



National Science & Technology Council

Interagency Working Group on Biometrics

Progress in Face Recognition Research & Biometric Infrastructure

Dr. P. Jonathon Phillips
National Institute of Standards and Technology





BEE
Jan 2002 – Present

FRGC
May 2004 – Mar 2006

FRVT
2005
Oct 2005 – Dec 2006

Future Directions

ICE
Aug 2005 – Dec 2006



FRGC, FRVT 2005 & ICE Sponsor



Executing Agency

National Institute of Standards and Technology

NIST

...working with industry to foster innovation, trade, security and jobs

Sponsoring Agencies



Director of National Intelligence
Intelligence Technology Innovation Center

ITIC



Federal Bureau of Investigation
www.fbi.gov



Homeland Security

- Science & Technology Directorate
- Transportation Security Administration



National Institute of Justice

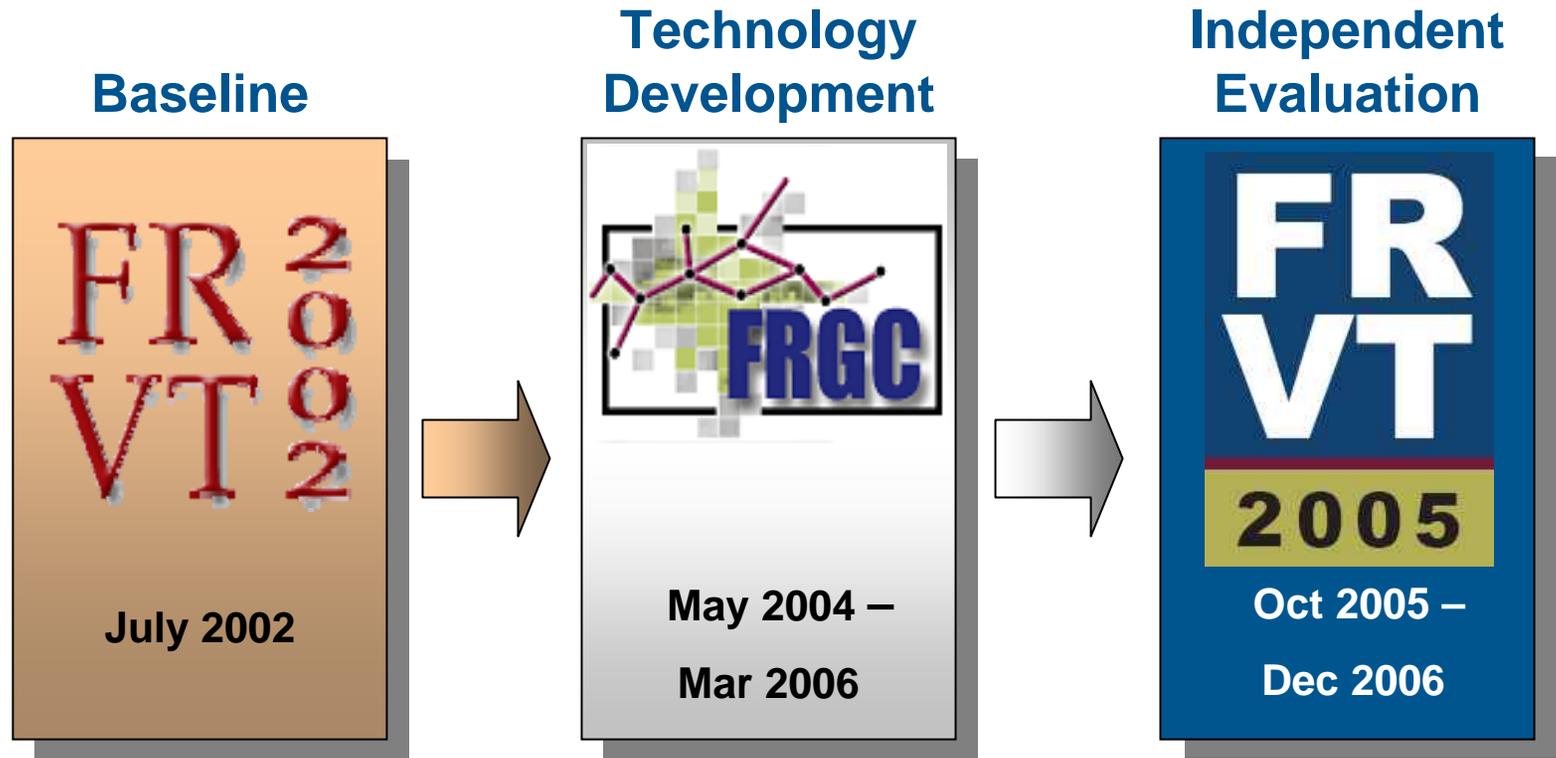
The Research, Development, and Evaluation Agency of the U.S. Department of Justice



