









NEXT GENERATION IDENTIFICATION

Implementing the future of identification & investigative services

RAP BACK

RAPID MOBILE ID

IRIS

FACIAL

LATENTS

PALMS



Implementing the future of identification & investigative services



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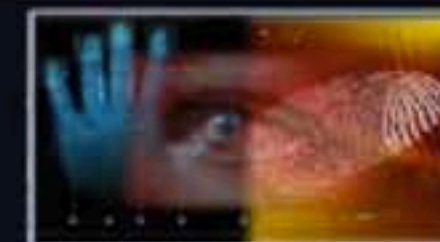


NGI Face Pilot

Face matching system – Currently Available

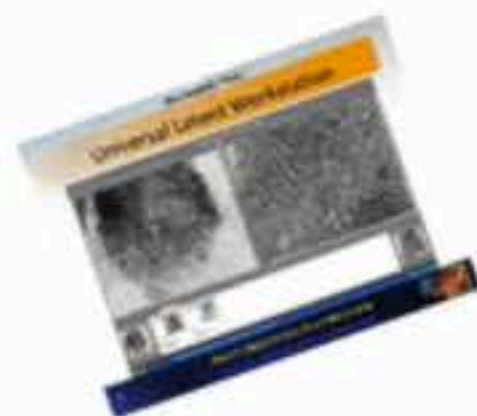
- 12 million Local/State/Federal searchable photos
- Focus on contributor image quality

Universal Facial Workstation software

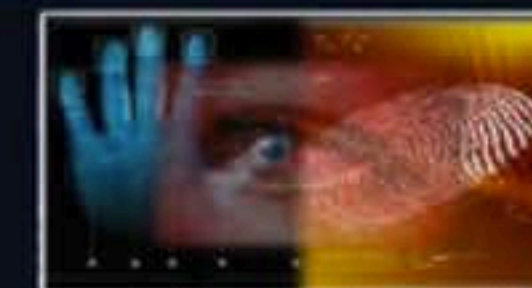
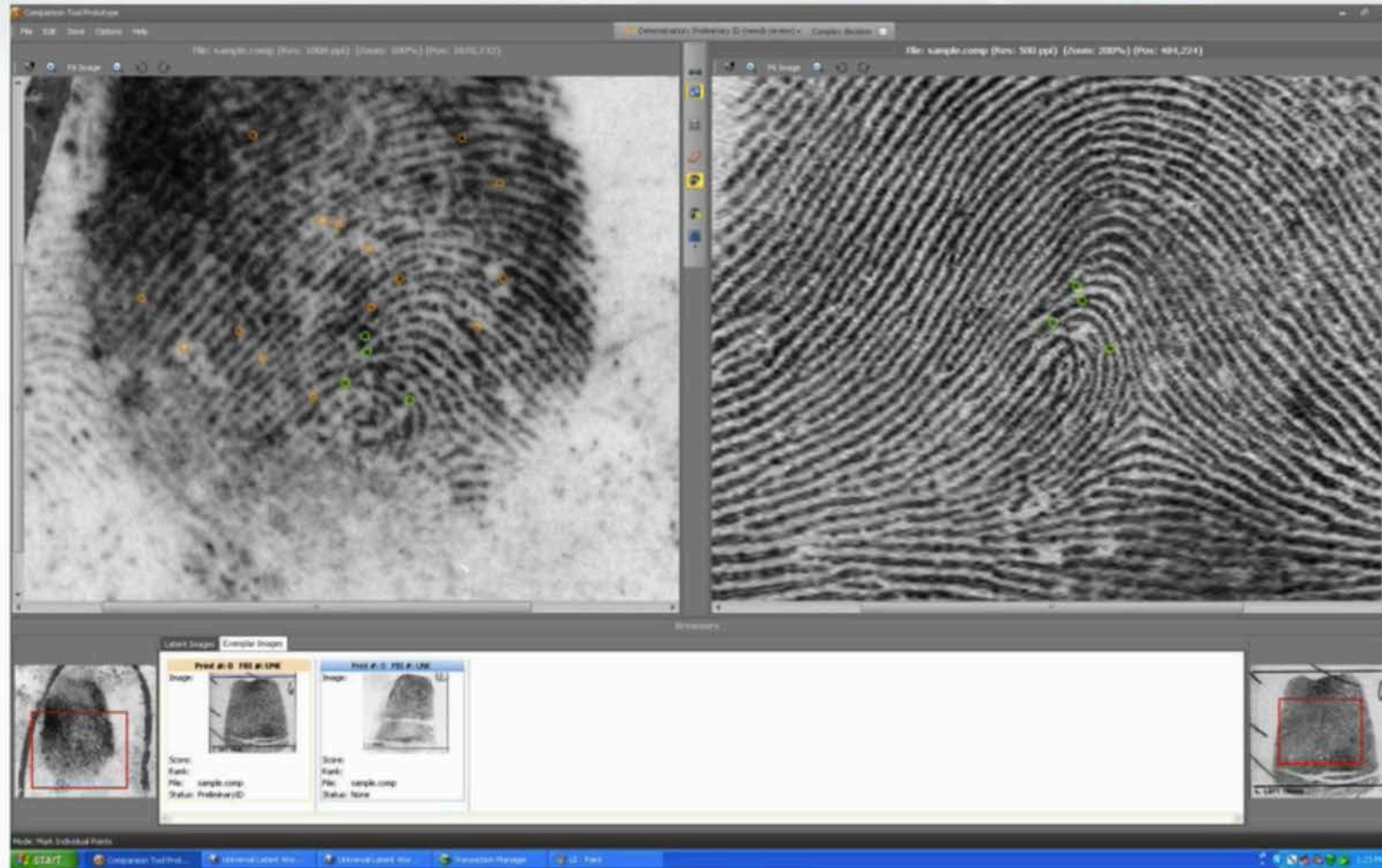


Universal Latent Workstation

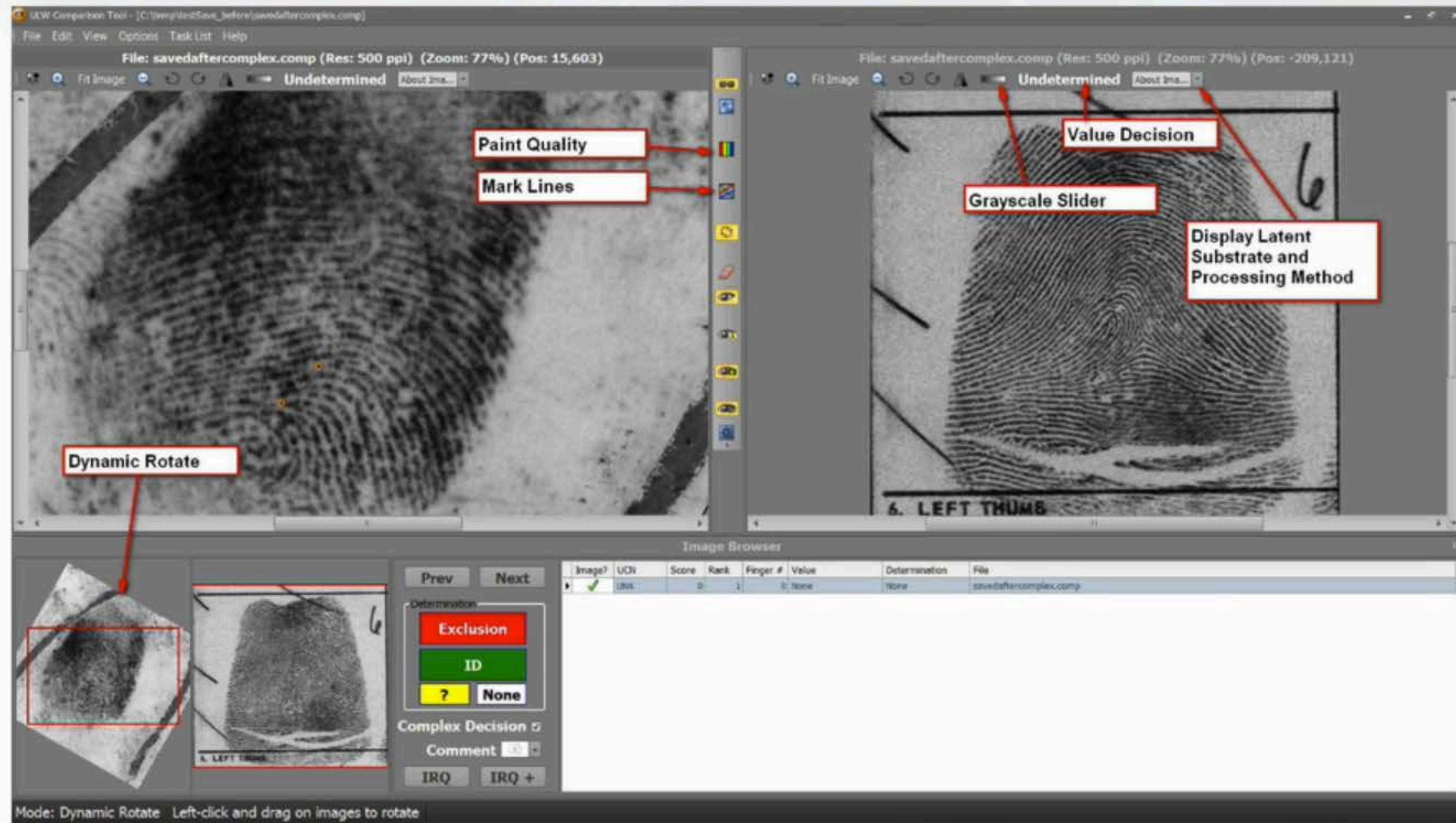
ULW Software



Universal Latent Workstation



ULW Comparison Tool



ULW Comparison Tool

File: tmp5D09.tmp (Res: 1000 ppi) (Zoom: 160%) (Pos: 398,550)

