INFORMATION TECHNOLOGY LABORATORY

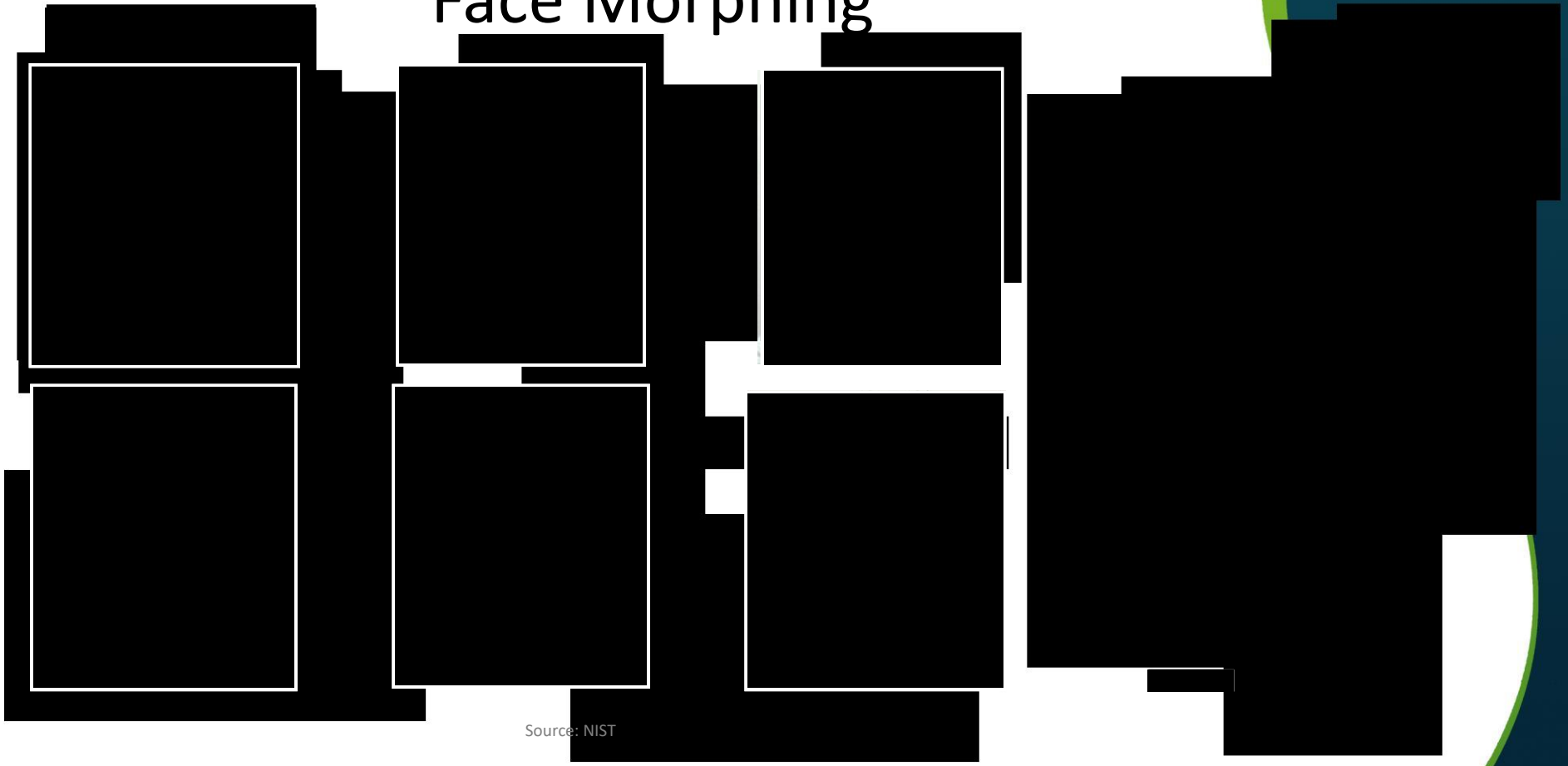
NIST FRVT MORPH
An Ongoing Morph Detection Evaluation

National Institute of Standards & Technology

International Conference on
Biometrics for Borders 2019 (ICBB 2019)
October 9, 2019
Warsaw, Poland