TSWG
TECHNICAL SUPPORT WORKING GROUP

COMBATING TERRORISM

Background



FRGC Goal and Objective



- **The primary goal of the FRGC is to:**

Promote and advance face recognition technology to support U.S. Government face recognition efforts

FRGC Goal and Objective



- The primary goal of the FRGC is to:

Promote and advance face recognition technology to support U.S. Government face recognition efforts

- **The primary objective of the FRGC is to:**

Develop still and 3D algorithms to improve performance an order of magnitude over FRVT 2002

Grand Challenge Architecture

Accuracy of: 3D Sensors



3D from stills



Comparison

Algorithms/ Systems

Modes



Human
Performance

Preprocessing/
Reconstruction
Compression

Image Quality
Measures

Meta data

- eye coordinates
- pose
- gender

Advanced
Statistical
Analysis

FRGC Modes Examined



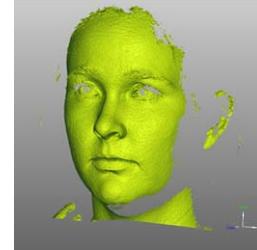
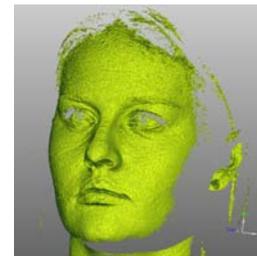
Single Still