File: tmp5D09.tmp (Res: 500 ppi) (Zoom: 320%) (Pos: 123,142)

Mark Individual Points

Image Browser

Prev Next

Determination

Exclusion

ID

? None

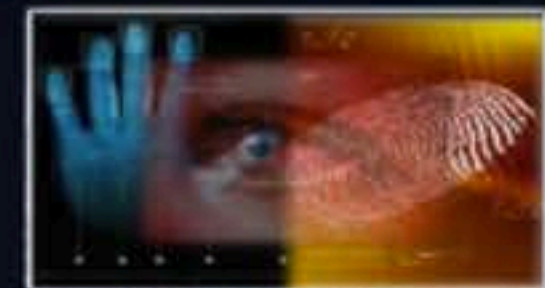
Complex Decision

Comment

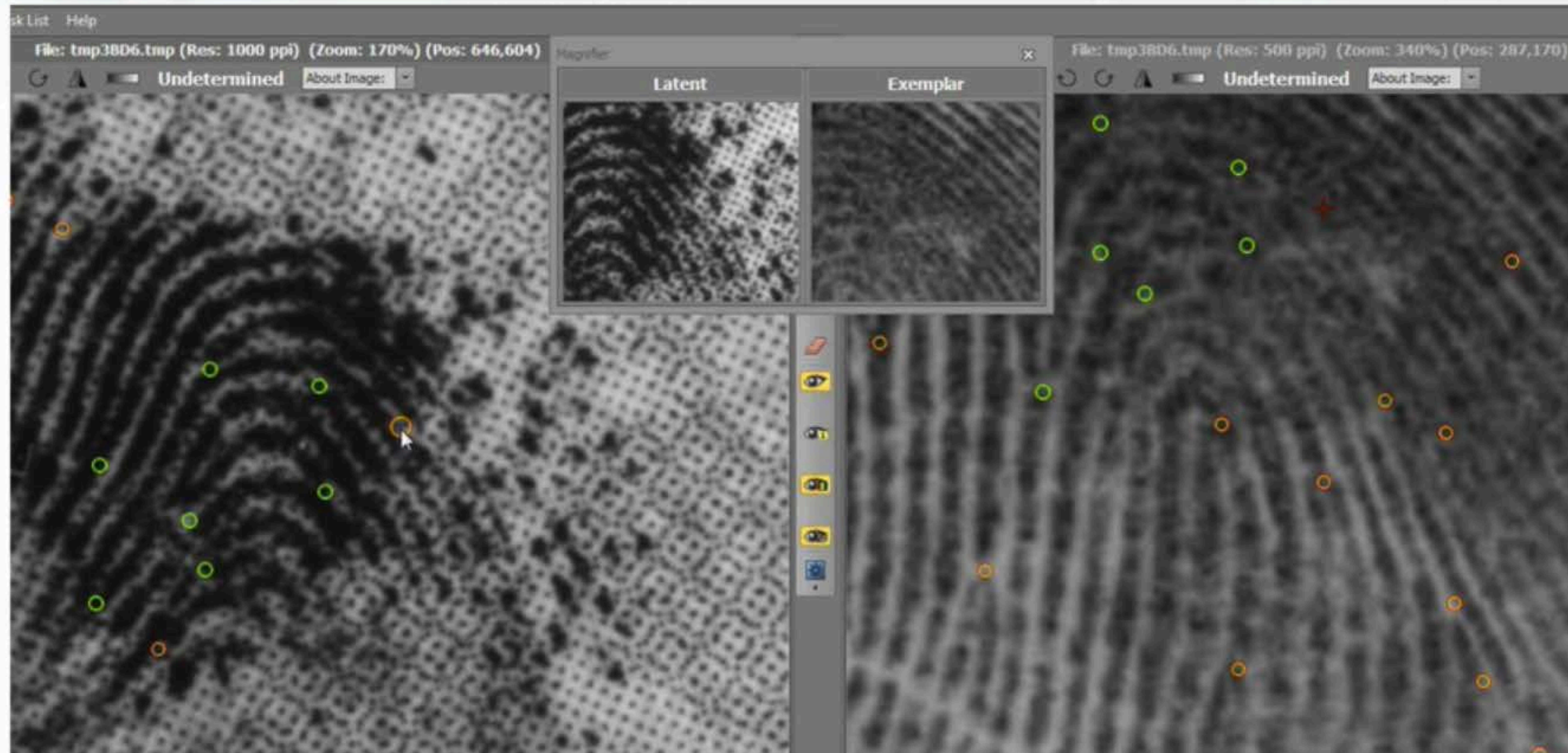
IRQ IRQ+

Mode: Mark Points

Image?	UOI	Score	Rank	Finger #	Value	Determination	File
✓	TESTUCH01	2345	1	8	None	None	tmp5D09.tmp
✓	TESTUCH02	1800	2	8	None	None	tmp5D09.tmp
✓	TESTUCH03	1621	3	9	None	None	tmp5D09.tmp
✗	TESTUCH04	1522	4	7	None	None	
✗	TESTUCH05	1501	5	4	None	None	
✗	TESTUCH06	1477	6	8	None	None	
✗	TESTUCH07	1421	7	7	None	None	
✗	TESTUCH08	1371	8	8	None	None	
✗	TESTUCH09	1321	9	9	None	None	
✗	TESTUCH10	1299	10	8	None	None	



ULW Ghost Cursor



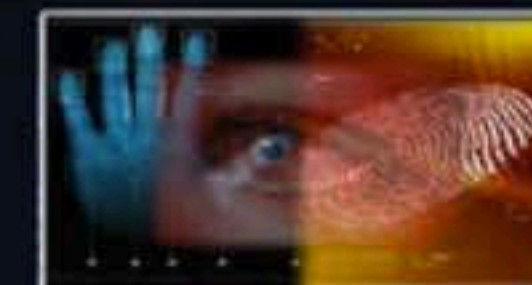
Face Quality





Face Quality Metrics

- ▶ Facial Recognition improved through best practices to system contributors
 - ▶ Educate the user community on those best practices today
- ▶ FBI Face Report Cards
 - ▶ Feedback on photo quality and recommendations for better photo capture will be provided upon request
 - ▶ Two step image quality review
 - ▶ Using quality assessment tools (leveraging from federal partners, private industry, in-house developed)
 - ▶ Trained examiner review
- ▶ Working to adapt to higher Subject Acquisition Profile (SAP) requirements in user operations (driving better capture technology)



Your Mugshots Should Look Much Like This

1. Face Straight On
2. Properly Lighted
3. Properly Composed



IMPORTANT

Your primary photo should be without glasses.

1.
Face Not
Straight On



Side to side tilt



Front to back tilt



Side to side rotation



Smile or grimace, mouth open

2.
Not
Properly
Lighted



Too light



Too dark



Unevenly lit



Shadows on background

3.
Not
Properly
Composed



Too loose



Too tight



Texture or objects in background



Obstructions to face
hair, glasses, piercings, dirt, blood, excessive make-up

When possible, long hair should be tied back or at least tucked behind ears.



Head coverings should be removed unless they serve a religious or medical purpose.

