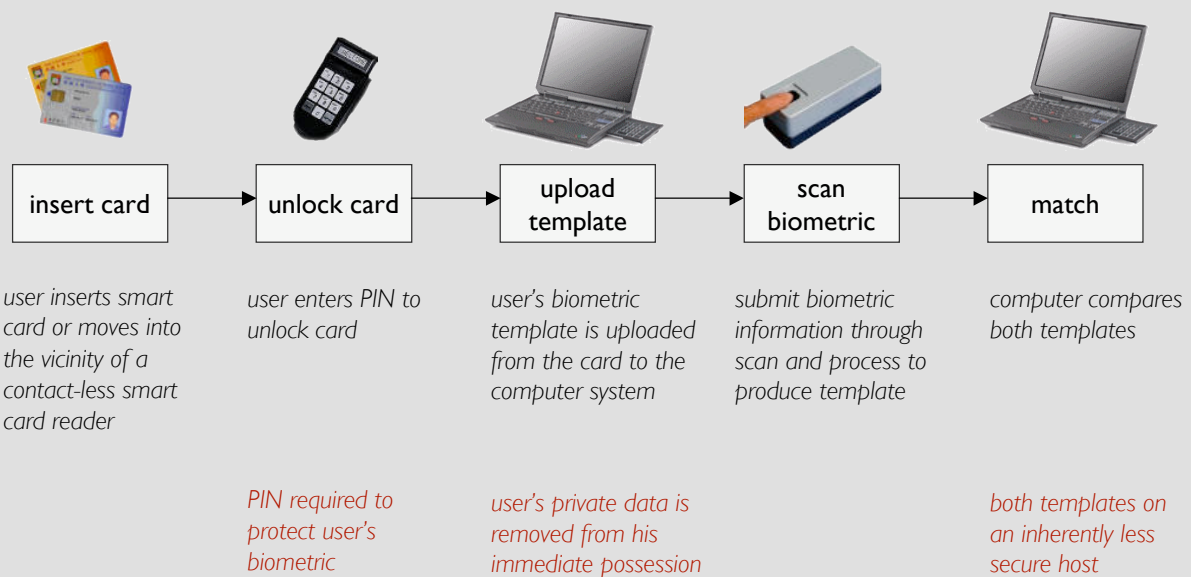
- Voice people prefer voice to fingerprints
- Iris/retina people don't like removing their glasses (contact lenses)
people are very sensitive about their eyes (e.g., lasers)
some cultures don't like bending/bowing to machines
- Face people don't like to look at their own images in low resolution
or have their pictures taken
people don't recognize "facial id" as an authenticator in the
same way they recognize finger prints, for instance
- Fingers people don't like touching something that somebody else has
touched before
finger prints are associated with felons

B. Biometrics: Using Smart Card

- Smart cards were initially biometric agnostic
 - *used as secure tokens for the storage of biometric templates only*
- Increasingly seen as matching engines
 - *on-card biometric authentication increases security and resolves some biometric privacy issues*
- Require an enrollment process