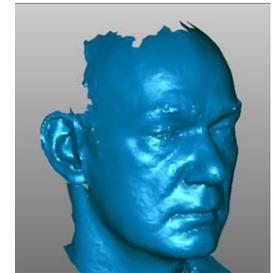
Outdoor/
Uncontrolled



Multiple Stills



3D Single
view



3D Full Face

FRGC Experiments

•Exp 1: Controlled indoor still versus indoor still

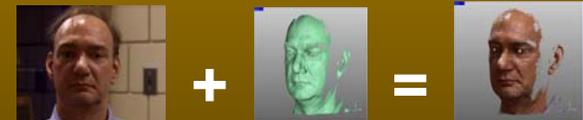


•Exp 2: Indoor multi-still versus indoor multi-still



•Exp 3: 3D versus 3D

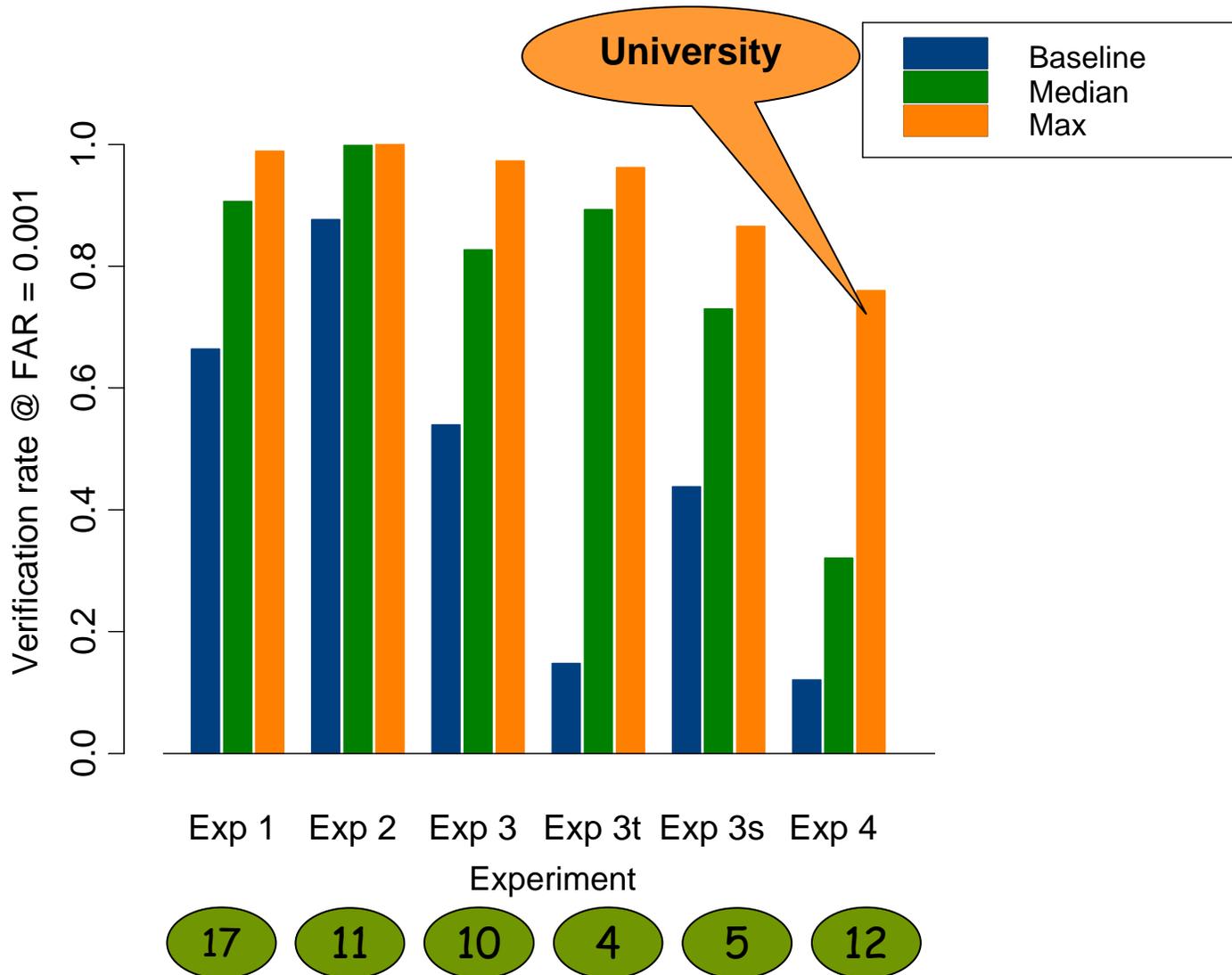
- 3t, texture channel only
- 3s, shape channel only