Revised 12/12/12

Universal Facial Workstation

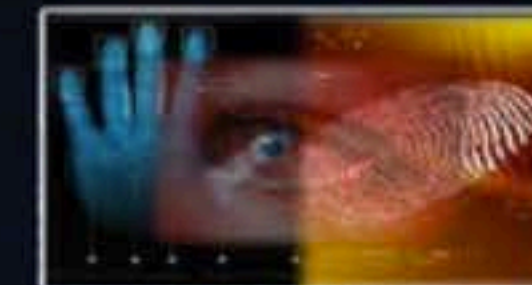
UFW Software





Universal Face Workstation (UFW)

- ▶ FBI user software to support access to NGI Face Pilot and NGI System face search capabilities
- ▶ Cross Platform (Windows, OSX, Linux)
- ▶ Built upon a Biometric Integration Platform
- ▶ Built on open source frameworks
- ▶ Extensive support for plugins
- ▶ Will be available for Law Enforcement use free of charge





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UFW Objectives

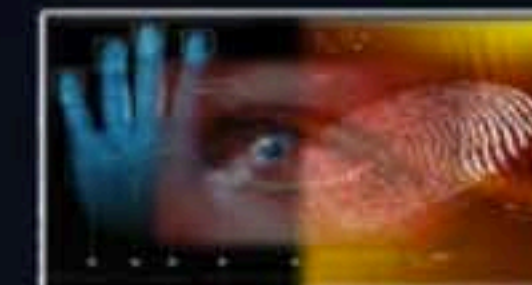
- ▶ Plan, design, prototype and demonstrate a face workstation which can be freely deployed by the FBI
- ▶ Develop services which can be carried over to NGI for biometric processing
- ▶ Employ a user experience design philosophy to develop UFW specifically for face examiners
- ▶ Permit examiners to:
 - ▶ Ingest, analyze and enhance images
 - ▶ Select sub-frames or sub-images areas for further analysis
 - ▶ Submit files to local and remote matching systems
 - ▶ Review, store and match search results





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UFW – Media Manager

Media Manager interface showing a list of image files (image1.jpg through image8.jpg) with details such as Date Created, Date Captured, File Type, Agency (NSI), and Status (Pending). The interface includes a sidebar for folder navigation (C Drive, Desktop, Folder A through F) and a preview pane on the right displaying a selected image (image2.jpg).

File Edit Image Layer View Tools Window Help

Media Manager

Folders External Drive Favorites

C Drive

Desktop

Folder A

Folder B

Folder C

Folder D

Folder E

Folder F

Folder E

Sort

Image	Date Created	Date Captured	File Type	Agency	Status
image1.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image2.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image3.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image4.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image5.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image6.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image7.jpg	7/7/11, 6:39:28 PM	7/7/11, 6:39:28 PM	Image, JPG	NSI	Pending
image8.jpg					

Preview Agency Info AudioVideo

Open File With: Editor/Viewer

image2.jpg

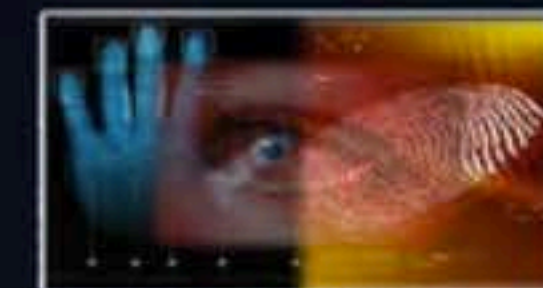
Date Created: 7/7/11, 6:39:28 PM

Date Captured: 7/7/11, 6:39:28 PM

File Type: Image, JPG

Agency: NSI

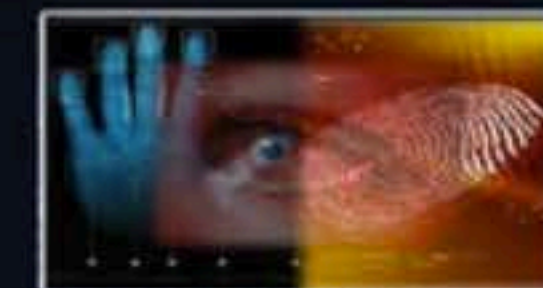
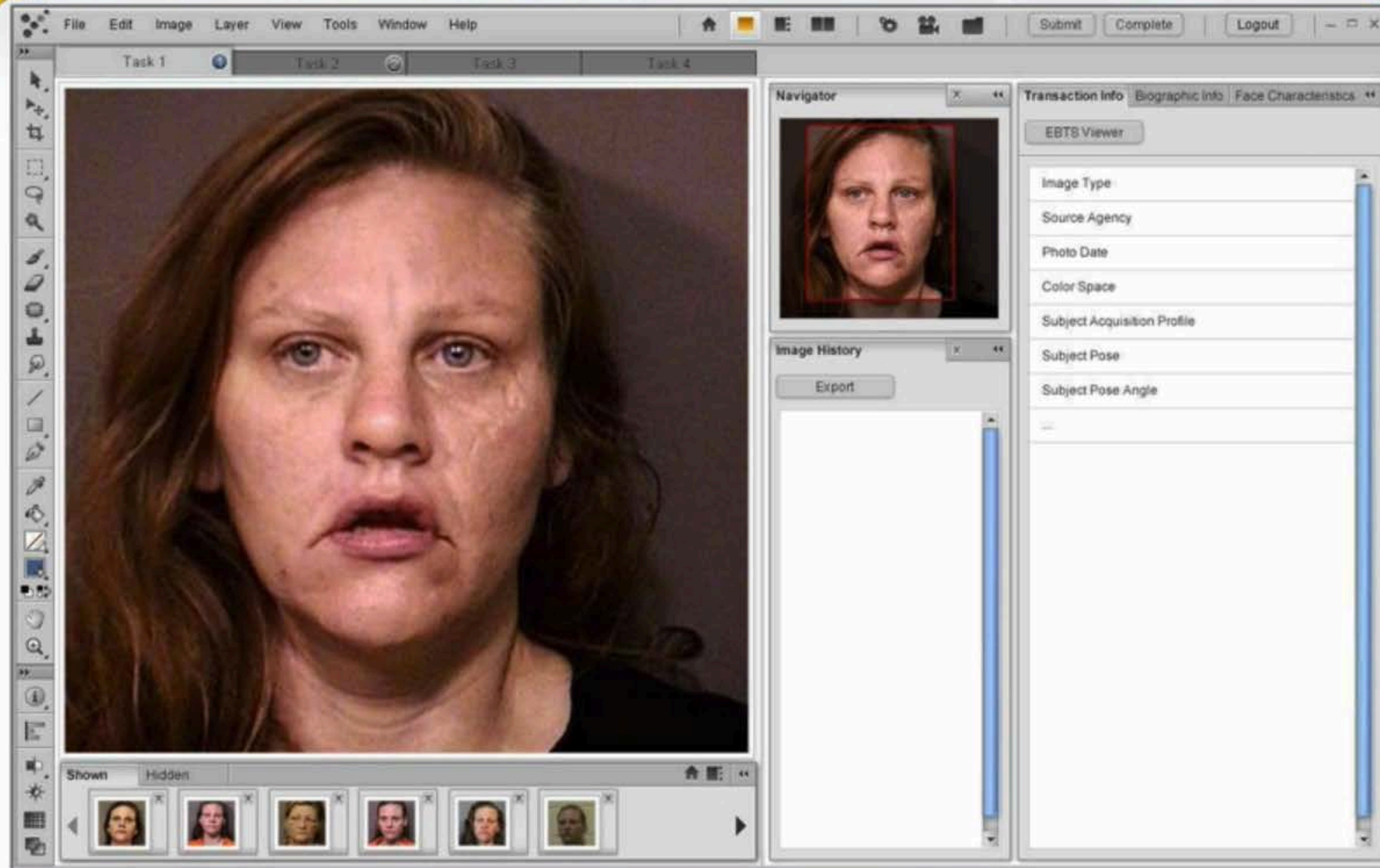
Status: Pending