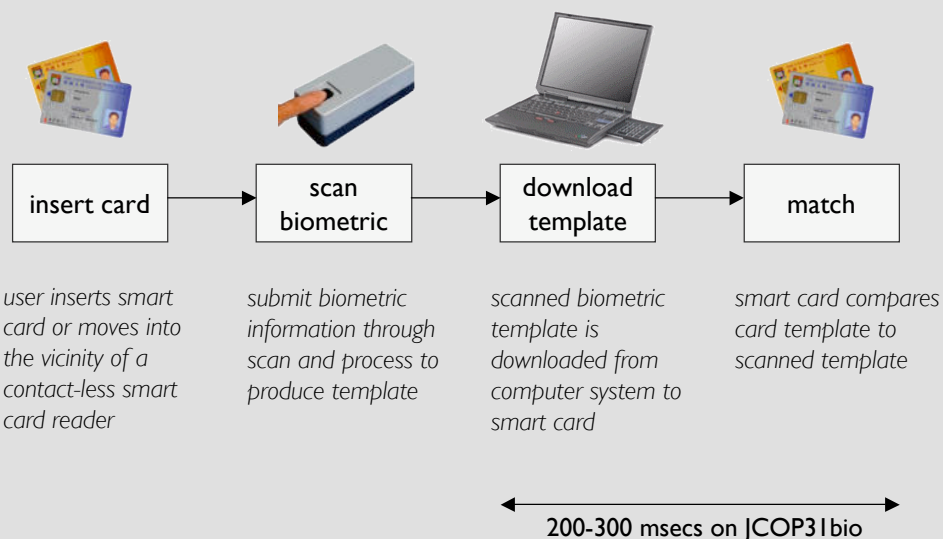


B. Biometrics: Off-Card Matching



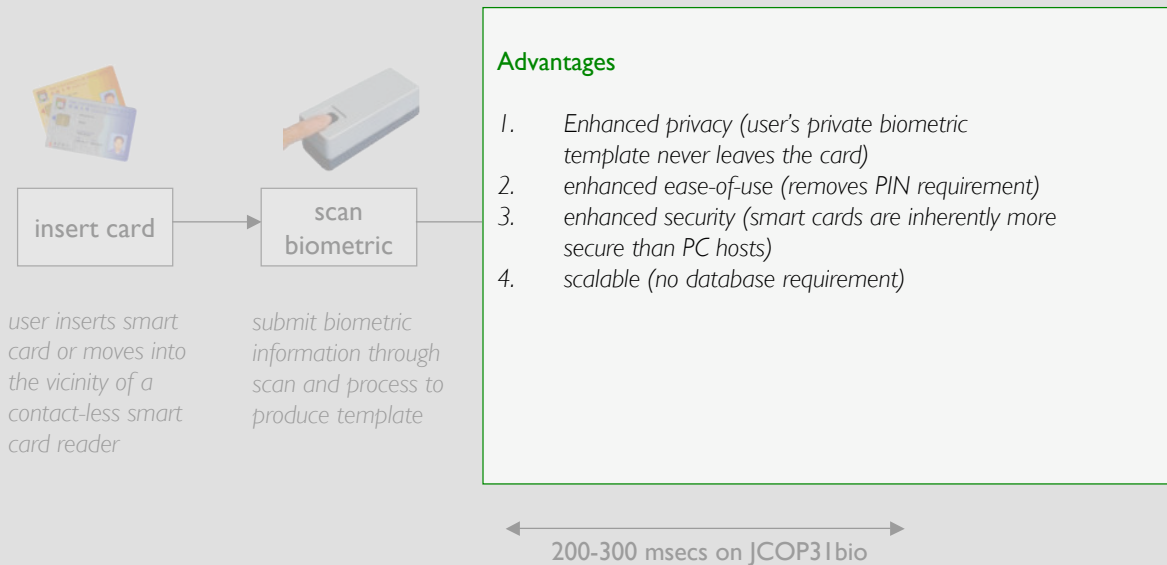
B. Biometrics: On-Card Matching

- Secure applet on the JavaCard uses the Java BioAPI to compare and verify biometric templates



B. Biometrics: On-Card Matching

- Secure applet on the JavaCard uses the Java BioAPI to compare and verify biometric templates



B. Biometrics: javacard.biometry

- `javacard.biometry.BioBuilder`
 - builds empty/blank biometric reference templates
- `javacard.biometry.BioTemplate`
 - base interface for all biometric templates
- `javacard.biometry.OwnerBioTemplate`
 - provides the ability to enrol a reference template
- `javacard.biometry.SharedBioTemplate`
 - provides the means for accessing unrestricted biometric functionality (e.g., the biometric matching functions)

B. Biometrics: javacard.biometry

- **javacard.biometry.BioBuilder**
 - builds empty/blank biometric reference templates

```
public final class BioBuilder {
    static OwnerBioTemplate buildBioTemplate
        (byte bioType, byte tryLimit);

    final static byte BODY_ODOR;
    final static byte DNA_SCAN;
    final static byte EAR_GEOMETRY;
    final static byte FACIAL_FEATURE;
    final static byte FINGER_GEOMETRY;
    final static byte FINGERPRINT;
    final static byte GAIT_STYLE;
    final static byte HAND_GEOMETRY;
    final static byte IRIS_SCAN;
    final static byte KEYSTROKES;
    final static byte LIP_MOVEMENT;
    final static byte PALM_GEOMETRY;
    final static byte PASSWORD;
    final static byte RETINA_SCAN;
    final static byte SIGNATURE;
    final static byte THERMAL_FACE;
    final static byte THERMAL_HAND;
    final static byte VEIN_PATTERN;
    final static byte VOICE_PRINT;
};
```

- **javacard.biometry.BioTemplate**
 - base interface for all biometric templates
- **javacard.biometry.Candidate**
 - provides the ability to enroll a candidate
- **javacard.biometry.Sensor**
 - provides the means for acquiring biometric matching functions

B. Biometrics: javacard.biometry

- **javacard.biometry.BioBuilder**
 - builds empty/blank biometric reference templates

```
public interface BioTemplate {
    short getPublicTemplateData(short publicOffset,
        byte[] dest, short destOffset, short length);
    byte getBioType();
    byte getTriesRemaining();
    short getVersion(byte[] dest, short offset);

    short initMatch(byte[] cand, short ofs, short len);
    short match(byte[] cand, short ofs, short len);

    boolean isInitialized();
    boolean isValidated();

    void reset();
};
```

- **javacard.biometry.BioTemplate**
 - base interface for all biometric templates
- **javacard.biometry.Candidate**
 - provides the ability to enroll a candidate
- **javacard.biometry.Sensor**
 - provides the means for acquiring biometric matching functions

B. Biometrics: javacard.biometry

- `javacard.biometry.BioBuilder`
 - *builds empty/blank biometric reference templates*

- `javacard.biometry.BioTemplate`
 - *base interface for all biometric templates*

```
public interface OwnerBioTemplate extends BioTemplate {  
    void init(byte[] bArray, short ofs, short len);  
    void update(byte[] bArray, short ofs, short len);  
    void doFinal();  
  
    void resetUnblockAndTryLimit(byte newTryLimit);  
};
```

- `javacard.biometry.Cert`
 - *provides the ability to enroll a certificate*

- `javacard.biometry.Sha1`
 - *provides the means for adding a SHA-1 biometric matching function*

B. Biometrics: javacard.biometry

- `javacard.biometry.BioBuilder`
 - *builds empty/blank biometric reference templates*

- `javacard.biometry.BioTemplate`
 - *base interface for all biometric templates*

```
public interface SharedBioTemplate extends BioTemplate {  
};
```

- `javacard.biometry.Cert`
 - *provides the ability to enroll a certificate*

- `javacard.biometry.Sha1`
 - *provides the means for adding a SHA-1 biometric matching function*

DEMO

Copyright © 2004-2007 IBM Corp.