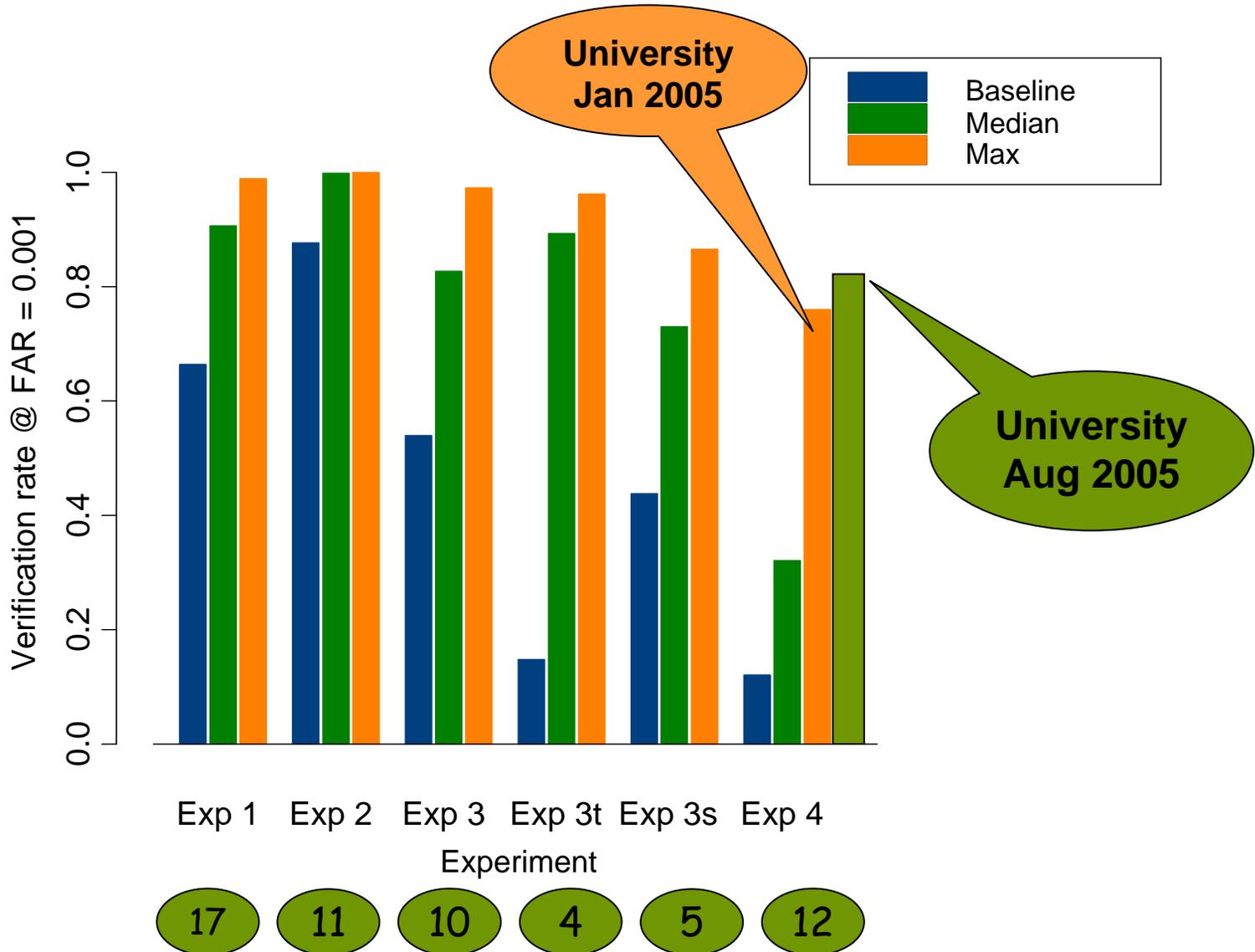
•Exp 4: Controlled indoor still versus uncontrolled still



Summary of FRGC Results – January 2005



FRGC Progress



Performance Goals and Progress

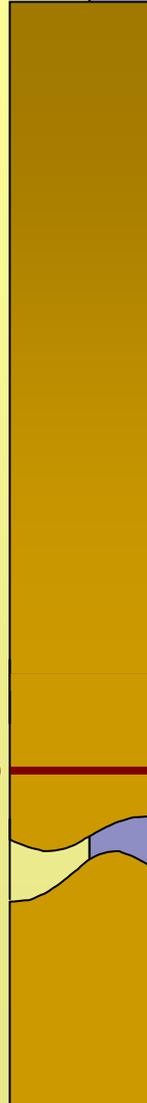
Independent Evaluations
(Gold Standard)

FR 20
VT 02

Starting Point 80%

Measured in
FRVT 2002

FAR = 0.1%



Performance Goals and Progress

Independent Evaluations (Gold Standard)



Goal 98%

To be measured
by FRVT 2005

Starting Point 80%

FRVT 2002
Measured in
FRVT 2002

FAR = 0.1%



Performance Goals and Progress

Independent Evaluations (Gold Standard)

Face Recognition Grand Challenge (Qualified Results)



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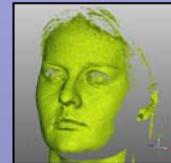
**99.99% Multi-Still
(Jan 05)**



**99% High Resolution Still
(Jan 05)**



**97% Three-Dimensional
(Jan 05)**



* First set of results after 4 months in a 12 month period

Performance Goals and Progress

Independent Evaluations (Gold Standard)



Goal 98%

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Face Recognition Grand Challenge (Qualified Results)

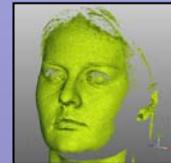
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Future Directions