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UFW – Editor/Viewer

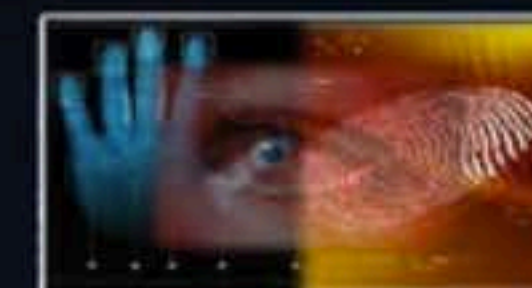
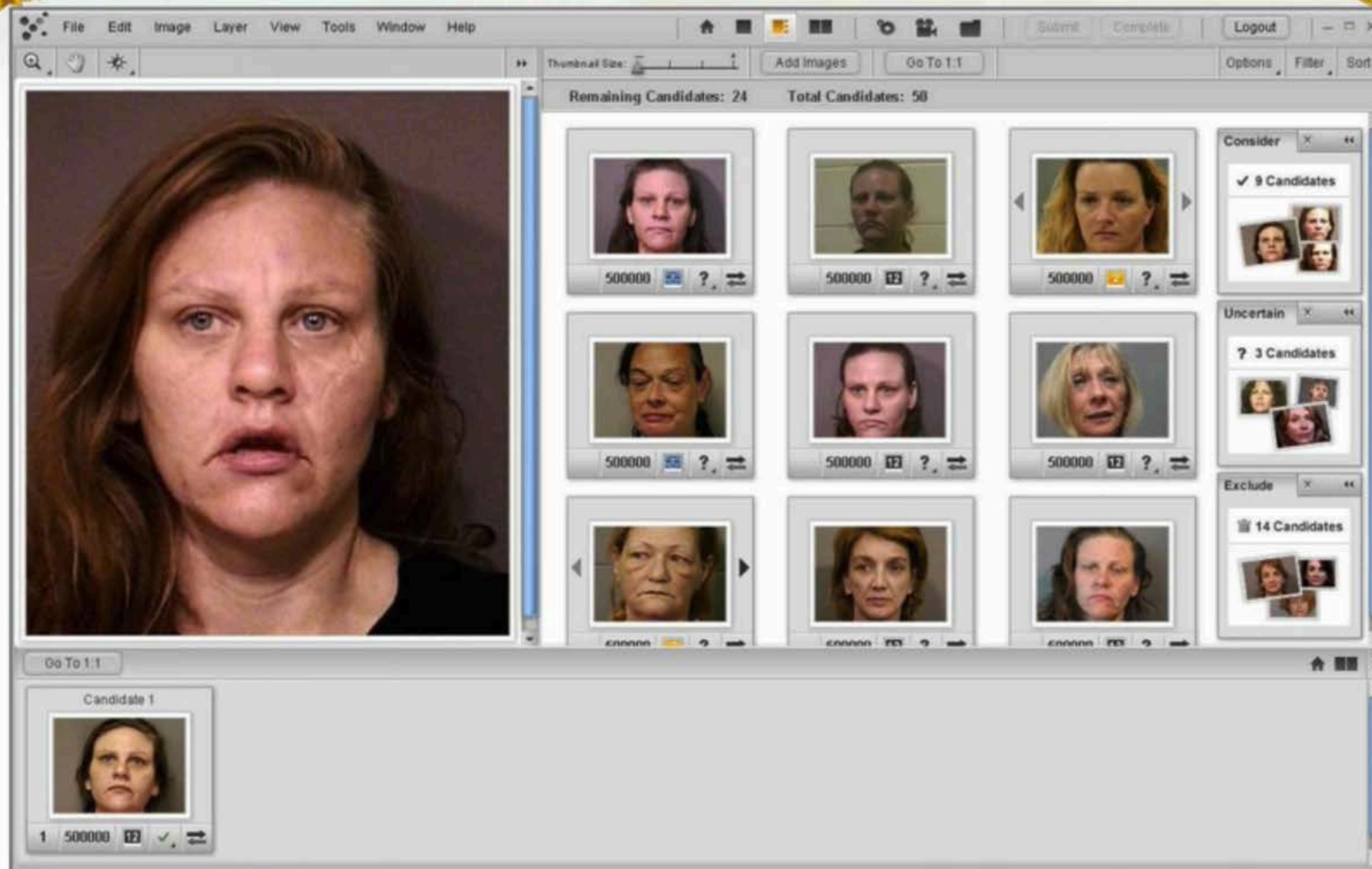




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UFW – 1:Many Comparison





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UFW – 1:1 Comparison

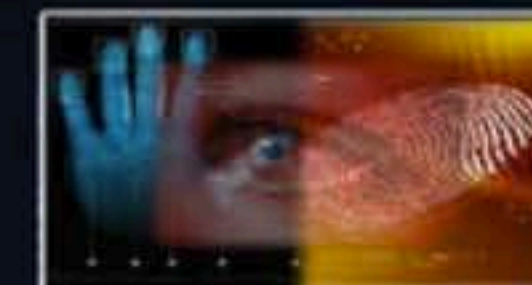
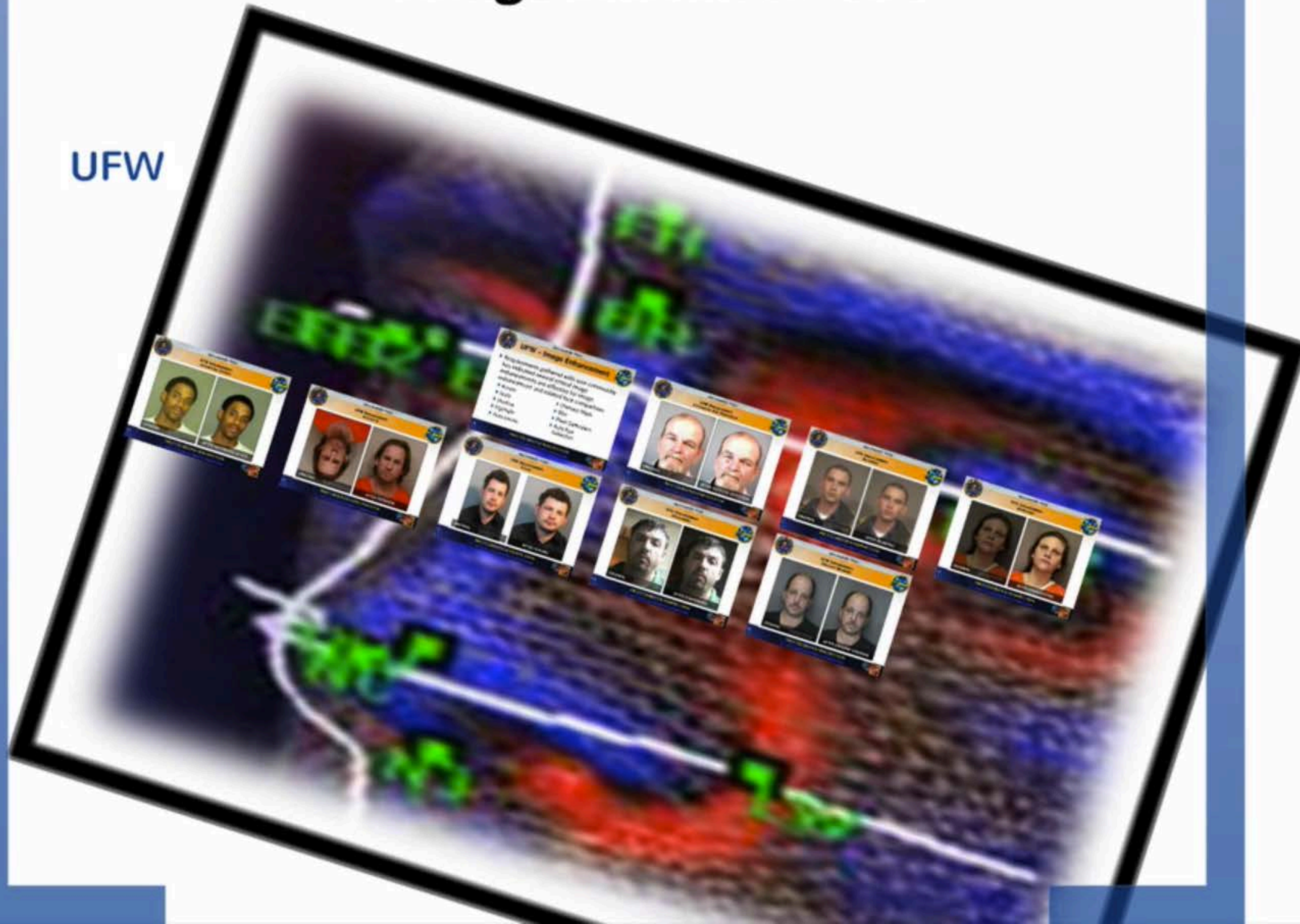


Image Enhancement

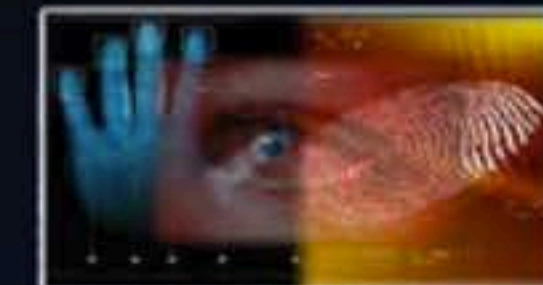
UFW





UFW – Image Enhancement

- ▶ Requirements gathered with user community has indicated several critical image enhancements are effective for image enhancement and related face comparison.
 - ▶ Rotate
 - ▶ Scale
 - ▶ Shadow
 - ▶ Highlight
 - ▶ Auto Levels
 - ▶ Unsharp Mask
 - ▶ Blur
 - ▶ Pixel Calibration
 - ▶ Auto Eye Detection

