

Chicago Police Department
Facial Recognition Technology
Detective Michael Chiocca
Bureau of Detectives

What is Facial Recognition?

- Only used as an investigative tool akin to using the mug shot database and entering demographic information.
- Instead of demographics, the software uses an analysis of various features and points on the face.
- The measurements of those points and an analysis of the spatial relationship between those points.
- The software does **NOT** identify offenders in of itself.

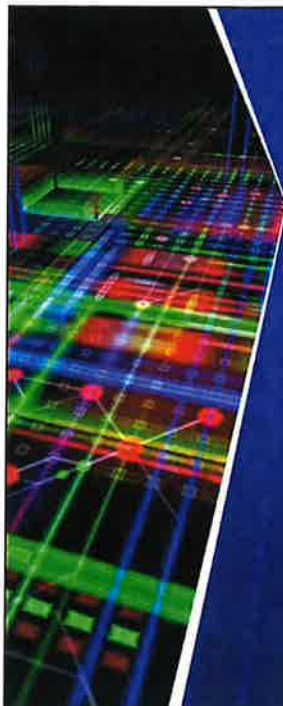
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Facial Recognition Laws

- San Francisco and Oakland, California **BAN**
 - Assembly Bill 1215
 - At first, AB 1215 called for an indefinite ban on the facial recognition in body cams. But after the debate over the legislation, the time of the moratorium of seven years was reduced to three years.
- Somerville, Massachusetts **BAN**
- Illinois 740 ILCS 14/1 Biometric Information Privacy Act
 - Private entities must comply with a number of requirements pertaining to the collection and storage.

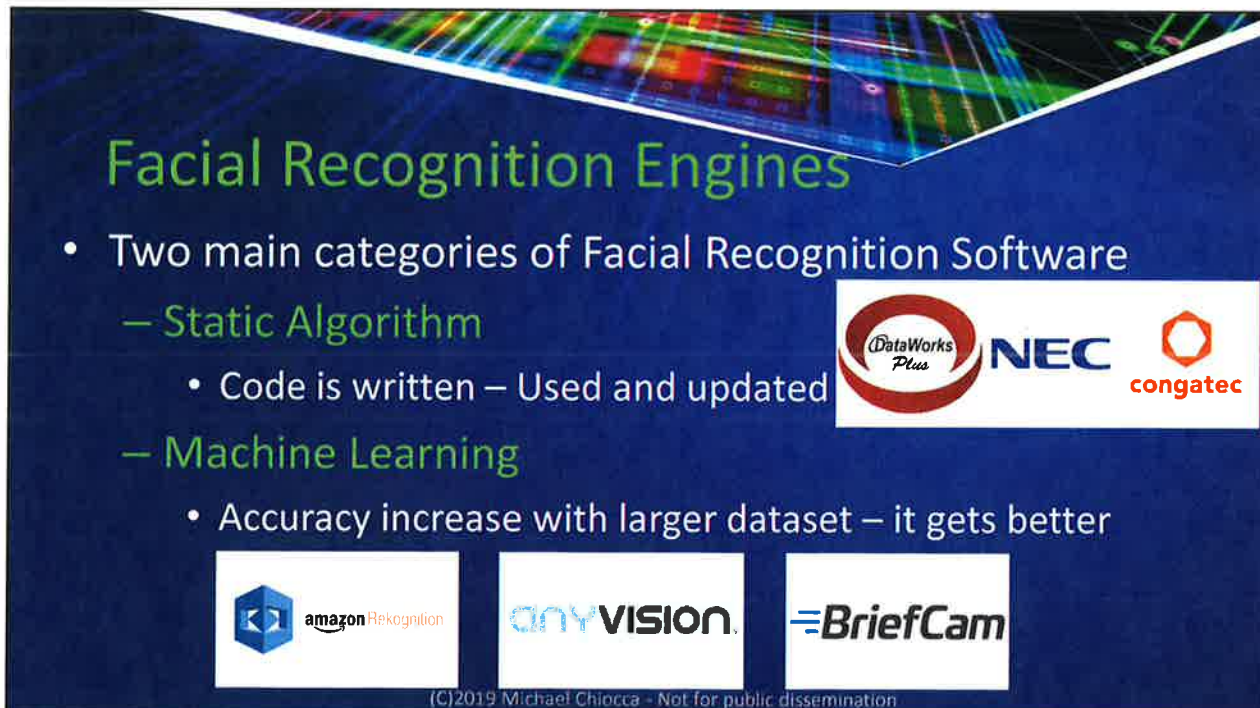
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Facial Recognition Use Types


- Identify
 - This is a one-to-one analysis.
 - Help identify a subjects face against a known image.
- Discovery
 - This is a one-to-many analysis.
 - Compares one image to many other to find a **candidate**.


