

FACIAL RECOGNITION AND IDENTIFICATION INITIATIVES

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Image Technology in the Forefront

- Unparalleled ease of capturing, storing, copying, and sharing images
- Proliferation of surveillance cameras, expanding global media enterprises, and average citizens with mobile phone still and video camera capabilities
- Unprecedented level of sharing images and videos via the internet and other advanced communication methods
- Photographs and videos depicting victims, suspects, and eyewitnesses are becoming the subject of investigations



Face: Forensic Discipline And Biometric



Biometrics

- A measurable biological (anatomical and physiological) or behavioral characteristic used for identification
 - Facial Recognition (FR) - the **automated** searching of a facial image in a computer database, typically resulting in a group of facial images ranked by computer-evaluated similarity



Event

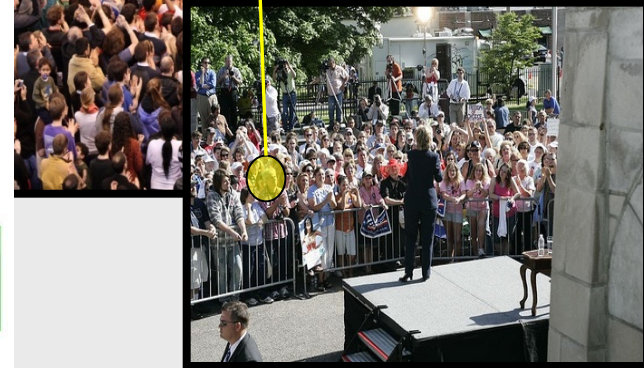


Forensics

- Visible physical characteristics one can use for the purposes of measurements or comparisons that are collected after an event
 - Facial Identification (FI) - the **manual** examination of the differences and similarities between two facial images for the purpose of determining if they represent different persons or the same person

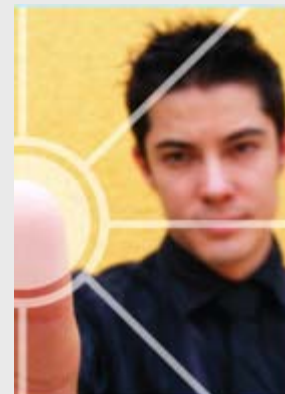
FI & FR Address Multiple Missions

- Mission Areas:
 - Access control
 - Automated identity verification
 - Human identification
 - Screening
 - Surveillance
 - Law enforcement & national security investigations
 - Identity intelligence to understand intent



FBI Facial Use Cases

- Identifying fugitives and missing persons in FR systems
- Identifying unknown persons of interest from images (1:N)
- Tracking subjects movements to/from critical events (e.g., 9/11)
- Conducting automated surveillance at lookout locations (1:M, where $1 < M \ll N$)
- Identifying subjects in public datasets
- Identifying subjects from images in seized systems
- Verifying mug shots against National Criminal Information Center (NCIC) records (1:1)
- Controlling access