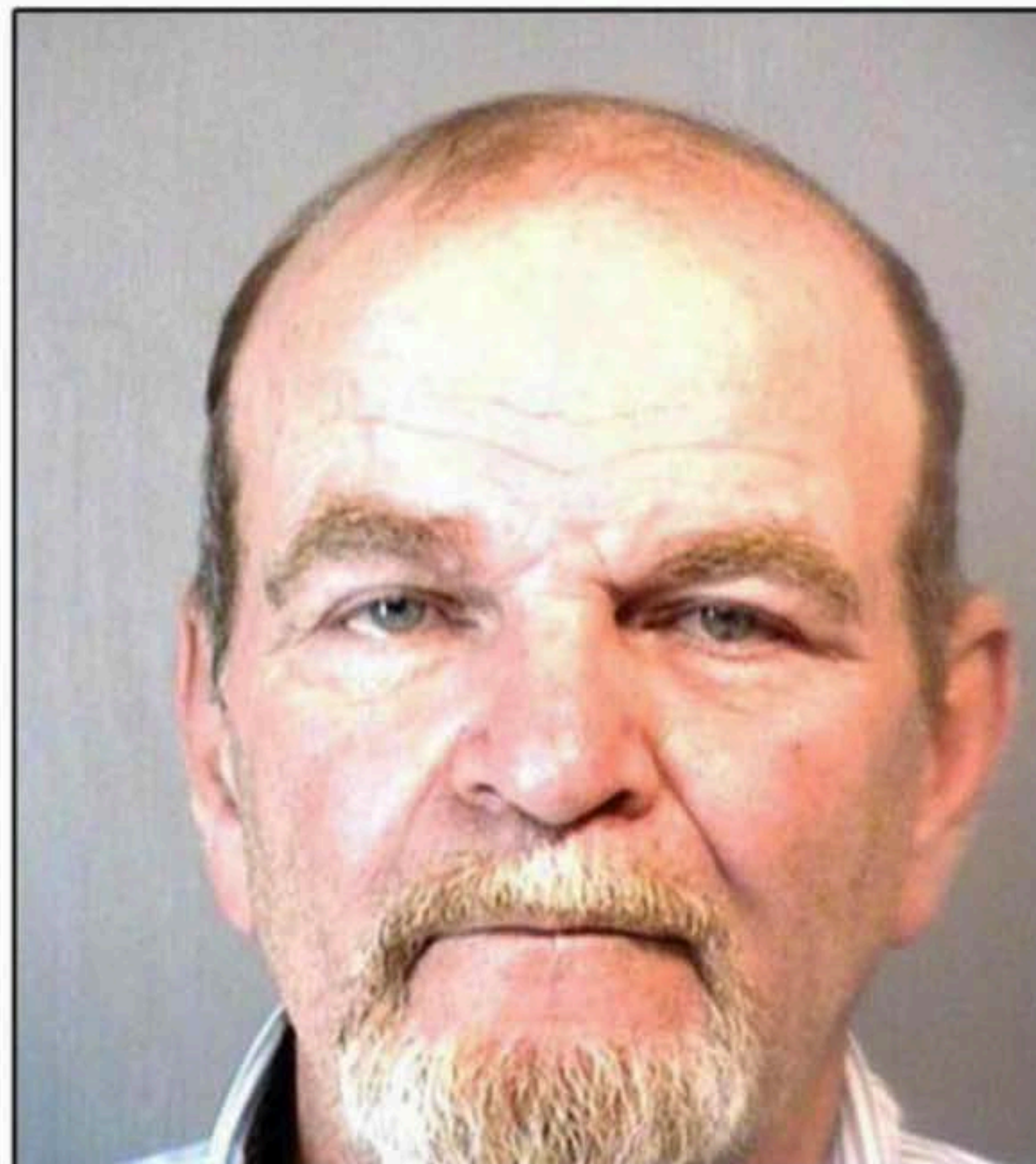




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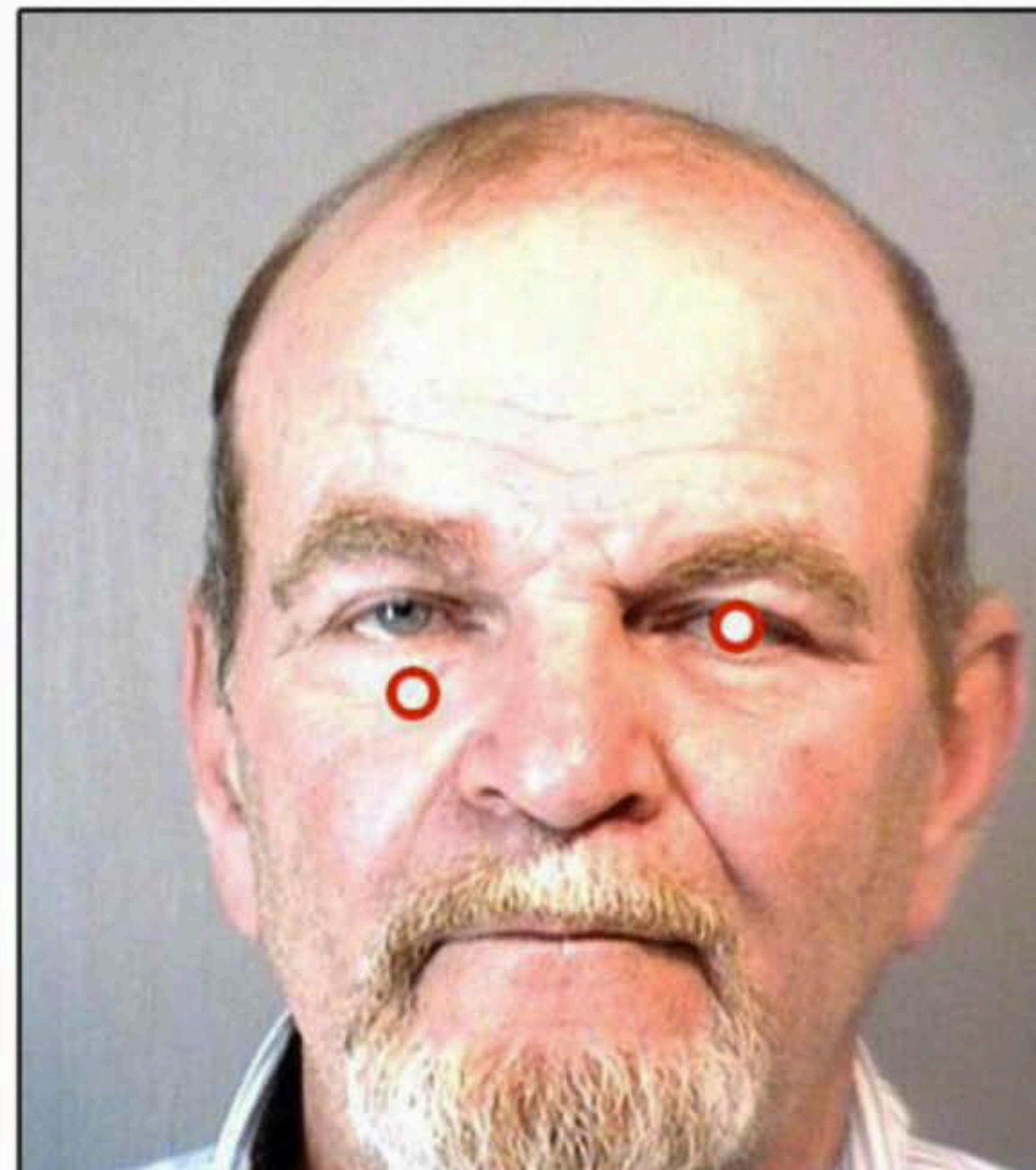


UFW ENHANCEMENT: AUTOMATIC EYE DETECTION



ORIGINAL

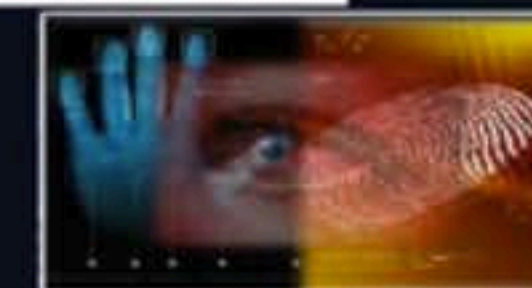
The AUTO EYE DETECTION enhancement can be used to verify that the application has correctly identified the subject's eyes.



