Call for cooperation: biometric template ageing

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Source of age-related changes

- Natural processes of our body or behavior changes
  - Not adequately studied for most of the biometric modalities
- Indirect due to diseases, injuries and surgeries

Ageing sources for selected modalities [Lantinis 2010]

- Iris: cataract (cloudiness of the eye lens), increase of blood pressure within the eyeball (often associated with glaucoma)
- Fingerprints: low skin elasticity = problems with fingerprint capture; wear and tear
- Face: bone movement and growth (childhood, puberty), skin deformations (old age) due to lowering the skin elasticity and wrinkles
- Voice: loss of lungs elasticity, vocal muscle atrophy, anatomical changes in larynx, epithelium thickening
Template ageing

**Typical solutions**
- Template frequent (and forced) update
- Simulation of the ageing effects
  - Based on „age progression” methods
  - No adequate attention in the literature for other modalities
- Usage of age invariant biometric features

**Lack of ample data bases**
- Biometrics: relatively young technology
- Technological problems: equipment and measurement protocols must be kept for long time periods
- Availability of volunteers during the database collection
- Sociological resistance (e.g. creation and usage of templates for children)
Ageing databases

- **MORPH**
  (Craniofacial Longitudinal Morphological Face Database)

  - Biometric type: **face**
  - Two sets
    - Album 1: scanned photographs; population: 515 subjects; time intervals from a few months up to 29 years;
    - Album 2: digital images; population: 4000 subjects; time intervals: several years
    - Metadata available: race, date of birth, date of acquisition, gender, eye coordinates
  - Seems to be the largest publicly available ageing database (yet for only one modality)
  - Dedicated for use with standard face recognition algorithms
  - Research (ready) and commercial (planned) use
Ageing databases

- **FG-NET** [www.fgnet.rsunit.com]
  - Biometric type: **face**
  - Population: 82, 6-18 images per subject
  - Auxiliary data available
    - Preprocessing data:
      - Face localization (68 landmarks)
      - Existence of occlusions (beard, moustache, hat, glasses)
      - Face vertical and horizontal pose
    - Demographic data: age, gender
  - **Research use only**

FG-NET database sample

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KFRIA Ageing DB
(Korea Fingerprint Recognition Interoperability Alliance) [Ryu 2007]

- Biometric type: **fingerprints**
- Time interval: 1 year
- Population: 100 subjects, three sensors used
- Demographic data available: age, gender, occupation
**BioBase (www.BiometricLabs.pl)**

- Multimodal set: *iris, face, handwritten on-line signatures, fingerprints, hand* (2D geometry)
- Time interval: 7 years
- Equipment and capture protocols kept the same
- Population: 50 subjects
- Extension (planned for mid of 2010) co-sponsored by the Polish Ministry of Science and Higher Education
Cooperation aspects

- **Identification/development of cooperation rules**
  - Partners and end users, recognition technology suppliers
  - Project financing/coordination

- **Identification of the existing databases gathering biometric measurements a few years apart**

- **Development of testing methodology and tools**
  - Analysis of the work already done (especially for face and fingerprints)
  - Analysis of the end users requirements
References

[Lantinis 2010]

[Giraldi 2009]

[Ramanathan 2006]


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