Multiple Biometric Grand Challenge
Second Workshop
05 December 2008
MBGC Sponsors

Executing Agency

- National Institute of Standards and Technology

Sponsoring Agencies

- Director of National Intelligence
  - Intelligence Advanced Research Projects Activity

- Department of Homeland Security
  - Science & Technology Directorate

- Federal Bureau of Investigation
  - Criminal Justice Information Services
  - Operational Technology Division
The MBGC Team

- **NIST**
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  - Hassan Sahibzada
- **Colorado State University**
  - Prof. Ross Beveridge, Prof. Geof Givens, David Bolme, Yui Man Lui
- **SAIC**
  - Dr. Todd Scruggs
- **Schafer Corporation**
  - Jay Scallan
- **University of Notre Dame**
  - Prof. Kevin Bowyer & Prof. Patrick Flynn
- **University of Texas at Dallas**
  - Prof. Alice O’Toole
Overview

- MBGC Overview
- Results MBGC version 1.0 Part 1
  - Still Face
  - Video
- Talk & Lunch
- Results MBGC version 1.0 Part 2
  - Portal
- MBGC version 2.0
- Multiple Biometric Evaluation 2009
Challenge Problems

• What are challenge problems?
  – A series of experiments designed to advance a technology’s state-of-the-art
    • Experiments designed
    • Experiments and test data distributed to researchers
    • Researchers complete experiments and submit results
    • Scores are consolidated and reported
  – Introduction of new technology
Ideal Challenge Problem

- Time
- Progress / Performance
- Difficulty
- Challenge Problem
- Today

Chart showing the relationship between time, effort, and difficulty for a challenge problem.
Technology Progress

• 17 Years
• 7 Evaluations
• 5 Challenge Problems (Technology Development)
• 3 Biometrics
• 150,000+ Facial and Iris Images
Improved FR Performance

Face Recognition Error Rate

<table>
<thead>
<tr>
<th>Year of Evaluation</th>
<th>FRR at FAR = 0.001</th>
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<tbody>
<tr>
<td>1993</td>
<td>0.79</td>
</tr>
<tr>
<td>1997</td>
<td>0.54</td>
</tr>
<tr>
<td>2002</td>
<td>0.20</td>
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<tr>
<td>2006</td>
<td>0.01</td>
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</tbody>
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Turk & Pentland (Partially Automatic)  
FERET 1996 (Fully Automatic)  
FRVT 2002 (Fully Automatic)  
FRVT 2006 (Fully Automatic)

Single Still  
Controlled  
Different Days
MBGC Goal

• The main goal of the Multiple Biometric Grand Challenge (MBGC) is to

  – Address face and iris recognition problems that are more relevant to those found in operational data
    • Low to medium resolution face
    • Still and video iris
    • Near Infrared (NIR) & High Definition (HD) video from portals
    • Unconstrained recognition from still & video
MBGC Goal

• Programmatic method

  – Sequence of challenge problems
    • Modeled after the FRGC and ICE 2005
    • Challenge problems and data distributed to researchers
  – Workshops
  – Multiple Biometric Evaluation 2009
Timeline

• Estimated task schedule for MBGC:

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Task</th>
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<tbody>
<tr>
<td>December 2007</td>
<td>Formal announcement of MBGC project</td>
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<tr>
<td></td>
<td>Begin data collection at University of Notre Dame</td>
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<tr>
<td></td>
<td>Design protocols, challenge problems and prepare test infrastructure</td>
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<tr>
<td>April 2008</td>
<td>1st MBGC Workshop</td>
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<td></td>
<td>Release 1st challenge problem</td>
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<td>December 2008</td>
<td>2nd MBGC Workshop</td>
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<td></td>
<td>Results Challenge Problem Version 1</td>
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<tr>
<td>January 2009</td>
<td>Release Challenge Problem Version 2</td>
</tr>
<tr>
<td>June 2009</td>
<td>3rd MBGC Workshop</td>
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<tr>
<td></td>
<td>Results Challenge Problem Version 2</td>
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</tbody>
</table>
MBGC Version 1

• Goals

– Familiarize community with problem and data.

– Introduce participants to challenge protocol and experiment environment.

– Grow the research community that works on these problems.

– 1st Characterization of the state of the art.
MBGC Implementation

• MBGC Team
  – Define challenge problems
  – Develop challenge problem protocols
  – Prepare data for distribution
  – Score submitted results

• Participants
  – Develop technology and algorithms
  – Submit self reported similarity matrices for challenge problems.
  – Submit quality scores.
Quality Scores

- No quality scores submitted
- The data reflects the natural variations encountered during data collection or in subsequent processing.
- Representative of operational data.
- An appropriate mechanism for dealing with data variation are quality scores.
MBGC Participation to Date

- Organizations given access to MBGC data. 68
- Organizations submitting results for MBGC version 1.0. 14
- Both industry and academic organizations participated
  - Industry 7
  - Academic 7
- Countries
  - China
  - France
  - Germany
  - Greece
  - United Kingdom
  - United States
MBGC Version 1 Results

- Challenge problems released summer 2008.
- Results were submitted in November 2008.
  - Portal 3 November
  - Still Face 10 November
  - Video 20 November
- Similarity matrices submitted.
- Similarity matrices are self reported.
- These matrices represent participants best efforts.
Challenge problem assessments

• Provides snapshot at one date
  – MBGC v1: Beginning of November 2008
• Power from multiple results
• Reasonable assessment
• FRGC predictive of FRVT 2006
Multiple Biometric Evaluation 2009

Planned for Summer 2009