AFTER AUTO EYE DETECTION

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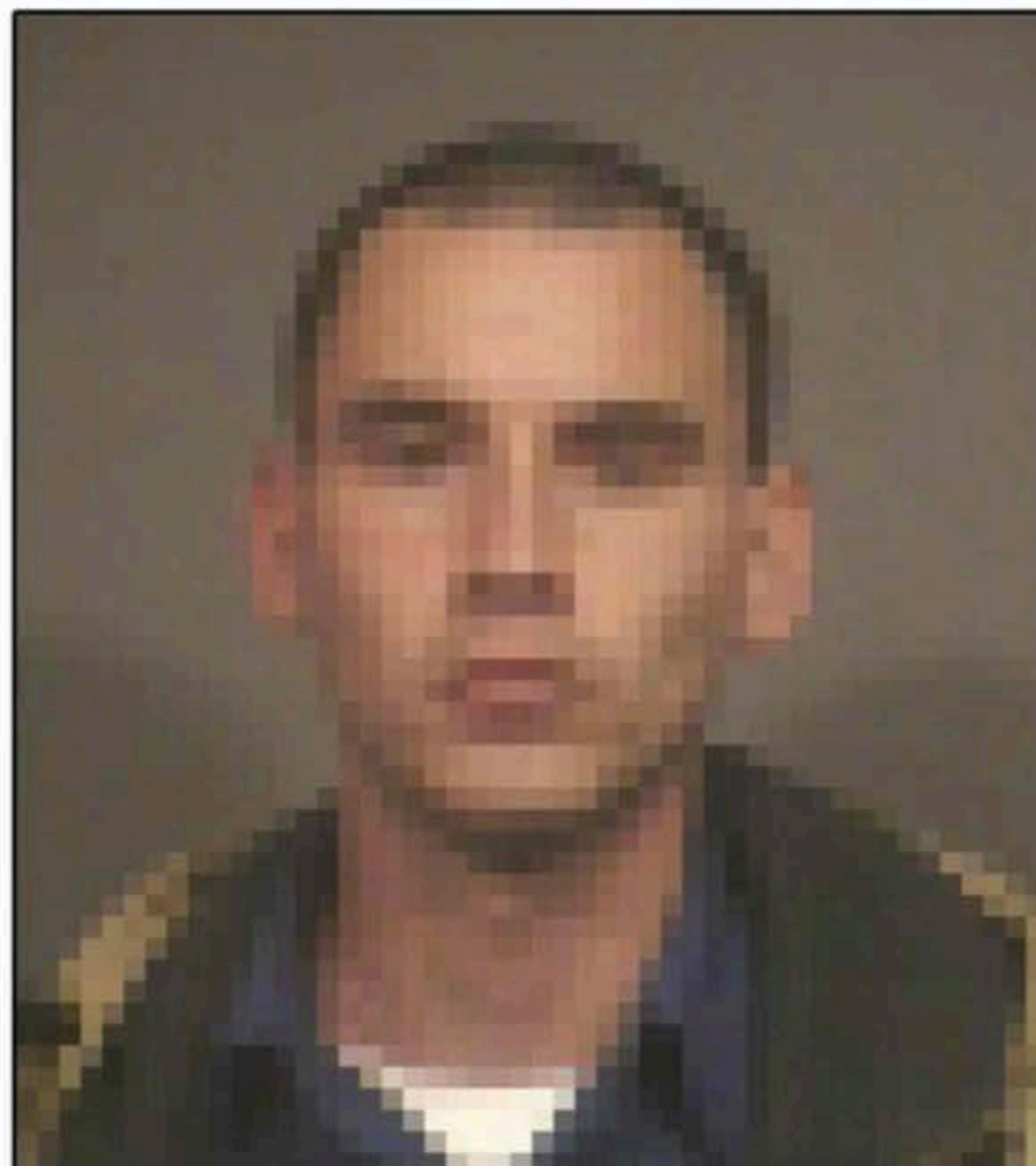




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UFW ENHANCEMENT: BLURRING

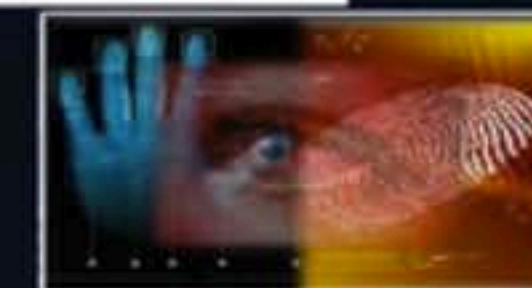


ORIGINAL

The BLUR enhancement can be used to smooth grainy, distorted, or otherwise pixillated images.



AFTER BLURRING





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UFW ENHANCEMENT: HIGHLIGHT

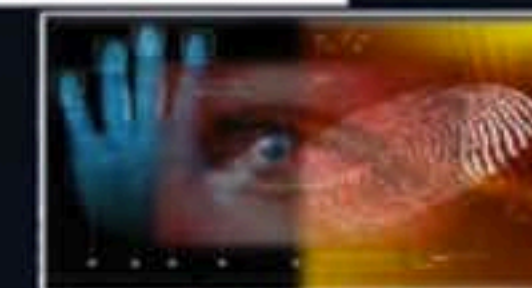


ORIGINAL

The HIGHLIGHT enhancement brightens the original image.



AFTER HIGHLIGHTING





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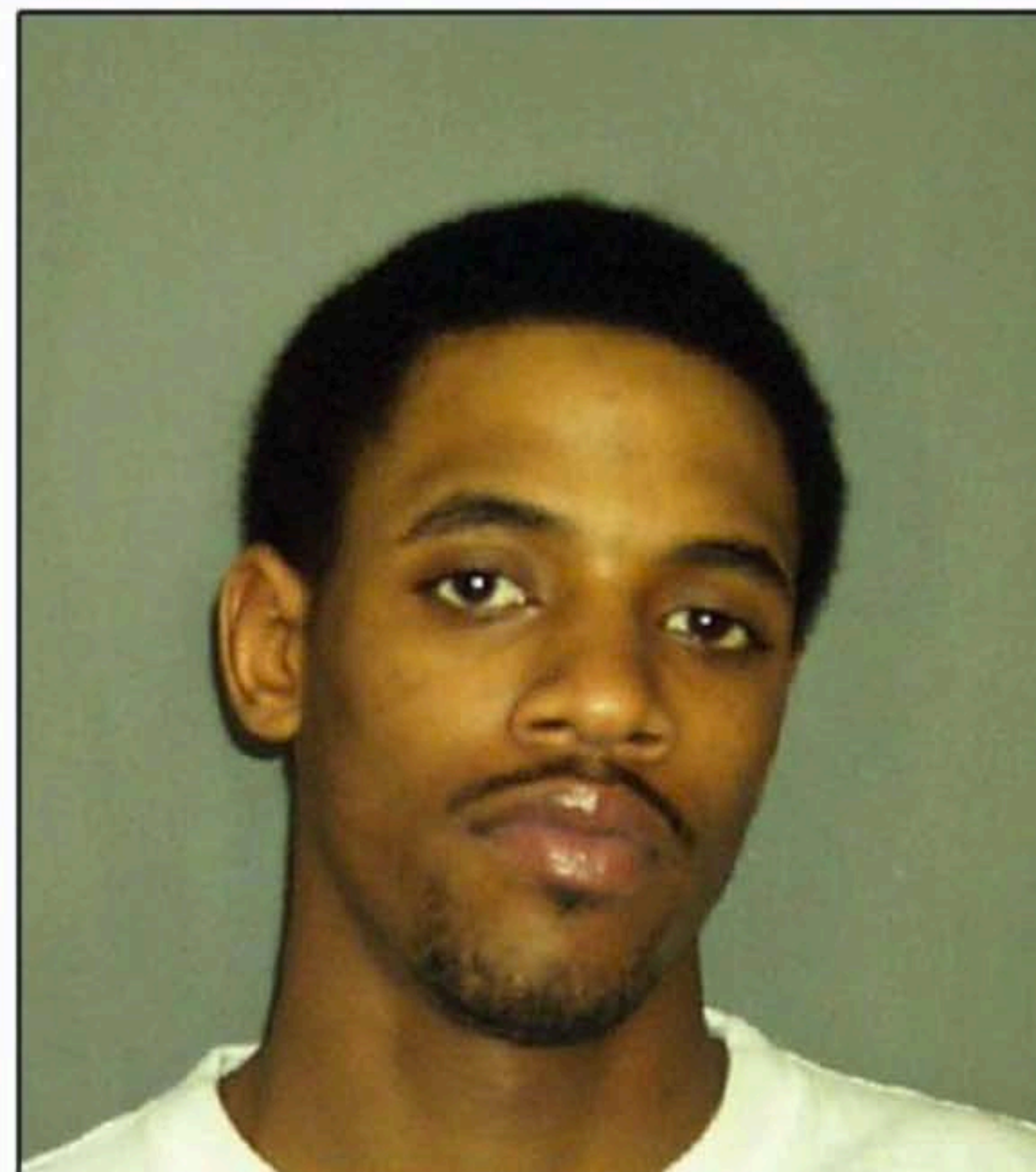


UFW ENHANCEMENT: AUTOMATIC LEVELS



ORIGINAL

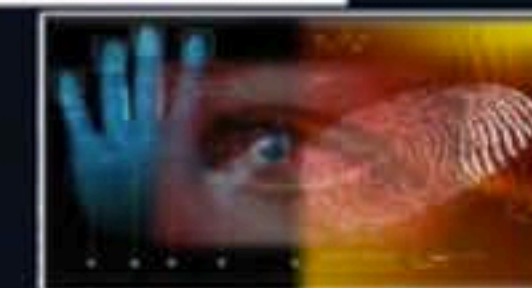
The AUTOMATIC LEVELS enhancement can improve the colors in a photo so that they appear more natural.