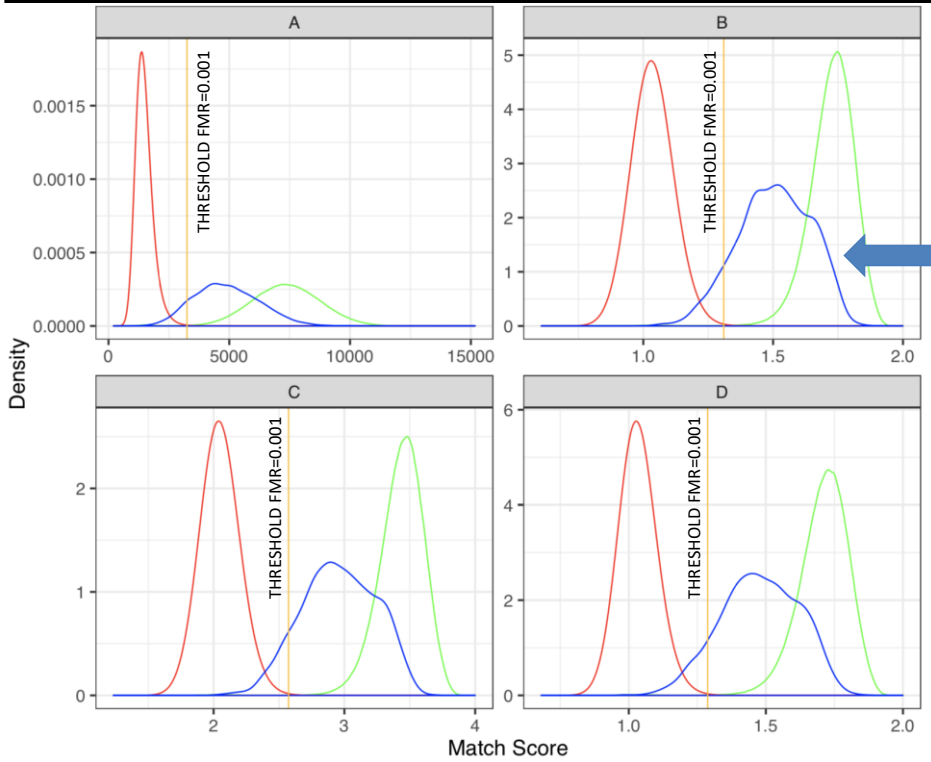
NIST

Face Morphing



Source: NIST

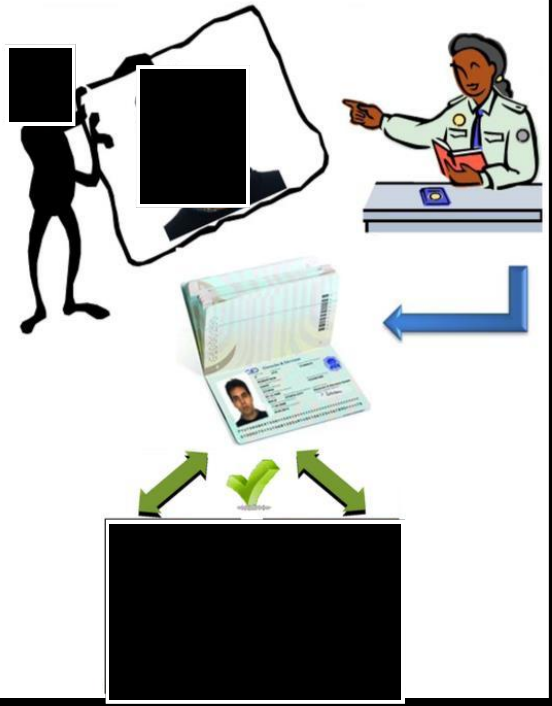
Automated Face Recognition Vulnerability [Sept. 2019]



Significant amount of morph comparisons would successfully authenticate

90 million n
mugshot photos

Threats & Consequences



Source: http://www.futuretravelexperience.com/2016/01/automated-border-control-e-gates-go-live-at-naples-airport/

Source: Ferrara, Franco, and Maltoni, ***The Magic Passport***, IEEE International Joint Conference on Biometrics, October 2014, pp. 1-7

NIST FRVT MORPH

FACE RECOGNITION VENDOR TEST

[redacted]

detectior

Currently Seeking…

- Developers of [redacted]

BREAKING NEWS

First FRVT MORPH Draft Report Published

Now available for public comment! Google: FRVT MORPH

LIVE NIST

Morph Detection: *Morphed image or not?*

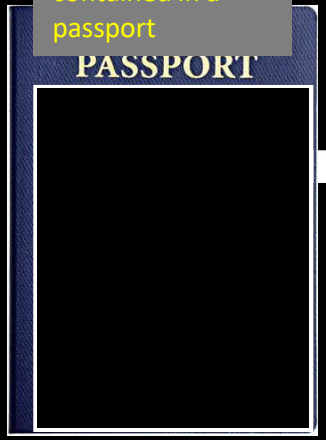
Security

Convenience

Source: NIST

Two-Image Differential Morph Detection:
Morph detection given live image?