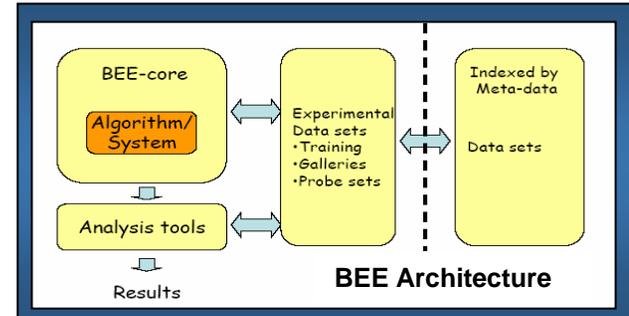
- **Face Recognition Advanced Study Workshop**
 - **11-14 November 2005**
 - **West Virginia University, Morgantown, WV**
 - **Objective**
 - **Intense technical discussions to identify next steps in face recognition**
 - **Outcome**
 - **Identification of technology gaps**
 - **Roadmap to bridge the gaps**



Infrastructure



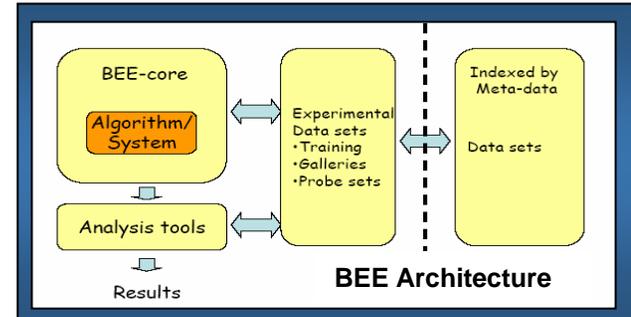
Biometric Experimentation Environment (BEE)



Infrastructure



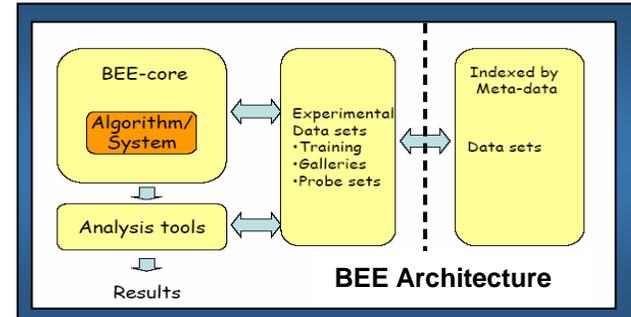
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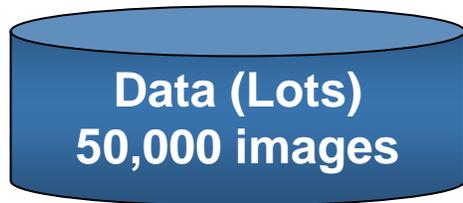
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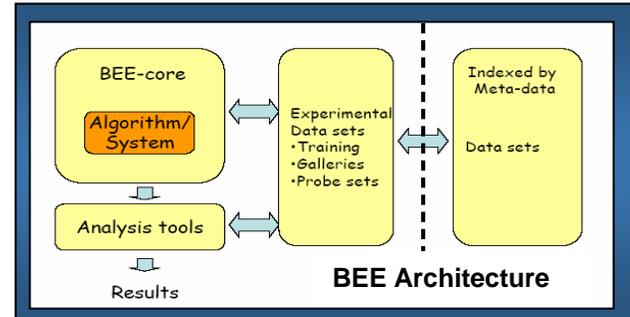
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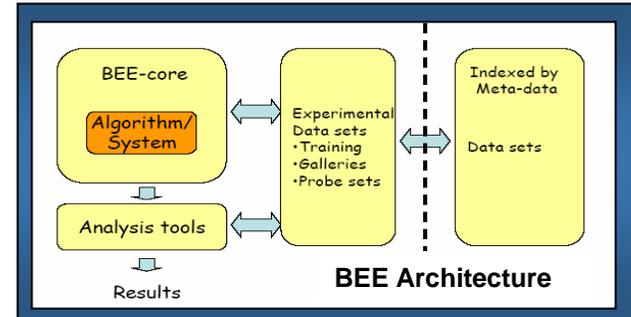


- Multi-Modal Demonstration on Operational Data
- Conducted in the Privacy of your own Lab

Infrastructure



Biometric Experimentation Environment (BEE)

