Still Face Challenge Problem
Multiple Biometric Grand Challenge
Preliminary Results of Version 1

05 December 2008

National Institute of Standards and Technology
...working with industry to foster innovation, trade, security and jobs
Still Face Background

- FRVT 2006
  - Verification rate = 0.99 at FAR = 0.001
  - Frontal
  - Controlled illumination
  - High resolution (400 pixels between the eyes)
  - Large scale laboratory collection
MBGC Still Face Goals

• Many applications of still face involve:
  – Unconstrained illumination
  – Low resolution (90-120 pixels between the eyes)
  – Compressed imagery (8KB to 20KB)
  – Non-frontal
MBGC Still Face Goals

• Many applications of still face involve:
  – Unconstrained illumination
  – Low resolution
  – Compressed imagery
  – Non-frontal

MBGC Still Face challenge problem addresses these constraints.
Still Face

• Two target sets – AY03-04 (FRGC)
  – Controlled illumination frontal
  – Uncontrolled illumination frontal

• One query set – AY04-05
  – Uncontrolled illumination frontal
  – Uncontrolled illumination non-frontal
Effects of Lower Resolution and Compression on FR

• Determine effect of
  – Lower resolution
  – Compression

• Process original images to meet data requirements
  – Scale and crop
    • 120 and 90 pixels between the eyes
  – Compress images
    • 20KB and 8KB
Still Face Processing

Original Image

Face Still

Scale / Crop

120 Pixels between the eyes

ISO SC-37

120 Pixels between eyes

20k

Compress jpeg 2000

90 Pixels between the eyes

8k

90 Pixels between eyes
Results from Still Face Challenge
Problem Version 1...
Participants

• Dalian University of Technology

• L-1 Identity Solutions AG

• Pittsburgh Pattern Recognition

• Cogent Inc.

• Toshiba Corporation
Frontal vs. Non-frontal

- **Frontal**
  - Controlled
    - Number of Stills
    - 16,028
  - Uncontrolled
    - Number of Stills
    - 8,014

- **Non-frontal**
  - Controlled
    - Uncontrolled
    - Number of Still Images
    - 3,097
  - Uncontrolled
Results from an Open Book Challenge Problem, NOT an Independent Evaluation
Controlled vs. Uncontrolled

Number of Images
16,028

Number of Images
10,687

No Compression

Compressed
120 pixels
20 KB

Compressed
90 pixels
8 KB
Controlled vs. Uncontrolled Frontal

Results from an Open Book Challenge Problem, NOT an Independent Evaluation
Uncontrolled vs. Uncontrolled

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Uncontrolled vs. Uncontrolled Frontal ROC

Results from an Open Book Challenge Problem, NOT an Independent Evaluation
Summary Frontal

Results from an Open Book Challenge Problem, NOT an Independent Evaluation
Conclusion

• Cross pose matching is very difficult.

• Performance on controlled images is easier than on uncontrolled.

• More studies are needed to characterize an algorithm’s response to resolution and compression.