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Facial Recognition Engines


- Two main categories of Facial Recognition Software
 - Static Algorithm
 - Code is written – Used and updated
 - Machine Learning
 - Accuracy increase with larger dataset – it gets better














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Machine Learning – Amazon Rekognition

Using Amazon Rekognition to Identify Persons of Interest for Law Enforcement

This is a guest post by **Chris Adams**, a Senior Information Systems Analyst for the Washington County Sheriff's Office.

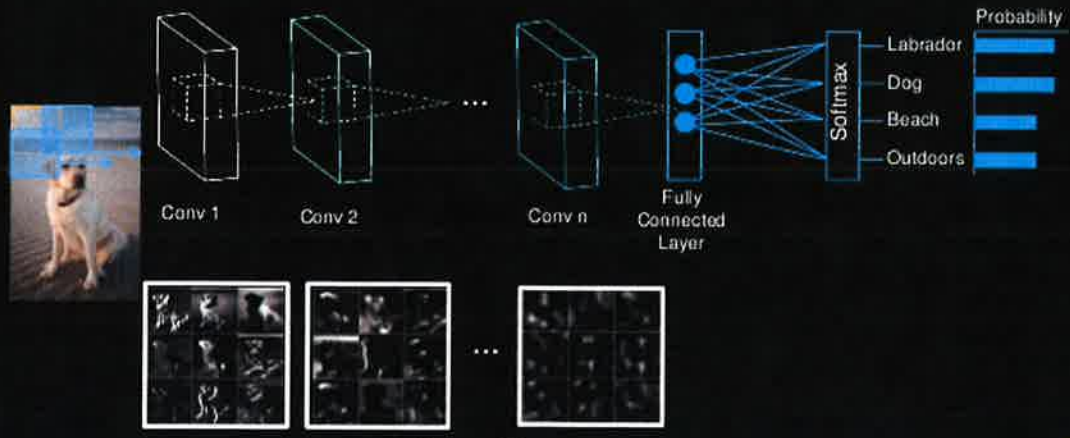
In law enforcement, it is extremely important to identify persons of interest quickly. In most cases, this is accomplished by showing a picture of the person to multiple law enforcement officers in hopes that someone knows the person. In Washington County, Oregon, there are nearly 20,000 different bookings (when a person is processed into the jail) every year. As time passes, officers' memories of individual bookings fade. Also, in most cases, investigations move very quickly. Waiting for an officer to come on duty to identify a picture might mean missing the opportunity to solve the case.

In this post, I discuss our decision to use AWS for facial recognition. I walk through setting up web and mobile applications using AWS, demonstrating how easy it is even for someone who is new to AWS. I then show how we used Amazon Rekognition to build a powerful tool for solving crimes.