AFTER AUTOMATIC LEVELS

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UFW ENHANCEMENT: ROTATION

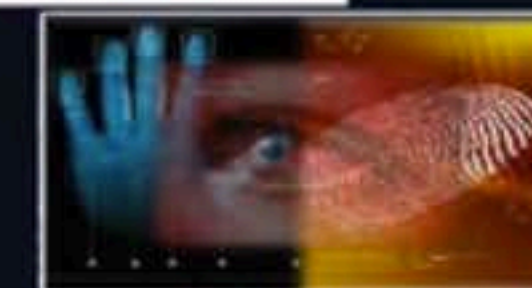


ORIGINAL

The ROTATION enhancement can correct photographs that are improperly oriented.



AFTER ROTATION





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UFW ENHANCEMENT: SCALE

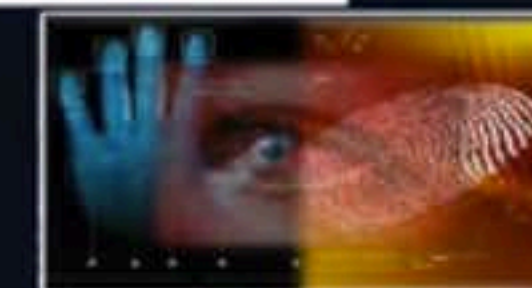


ORIGINAL

The SCALE enhancement can be used to correct images which have been resized in one or two dimensions.



AFTER SCALING





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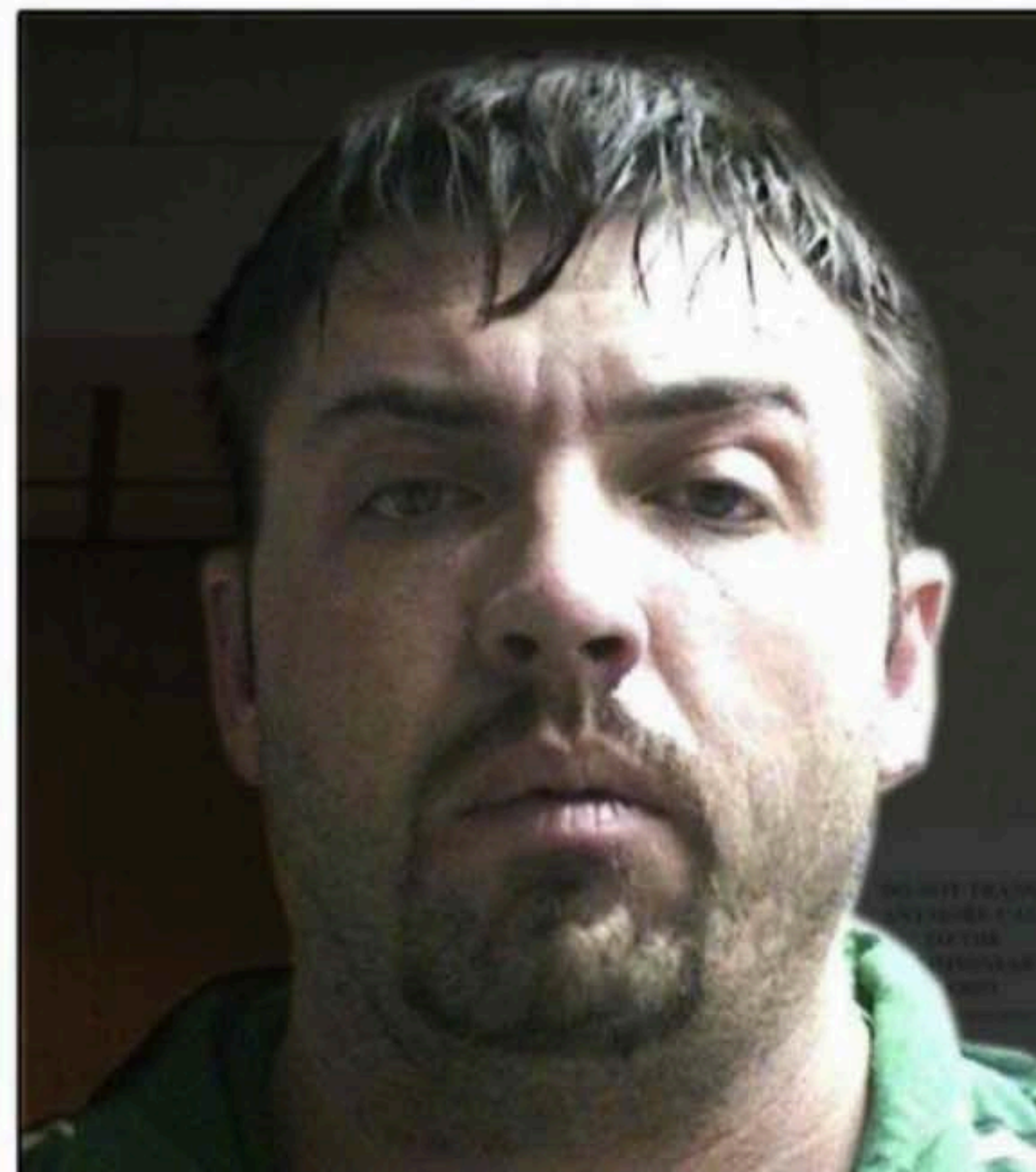


UFW ENHANCEMENT: SHADOWING



ORIGINAL

The SHADOW enhancement can compensate for photos in which the background of an image is too bright.



AFTER SHADOWING





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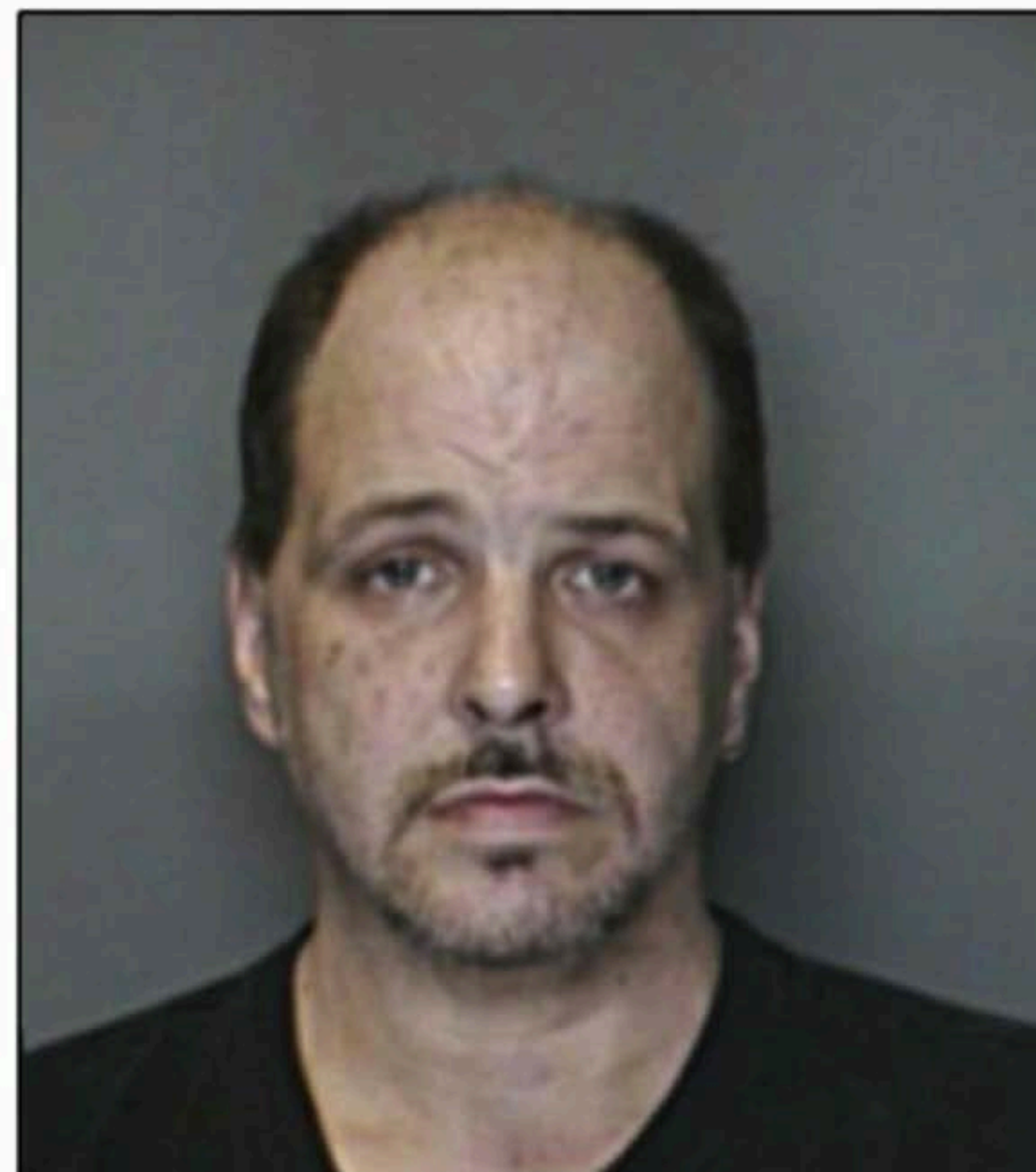