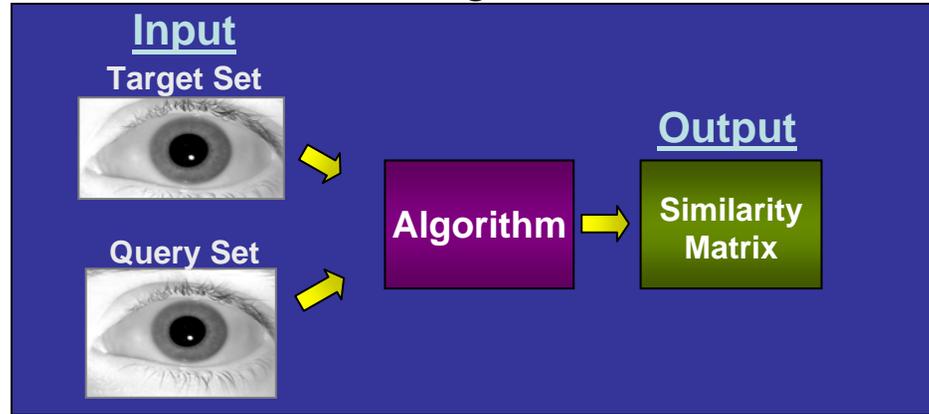




- Broad Goals
 - Technology assessment of iris recognition
 - Facilitate technology development
- Modeled after FRGC/FRVT 2005
- Q: What portion of the iris recognition problem does ICE address?
 - A: Recognition algorithms. ICE will provide a set of iris images

Questions Examined

Recognition



Segmentation / Location

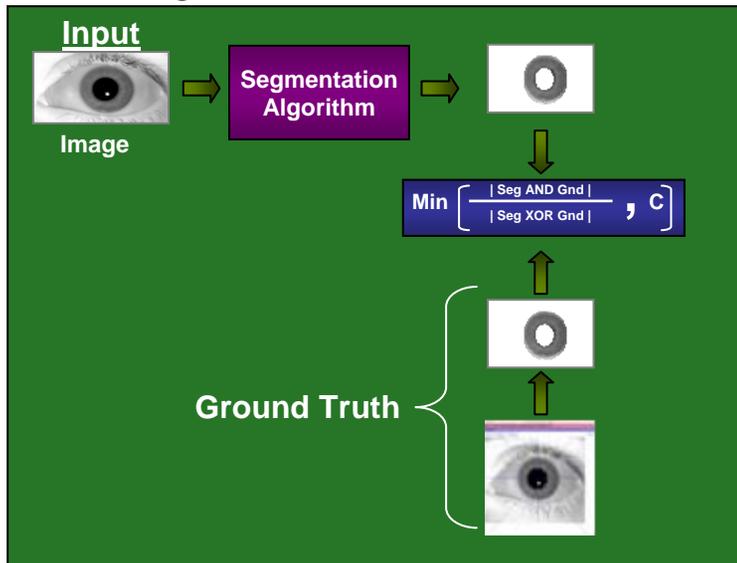
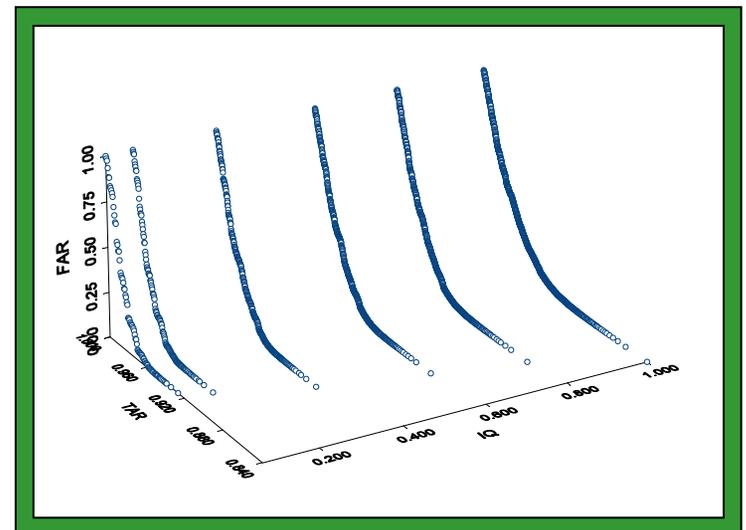


Image Quality



Conclusion

- Face Recognition Grand Challenge (FRGC)
- Face Recognition Vendor Test (FRVT) 2005
- Iris Challenge Evaluation (ICE)
- Biometrics Experimentation Environment (BEE)
- Face Recognition Advanced Study Workshop