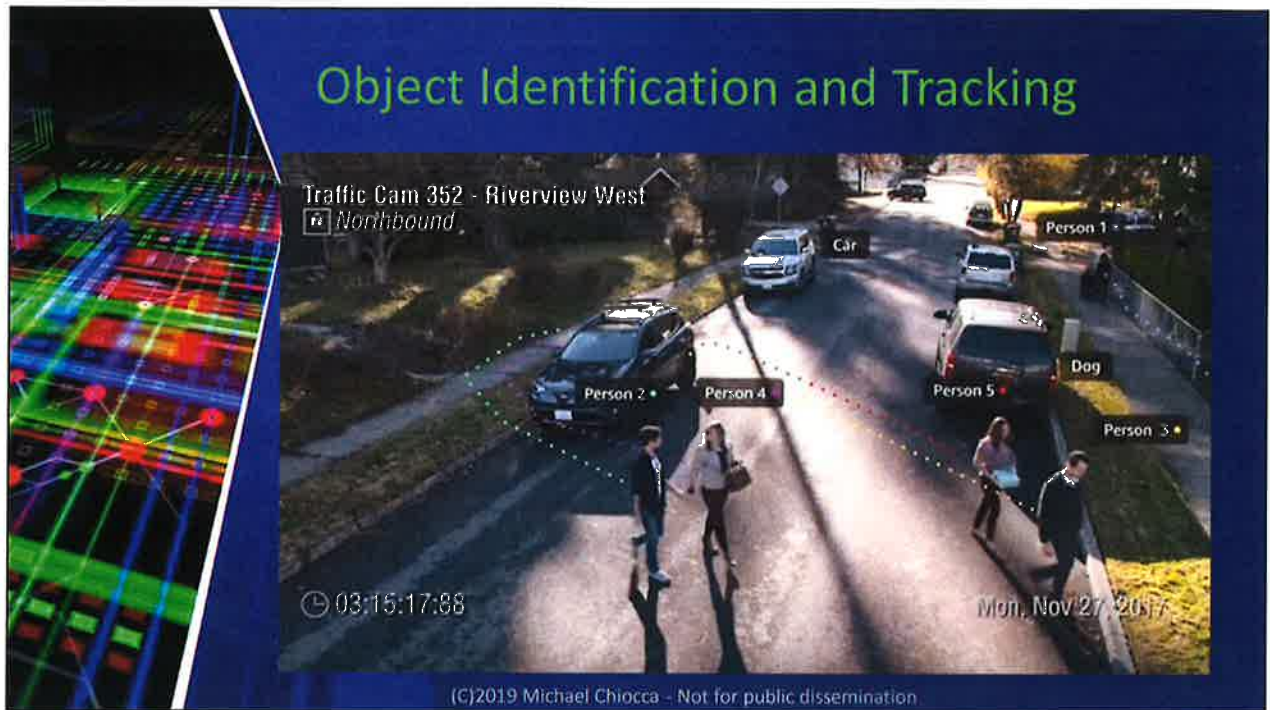
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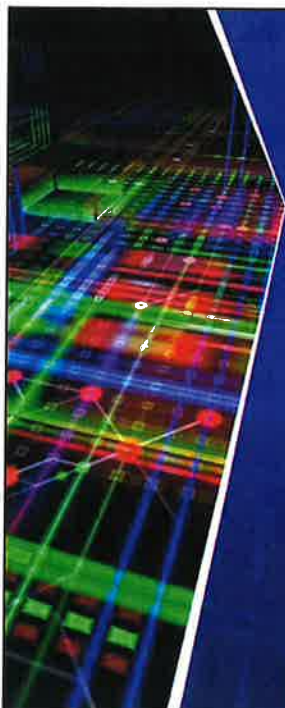
Amazon Rekognition - Deep Learning Process



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Object Identification and Tracking

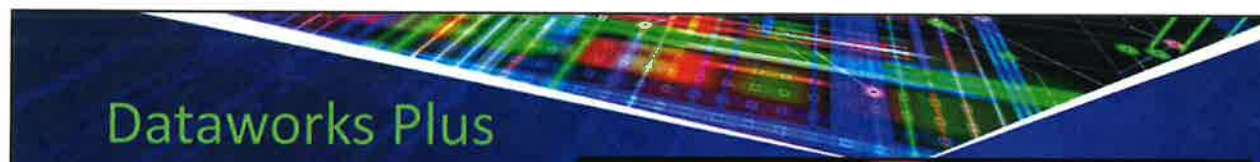




Quick Facts – Chicago Police Use

- Not real time
- Submitted images are compared against Chicago Police Department mug shot database (No Juveniles <17)
- Vendors (NEC, Cognitec) search the same data but use different algorithms.
- Mug shot or face front profile needed for best results.