Morphed image is contained in a passport



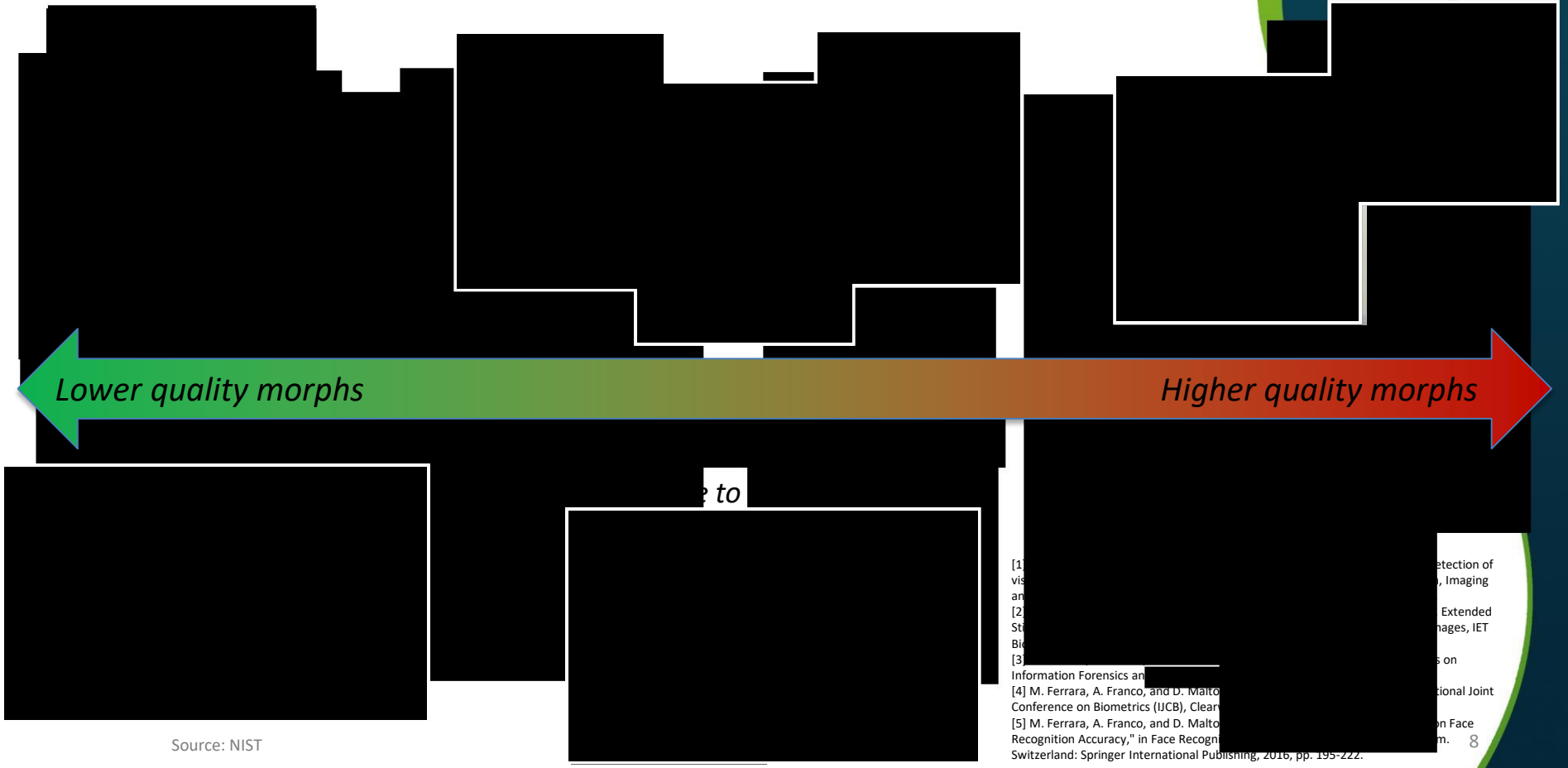
This image represents a live capture during an eGate border crossing, say.

suspected morph X

Source: NIST

Goal: Determine that image on passport is morphed by using the additional information available in the live capture image.