UFW ENHANCEMENT: UNSHARP MASKING



ORIGINAL

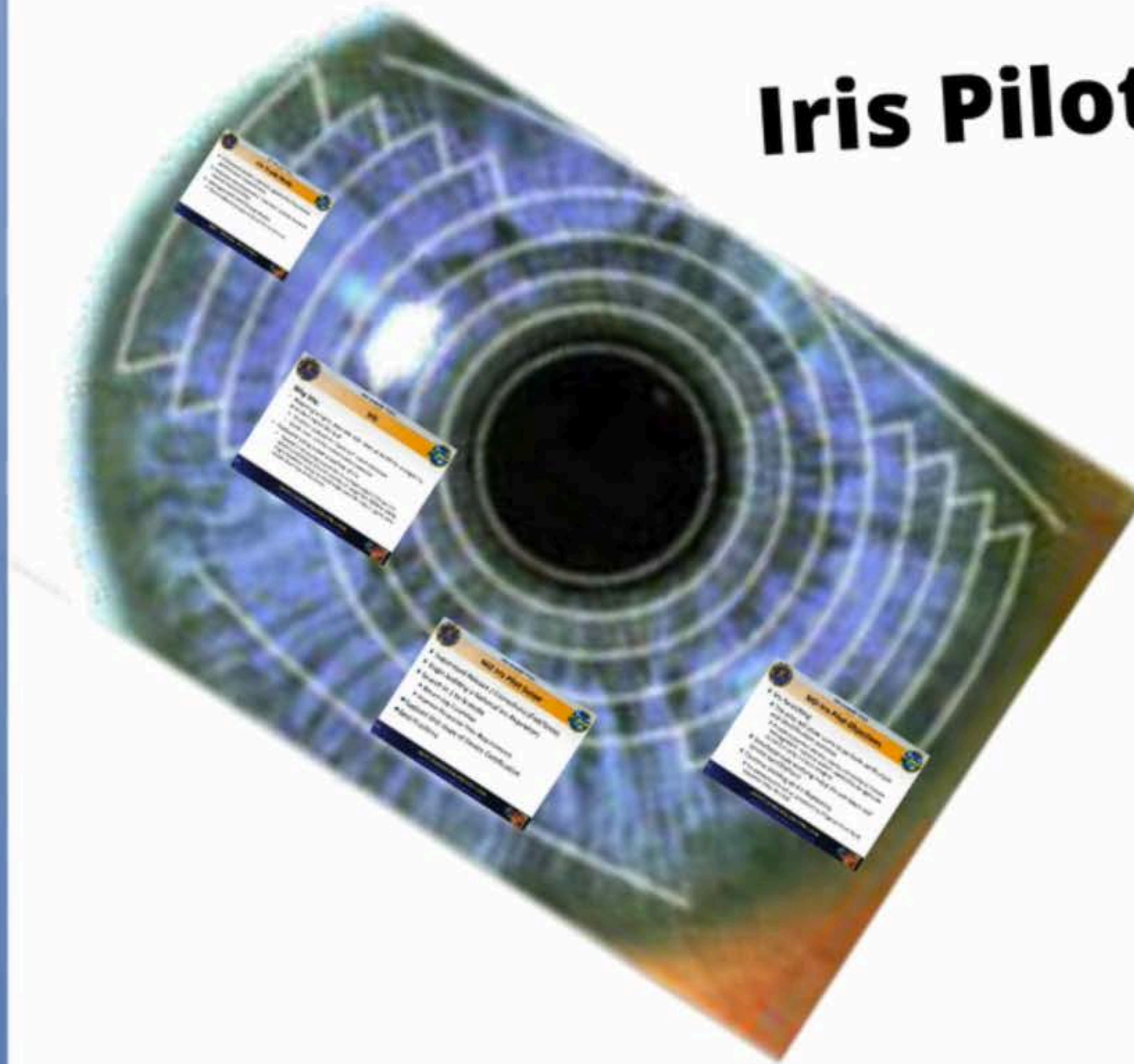
The UNSHARP MASK enhancement can improve the quality of blurry images.



AFTER UNSHARP MASKING



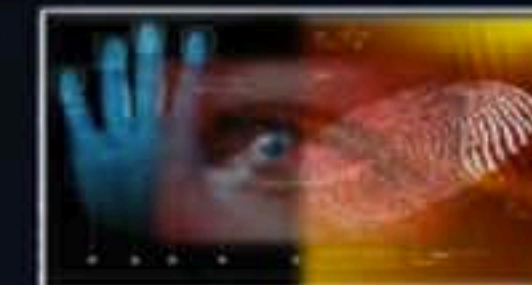
Iris Pilot





Iris Trade Study

- ▶ Compared vendor solutions against NGI functional performance requirements.
- ▶ Solutions encompassed a “turn-key” system for both capture and matching
- ▶ Leveraged NIST IREX Testing Results.
 - ▶ Over 4 million Iris images made up the test data set





Iris

Why Iris:

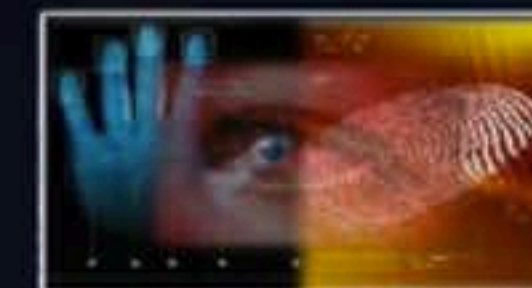
- Matching is highly accurate with rates at 98.4% for a single iris and even higher for dual
 - Excellent candidate for “Lights out” search operations
 - Quick, clean, minimal contact capture potential
- Hardware sizing is also a positive of iris
 - Templates measuring around 2kb for a single subject (1kb per iris) where as traditional 10 print records can range from 30KB to 100KB; major hardware savings as the storage space for irises is significantly smaller than that of ten-prints.





NGI Iris Pilot Scope

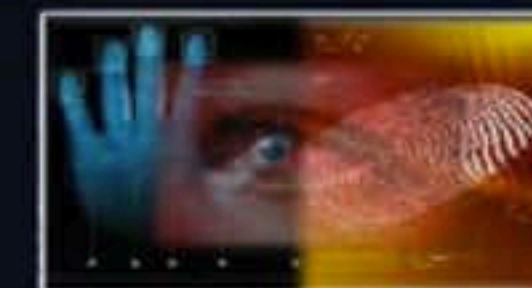
- ▶ Supervised Release / Corrections (Fed/State)
- ▶ Begin building a National Iris Repository
- ▶ Search in 1 to N mode
 - ▶ Return top Candidate
 - ▶ Improve Response Time Requirements
- ◀ Support first steps of Device Certification
- ◀ Best Practices





NGI Iris Pilot Objectives

- ▶ Iris Searching
 - ▶ The pilot will allow users to perform verification and identification searches
 - ▶ Probation/parole identity checks, correctional inmate management, national search capabilities to agencies currently using iris technologies
 - ▶ Simultaneously verifying initial iris use cases and device specifications
 - ▶ Continue building an Iris Repository
 - ▶ Iris datasets are not as prevalent as fingerprint or face; however they do exist





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Contact Information

**Federal Bureau of Investigation
Criminal Justice Information Services Division
Next Generation Identification Program Office**

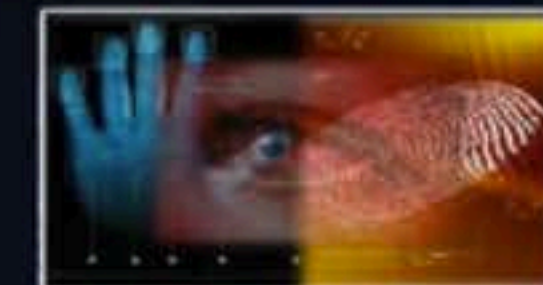
**Nick Megna
SEAU Unit Chief**



Telephone: (304) 625-2767

NGI Web Page: <http://www.fbi.gov/hq/cjisd/ngi.htm>

Email NGI: FBINGI@leo.gov





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