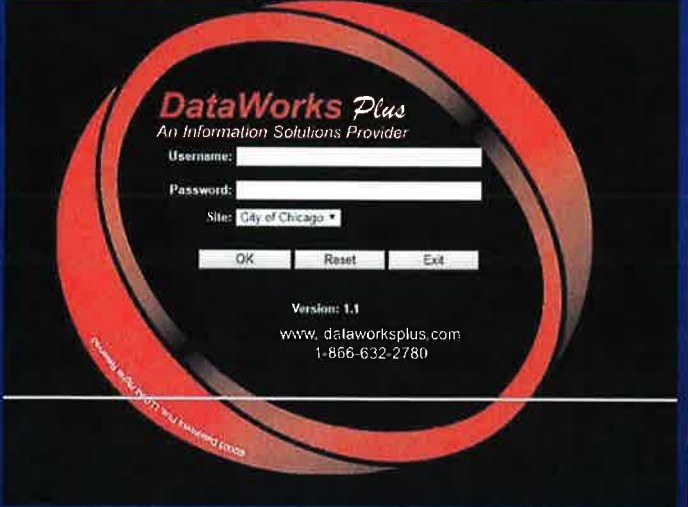
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Dataworks Plus

Web based interface

- Local Intranet
- Allows Integration with Mug Shot database



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DataWorks Plus

Logoff Close

Identifier: _____ Description: _____
 Start Date/Time: _____ End Date/Time: _____
 UserName: pc0r412

Reset Change Password
 Find New Session

Sessions (Count: 22)

Edit	Delete	Id	Description	Date Time Created
Edit	Delete	16366		11/12/2017 11:44:57 AM
Edit	Delete	16327		8/12/2017 11:34:25 AM
Edit	Delete	14033		5/17/2017 8:47:45 AM
Edit	Delete	12980		5/16/2017 11:05:39 AM
Edit	Delete	13667		4/30/2017 1:22:14 PM
Edit	Delete	13352		4/11/2017 8:13:41 PM
Edit	Delete	12789		3/19/2017 8:56:11 AM
Edit	Delete	12673		3/14/2017 7:45:20 PM
Edit	Delete	12661		3/13/2017 5:58:33 PM
Edit	Delete	12656		3/13/2017 3:00:14 PM
Edit	Delete	12572		3/8/2017 12:29:27 PM
Edit	Delete	12472		3/3/2017 8:52:22 AM
Edit	Delete	12051		1/30/2017 4:41:57 PM
Edit	Delete	11357		12/17/2016 5:41:59 PM
Edit	Delete	10669		10/14/2016 10:55:43 AM
Edit	Delete	10568		10/14/2016 10:25:36 AM
Edit	Delete	10567		10/14/2016 10:53:51 AM
Edit	Delete	10087		8/30/2016 2:57:10 PM
Edit	Delete	10078		8/29/2016 8:30:53 PM
Edit	Delete	8551		6/23/2016 8:53:09 AM
Edit	Delete	8550		6/23/2016 8:51:31 AM
Edit	Delete	8254		6/13/2016 8:36:41 AM

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Process



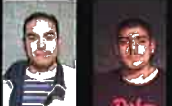


- User makes a JPG or BMP image
- User selects "Add Probe" in the web client
- User Clicks SEARCH
- User awaits results

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Searches: Display Probe Beside Each Row Search Type: <ALL>






Probe(s)

Cognitec Side By Side Comparison

				
645,000	626,000	619,000	586,000	580,000
Compare	Compare	Compare	Compare	Compare
Chart Compare	Chart Compare	Chart Compare	Chart Compare	Chart Compare
Data and Images	Data and Images	Data and Images	Data and Images	Data and Images
Linked Images	Linked Images	Linked Images	Linked Images	Linked Images
Mark for Review	Mark for Review	Mark for Review	Mark for Review	Mark for Review
Remove	Remove	Remove	Remove	Remove

1 of 2

REC Side By Side Comparison



				
626,000	584,000	584,000	537,000	530,000
Compare	Compare	Compare	Compare	Compare
Chart Compare	Chart Compare	Chart Compare	Chart Compare	Chart Compare
Data and Images	Data and Images	Data and Images	Data and Images	Data and Images
Linked Images	Linked Images	Linked Images	Linked Images	Linked Images
Mark for Review	Mark for Review	Mark for Review	Mark for Review	Mark for Review
Remove	Remove	Remove	Remove	Remove

