Michigan State Police
SEARCH Symposium
July 24, 2019
Facial Recognition Research: Measuring Efficiency, Effectiveness, and Business and Public Safety Value
**What is Facial Recognition?**

**Facial Recognition (FR)** is the automated searching of a facial image in a biometric database, typically resulting in a group of facial images ranked by computer-evaluated similarity.

**Facial Identification (FI)** is the manual examination of the differences and similarities between two facial images or a live subject and a facial image (one to one) for the purpose of determining if they represent the same person.

An algorithm takes measurements of the face to create a template. It is this template that is searched against all of the other templates within the SNAP database.
What is the Statewide Network of Agency Photos (SNAP)?

- MSP’s statewide central repository of photos
  - MDOS database copy, mug shots from agencies around the state, and MDOC photos

- Mug shot photos are submitted via Live Scan by participating agencies at the time of arrest

- July 2019- all but 6 counties across the state are contributing images to the central repository
SNAP Database - July 2019

- >10 million criminal images (Front and Side View, SMT)
  - Approx. 5 million templated front facing images
- >281 thousand templated MDOC images
- >45 million templated MDOS images
Michigan State Police SNAP Unit Services

Image Enhancement: 3D Pose Correction

Image Enhancement: Accessory Removal

Investigative Lead Report

Watchlist Hit

DHS HSIN Multi-State FR Program

Mobile FR Hit

Photo Lineup: Background Edit

To request MSP SNAP Unit Services, please email: MSPSNAP@michigan.gov
SNAP Unit- Staff and Training

- **Staff**
  - 2 trained digital image examiners and 1 trained supervisor (adding a third examiner)
  - Work in conjunction with the Audio Video Analysis Section

- **Training: minimum 80 hours of facial comparison and identification**
  - Federal
  - Private
  - In-house
  - Proficiency/Continuing Education

- **Examiners**
  - Study the effects of aging, cosmetic surgery, and weight gain
  - Utilize 3D pose correction software to enhance images
  - Conduct FR searches and morphological comparisons
  - Provide Investigative Lead Reports to law enforcement
  - Testify in court
  - Peer and supervisory review
  - Follow the ACE-V (*Analysis, Comparison, Evaluation, Verification*) Method when completing morphological comparisons
Facial Recognition Past & Present

- Law Enforcement has always used some form of FR (less accurate, less efficient)
  - Wanted Posters
  - Mug Books
  - News (Crime Stoppers)/Public Assistance

- Current use of FR by law enforcement (more accurate, more efficient)
  - Automated FR Searches
    - Investigative searches
    - Field identification (mobile devices)
    - Identity fraud detection
Michigan’s Approach

- Policies, procedures, audits, peer reviews, MOUs
- Training (Face Comparison and Identification, Expert Witness Testimony)
- Follow national standards: OSAC, FISWG, FBI/CJIS Admin Rules
- No real-time screening
- FR searches occur AFTER a crime has been committed (crime type & complaint number required)
- FR also utilized to detect identity fraud and to help identify unknown deceased or incapacitated persons (victims)
- Facial examiners role is similar to that of a latent fingerprint examiner and we provide investigative leads only.
Fraud Detection: Image Analysis Team (IAT)

- Process to reduce the number of fraudulent I.D. cards
- In conjunction with MDOS/DMV
- Michigan is ranked in the top 10 states for highest identity theft/fraud
Efficiency and Effectiveness

- How we attempt to measure our effectiveness? Number of Leads produced and our turn around time
- Effectiveness of the technology - algorithms improving in speed and accuracy (NIST FRVT)
- Training impacts efficiency – improving quality of images searched and overall understanding of the process/technology
- Difficult to measure the effectiveness for law enforcement (did an arrest take place)
FR Misconceptions

- False Positives- accuracy based on statistics and likelihoods, not on false positives and negatives. A gallery return isn’t measurable in terms of accuracy and error. Unless the computer software returns only 1 image, there are no false positives (vendor testing versus practitioner use).

- Use Cases- The MSP does not currently have the ability to perform FR resulting from a live video feed.

- CSI Effect- The MSP does not have the ability to take a poor-quality image and clarify it like it is depicted on popular television shows such as CSI (We cannot introduce data/detail that is not actually present).
FR Limitations

- Important factors that can positively or negatively impact the outcome of the FR search include: image collection, image capture, subject pose, facial expression, and obstructions.

- Automated FR relies on a computer-generated candidate list which may not recognize details humans can perceive, leading to images of the same person scoring weakly or different people scoring strongly. A human is therefore necessary to make the comparison (Black Box Study).
Best Practices - Mug Shots

- Distance
- Glasses
- Accessories

- Background
- Resolution
- Lighting

- Expressions
- Garbage in, garbage out

Garbage in, garbage out
Legislation – Facial Recognition

- Senate Bill 342 and House Bill 4810
  - Currently being introduced and debated
- We need legislation/regulations that govern our use of FR technology
- Banning the use of FR
  - Could cause crime rates to go up
  - Could ultimately cause the taxpayers more money as cases may not be solved in a timely Fashion
  - Cases may not be closed in an expeditious manner
Facial Recognition Successes
Fraud

Probe Image: AVAU still from CCTV (3D Pose Correction)
Homicide

Probe Image: Social Media
Child Predator
Probe Image: “Selfie” (Mirroring)
Michigan State Police

Investigative Lead Report

Law Enforcement Sensitive

This document is not a positive identification. It is an investigative lead only and is not probable cause to arrest. Further investigation is needed to develop probable cause to arrest.

Bid DA Identifier: BID-1234-19
Requester: Test
Date Searched: 07/17/2019
Requesting Agency: Test
Digital Image Examiner: Krystal Howard
Case Number: 19-1234
File Class/Crime Type: 0900

Probe Image

Investigative Lead

Name: Jane Doe
Alias:
Date of Birth: 01/01/1970
SID #: 1234567
FBI/UCN #:
DL/PID:

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Mobile FR: What is it and how does it work?

- In person capture only from a mobile device
- Officer Safety
- Purpose codes – must select a reason for the search (consent, probably cause, warrant, death)
- Audited – random and targeted
- MOU-agreement must be on file
- Training is required for all users
Mobile Facial Recognition
SUCCESS
Mobile Facial Recognition
Future Considerations

- Iris recognition
- Pattern recognition - Tattoos
- Anti-spoofing - Liveness Detection/Authentication
- Real-time
QUESTIONS?
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