FRVT MORPH Test Data



Source: NIST

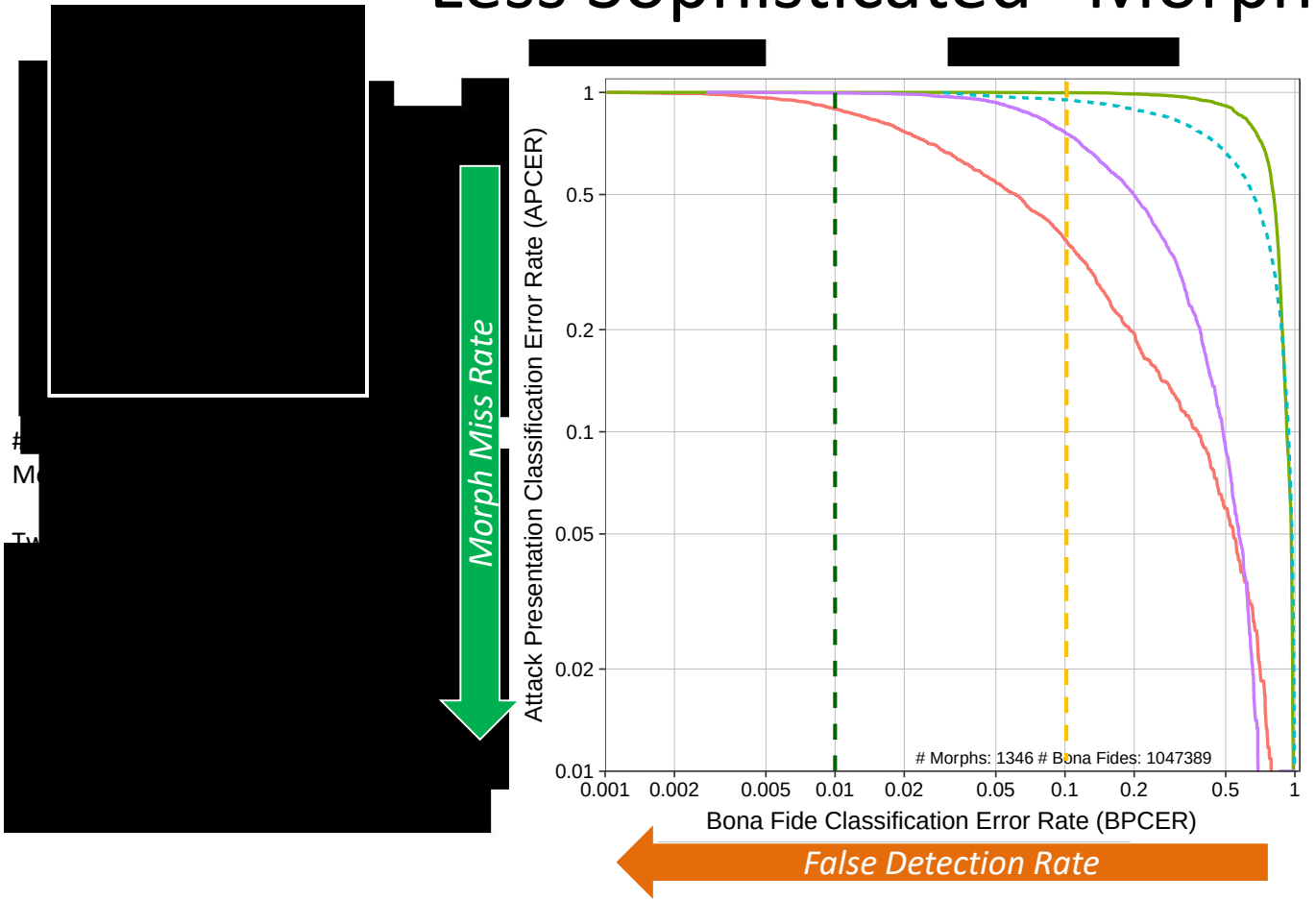
Measuring BPCER (false detection rates)

[redacted]

FRVT MORPH Participation

[redacted]