1 of 2

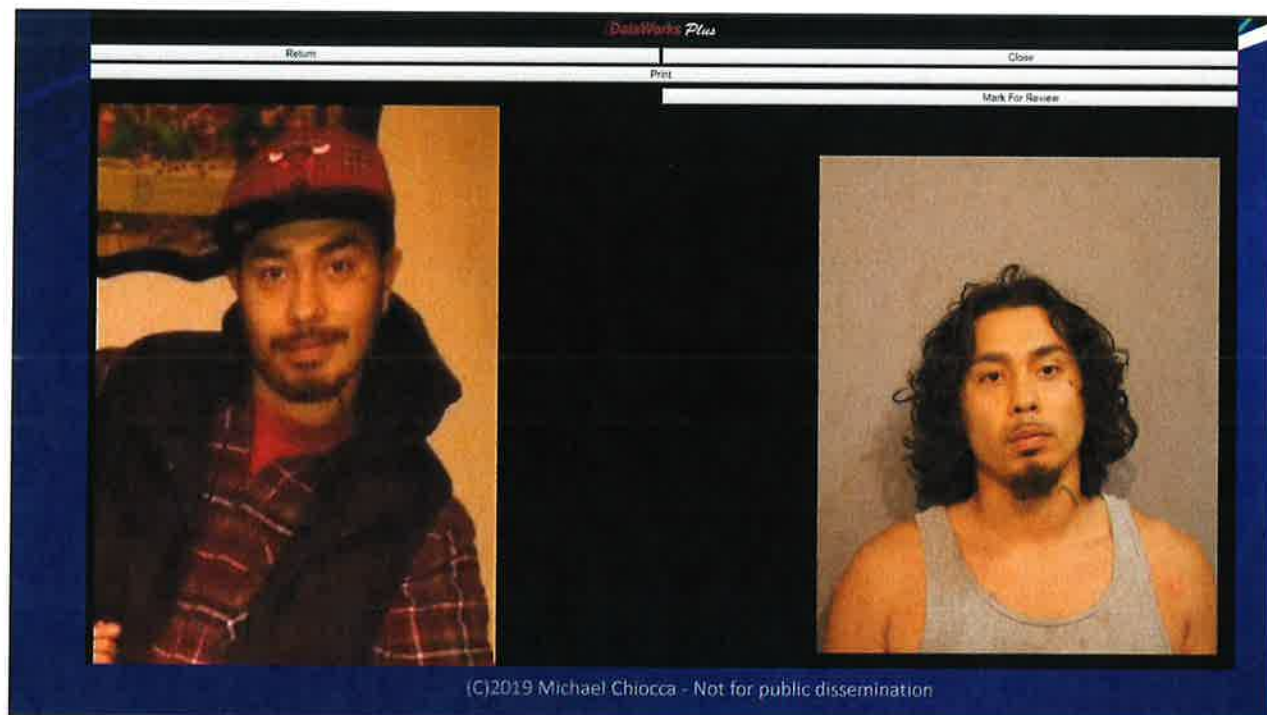
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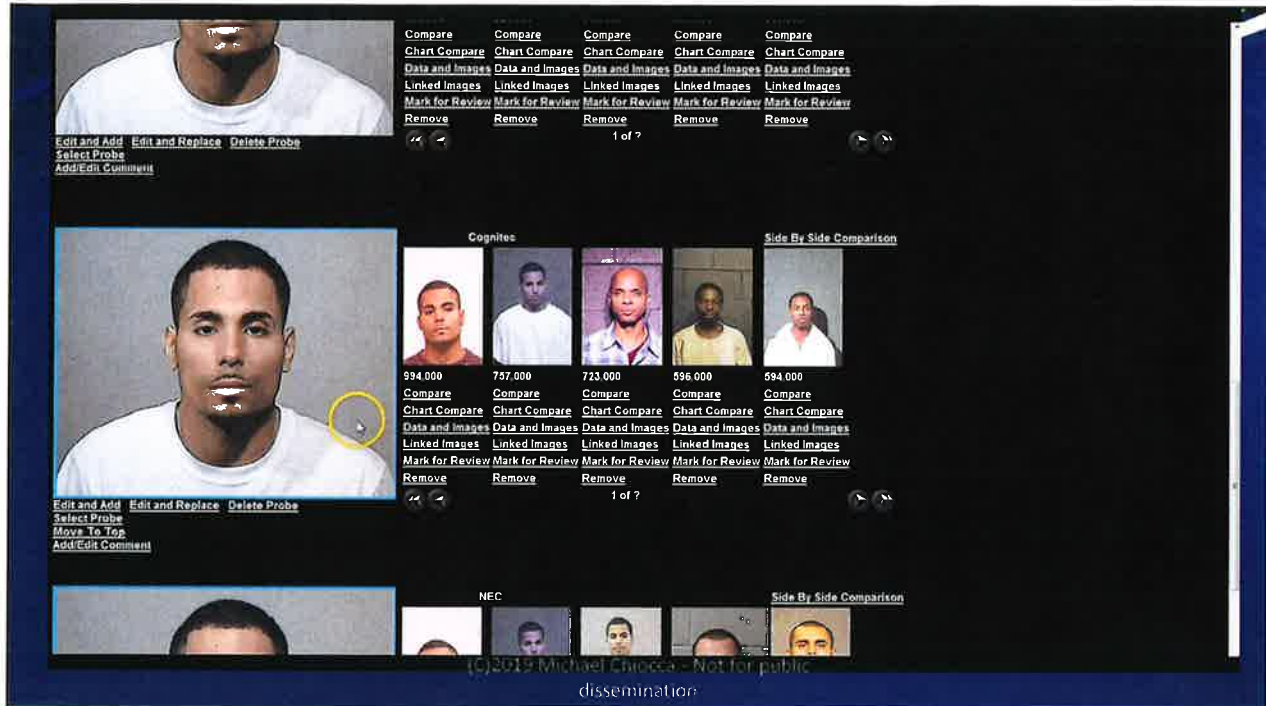
Return Close