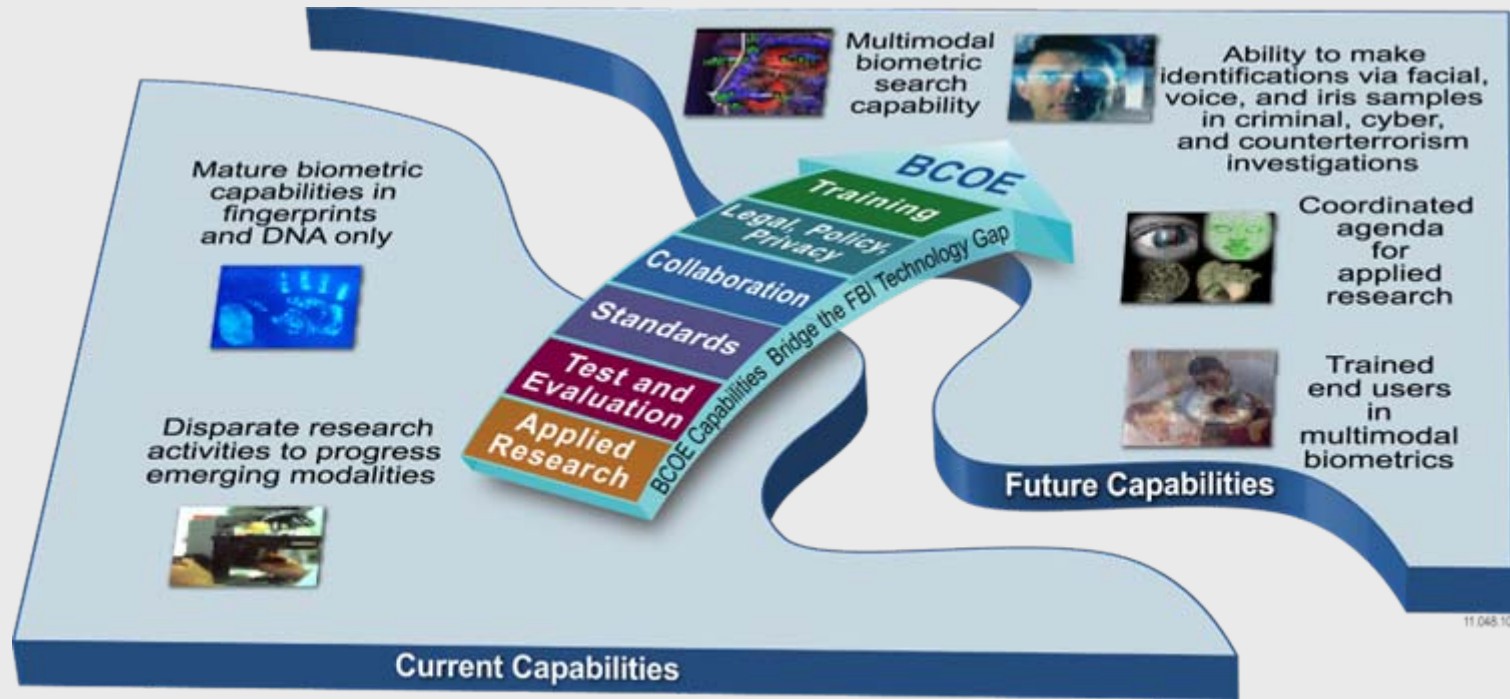


Identifying Subjects from Images for 40 Years

- The FBI's Facial Recognition/Identification work is performed within the Forensic Audio, Video, and Image Analysis Unit (FAVIAU)
- The FAVIAU is one of only a few accredited laboratories in the world that conducts examinations in the disciplines of video, image, and audio analysis



Driving New FBI Biometric Capabilities



The Biometric Center of Excellence (BCOE) is the Federal Bureau of Investigation's (FBI) program for exploring and advancing the use of new and enhanced biometric technologies and capabilities for integration into operations



Sponsoring Applied Research

- Ongoing applied research, development, test & evaluation:
 - Universal Face & Iris Workstation
 - FBI Facial Collaboration-Facial Landmarking/Facial Aging
 - Automated Face Detection and Recognition in Video
 - FI/FR of Twins (blemishes)
 - Obscuring Identity in Video
 - ReproFace (2D-3D-2D)
 - Facial Image and Camera Certification Process
 - Automated Retrieval of Scars, Marks, and Tattoos
 - Ear Recognition
 - Multiple Biometric Grand Challenge/Multiple Biometric Evaluation/ III Data Set Testing



Sponsoring Standards Development

- Facial Identification Scientific Working Group (FISWG)
- Sponsored by the BCOE and established in 2009
- Mission - “develop consensus standards, guidelines, and best practices for the discipline of image-based comparisons of human features”
- Participants include federal, state, local, and international government agencies, as well as invited non-governmental organizations
- Next meeting scheduled for November 15-18 in San Antonio, Texas
- Visit www.FISWG.org



Deepening FR Collaboration

- Sponsored the International Face Collaboration Meeting
 - 5 foreign countries and 11 U.S. agencies participated
- Participated in the FR workshop “From Bones to Bits”
 - 55 U.S. government and 47 contractor attendees
- Sponsored the U.S. Government Facial Collaboration Meeting
 - 88 attendees representing numerous law enforcement, intelligence, and military agencies