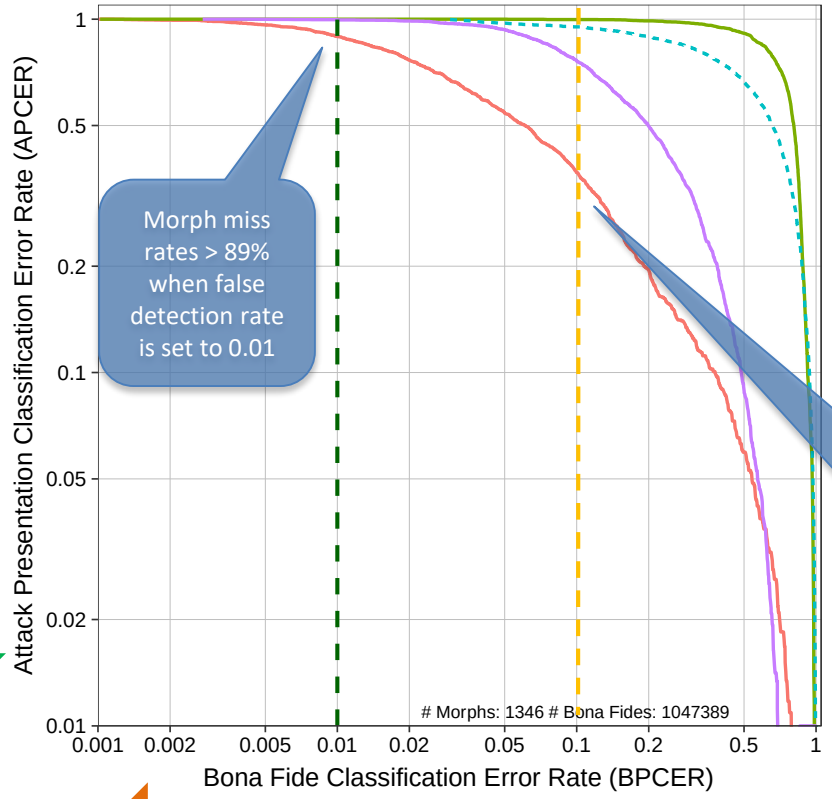
“Less Sophisticated” Morphs



Algorithm	APCER @ BPCER=0.1	APCER @ BPCER=0.01
hdalbp-005	0.37	0.89
unibo-000	0.76	1.00
hdawl-000	0.95	1.00
hdaprnu-002	1.00	1.00

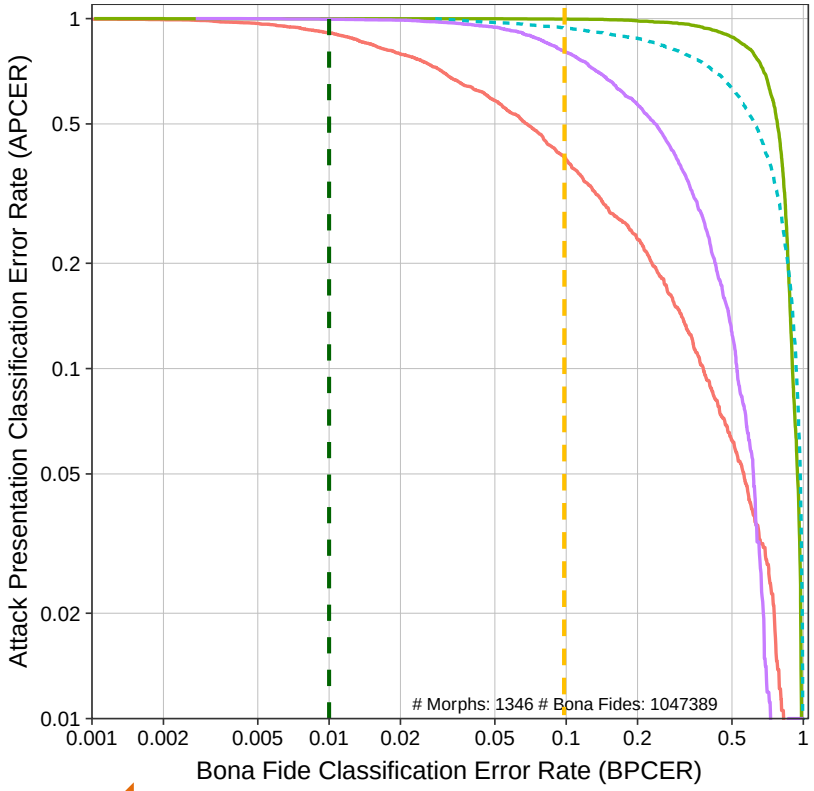
Algorithm Type
— single−image
- - two−image differential