Mark for Review

	
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Deployment

- Crime Prevention and Information Center
- CPIC@chicagopolice.org
- Dedicated Facial Recognition Team at Headquarters
- Detective Division Area Technology Centers
- Access – EVERY District and Area Location which has a BOD Video Machine Installed.

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Facial Recognition Team Report

Chicago Police Department
Bureau of Detectives, Unit 380
Facial Recognition Team
3510 S. Michigan Ave, 4th Fl
Chicago, IL 60653

Bureau of Detectives Facial Recognition Team	
Date of Report	10/2/2019
Case	190714111
Name	Investigation
BECK	1715 11th St. Animal Health Consulting Services
Shop/Zone	171111 17th St
Location	171111 17th St
Location of Sale	171111 17th St
Area	171111 17th St
District/Beat	171111 17th St
System	Chicago Police Department
Assigned Detective	Edwin Rangel
Possible Subject	RANGEL, Edwin 171111
Facial Recognition Team Report	Facial Recognition Team Report

CRIME: RANGEL has a prior number: RANGEL, Edwin 171111

The Facial Recognition Team was assigned the information provided by the Chicago Police Department on 10/2/2019. The information was reviewed along with all photos of the offender. The offender provided was information for 171111 for Facial Recognition of the case.

The offender is a male with short dark hair, a high forehead, and a serious expression. He is wearing a dark jacket and a dark cap. The offender is holding a mobile phone to his ear. The offender is standing in a store aisle.

The offender is a male with short dark hair, a high forehead, and a serious expression. He is wearing a dark jacket and a dark cap. The offender is holding a mobile phone to his ear. The offender is standing in a store aisle.

The offender is a male with short dark hair, a high forehead, and a serious expression. He is wearing a dark jacket and a dark cap. The offender is holding a mobile phone to his ear. The offender is standing in a store aisle.

Facial Recognition Team Report (Page 2 of 6)

The offender is a male with short dark hair, a high forehead, and a serious expression. He is wearing a dark jacket and a dark cap. The offender is holding a mobile phone to his ear. The offender is standing in a store aisle.



Based upon the information provided by the Chicago Police Department on 10/2/2019, the offender is a male with short dark hair, a high forehead, and a serious expression. He is wearing a dark jacket and a dark cap. The offender is holding a mobile phone to his ear. The offender is standing in a store aisle.