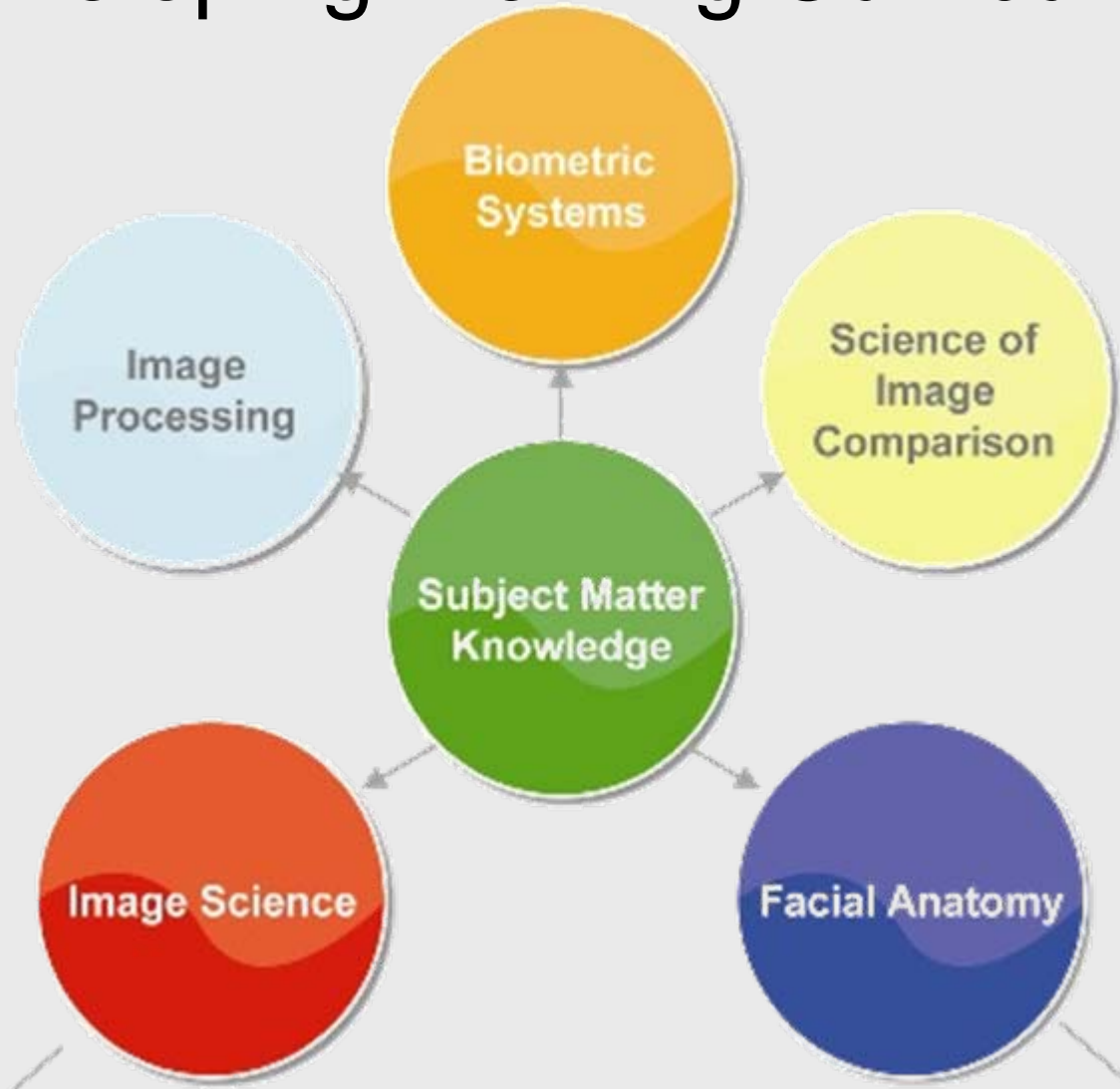
Analyzing Legal And Privacy Concerns

Tasks associated with this analysis include:

- Identifying databases external to the FBI to which the FBI has legal access
- Defining policy for both automated and human-tandem searching of databases and methods of how the images are used in searching and how they are destroyed or retained
- Identifying privacy implications of applied research using images of human subjects



Developing Training Curriculum



Preparing for FR incorporation into Next Generation Identification (NGI)

- ▶ An upgrade to IAFIS – The FBI is developing an automated, interoperable multimodal biometric system



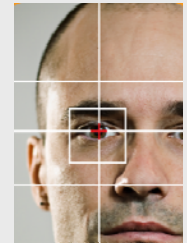
Enhanced
tenprint
services
2011



Palmprints
and latents
2012



Photos/Facial,
scars, marks,
and tattoos
2013



Iris
2014

- The NGI system:
 - Incremental replacement of the current IAFIS
 - Improving current functionality and providing new functionality
 - Developing multimodal collection and search identification services



Value Of the FBI-DMV Pilot

Operational Results

The BCOE-sponsored FR pilot program with NC DMV led to more than 700 leads including:

- One federal fugitive apprehension
- Six state fugitive apprehensions
- One missing person resolution

FR System Testing

FACEMASK has also served as an opportunity for FBI analysts to operationally test a FR system and determine its strengths and weaknesses. This aids the FBI as it develops its own FR capability

Identification of Follow-On Projects

Due to this success, the FBI took advantage of an ongoing survey of U.S. DMVs and used it as an opportunity to identify other prospective state DMVs for follow-on projects



Purpose Of The DMV Survey

The FBI wanted to identify key FR POC in order to direct inquiring investigators and agencies. The original DMV survey focuses around contact information; however, with the success of the original pilot the purpose and scope of the data gathering effort changed.

Initial Purpose

- Collect DMV FR POC Information
- Identify DMVs that have implemented FR systems

Expanded Purpose

- Gather data about FR vendors, state laws, and search protocol to help the FBI identify a DMV for a potential follow-on project
- Technical systems information
- Receptiveness to collaborating with the FBI
- Various concerns and suggestions voiced by the DMVs and trends were recorded



DMV Survey High Level Findings

	Specific Findings
Technology	✓ The vast majority of states that have FR Systems use L1 Technologies
Vendors	✓ Many DMV image databases are maintained and searched by their vendors. This presents privacy issues that should be explored
Legal Requirements	✓ Across the nation, there are widely varying legal requirements. To initiate searches, some DMVs require Memorandums of Understanding (MOU) while some just require the requesting agency to buy their vendor's software
Funding	✓ Due to a lack of funding, some states who had planned to develop FR systems had to delay or cancel their plans due to budgetary constraints
Knowledge	✓ Many DMV POCs lacked technical knowledge about their systems and the legal issues involved in their use. Since most POCs were unable or unwilling to nominate alternative POCs, more in-depth research may be required before FBI collaboration can be considered (i.e., researching state laws that apply to the DMV's FR system or interviewing a DMV's vendor for more specific systems information)



Questions / Comments

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