“Less Sophisticated” Morphs



Algorithm	APCER @ BPCER=0.1	APCER @ BPCER=0.01
hdalbp-005	0.37	0.89
unibo-000	0.76	1.00
hdawl-000	0.95	1.00
hdaprnu-002	1.00	1.00

“Better” Morphs



Morph Miss Rate

False Detection Rate

Algorithm	APCER @ BPCER=0.1	APCER @ BPCER=0.01
hdalbp-005	0.39	0.91
unibo-000	0.80	1.00
hdawl-000	0.94	1.00
hdaprnu-002	1.00	1.00

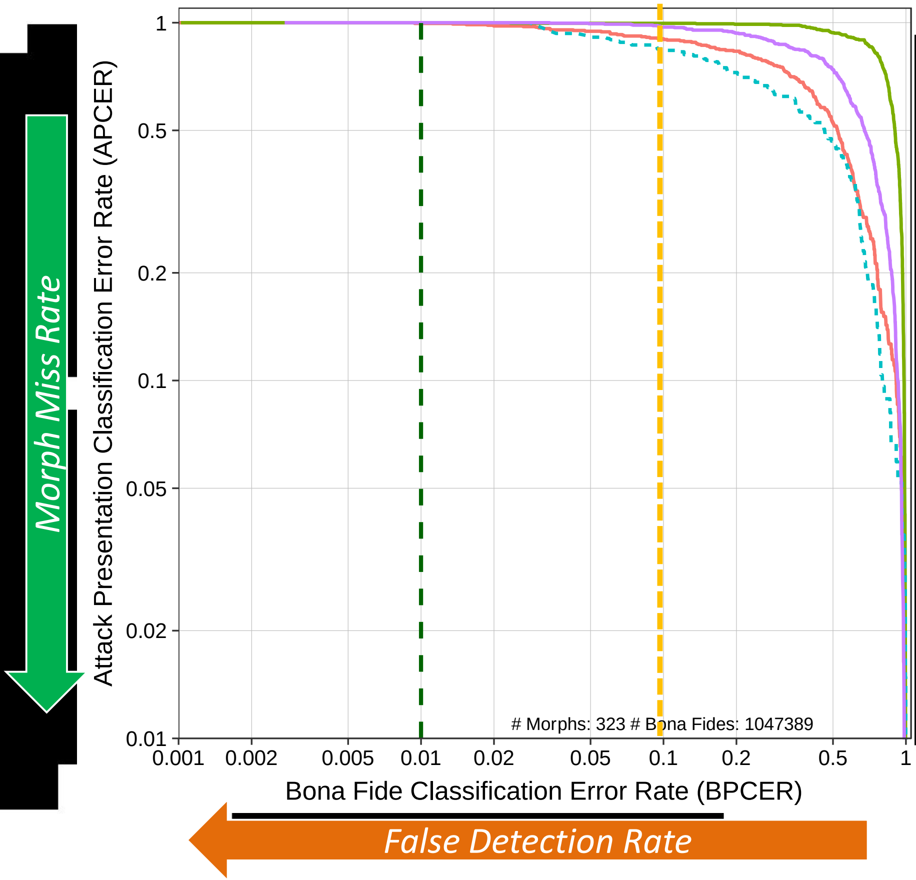
Algorithm Type
— single−image
- - two−image differential

"Uncomfortably Good" Morphs

[redacted]

#[redacted]
M[redacted]

[redacted] [redacted]



[redacted]

Algorithm	APCER @ BPCER=0.1	APCER @ BPCER=0.01
hdalbp-005	0.90	1.00
unibo-000	0.97	1.00
hdawl-000	0.84	1.00
hdaprnu-002	1.00	1.00

Algorithm Type
— single−image
- - two−image differential

[redacted]

Print and Scanned Morphs

Algorithm	APCER (morph miss rate)	BPCER (false detection rate)
hdalbp-005	0.08	0.76
hdaprnu-002	0.00	1.00
ntnussl-001	0.02	0.54
unibo-000	0.49	0.05

Low APCER but HIGH BPCER
Algorithm calibration to minimize false detections

High APCER but LOW BPCER
May still have utility in operations

[redacted] fi-7280 sca[redacted]

Closing Thoughts

[redacted]

[redacted]

https://www.nist.gov/programs-projects/frvt-11-verification

https://www.nist.gov/programs-projects/frvt-1n-identification

https://www.nist.gov/programs-projects/frvt-morph

sment: https://www.nist.gov/programs-projects/frvt-quality-assessment