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Facial Recognition Team Report (Page 3 of 6)



Facial Recognition Team Report (Page 4 of 6)



Page 3 of 6 (C)2019 Michael Chiocca - Not for public dissemination Page 4 of 6

Facial Recognition Team Report (Page 5 of 6)

Facial Recognition Team Report (Page 6 of 6)

Cautions Regarding Facial Recognition

- This is only an **enigmo** - it is not a hit to using the mug shot database and entering demographic information
- **Issues of demographics**, the software uses an analysis of various features and points on the face (the measurement of those points and an analysis of the spatial relationship between those points)
- **The software does not identify offenders and is not a**
- Being selected as a possible suspect is **NOT** a **guarantee** that the facial features of a potential suspect **resemble** the probe image
- Avoid using terms such as **match**, using the numeric values of gallery images as spots, and stating that the software identified the gallery image as the **hit**

Terminology

- **Probe Image** - The selected image that will be compared to the Clear Mug Shot Database using Face Plus
- **Gallery Image** - Images that are selected by the Face Plus software that have a similar Facial Template to the Probe Image and are available for review in the software based upon their selection
- **Possible Suspect** - Individuals whose Gallery Image strongly resembles the probe image and have been selected for further investigation by the User

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Department uses

- As a narrow tool
- Not used to “confirm” an identification made by other means (i.e. Line Up)
- Careful consideration given to the software’s limitations.
- **Not used alone for any identification.**
- **Not used in REAL TIME.**


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Best Results?

- Social Media
 - Selfie Culture
 - THANK YOU FACEBOOK!
- Security Apps within Smart Phones
 - Lookout security app.
- High Definition Cameras
 - Especially Cell Phones!

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Close but NO



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Close but NO

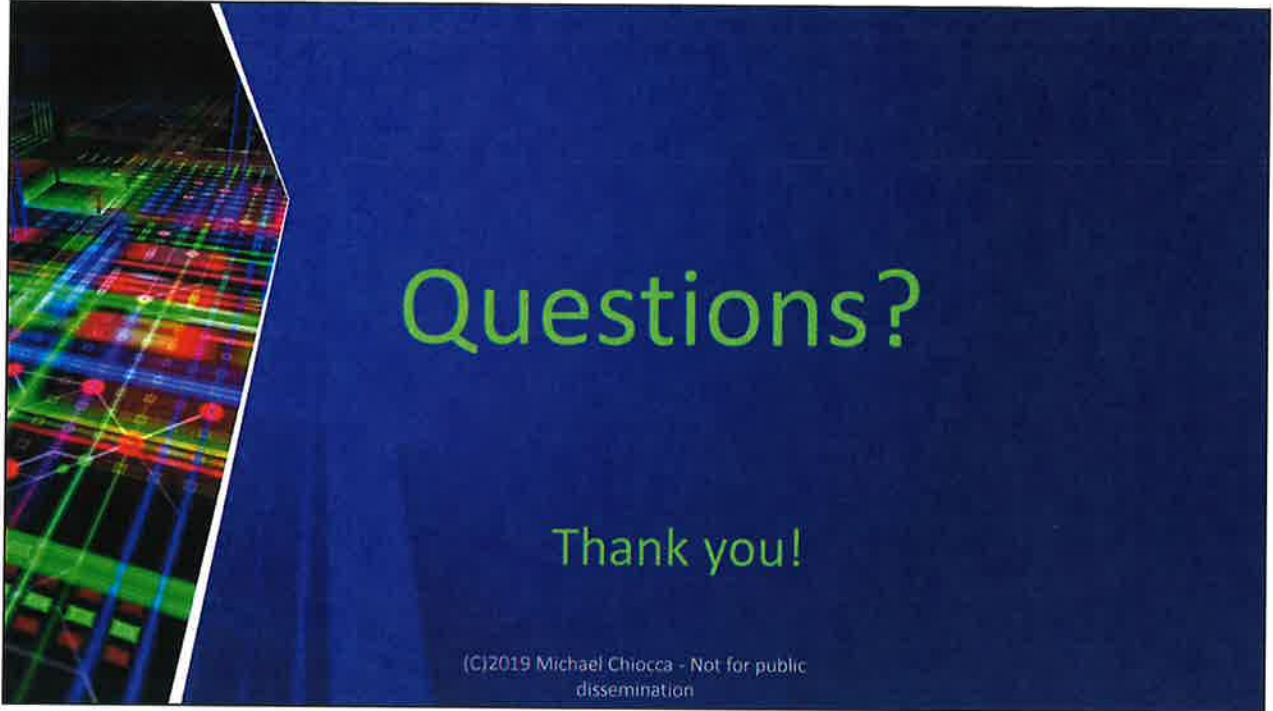
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FACIAL RECOGNITION USE CASE CATALOG

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Questions?

Thank you!

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