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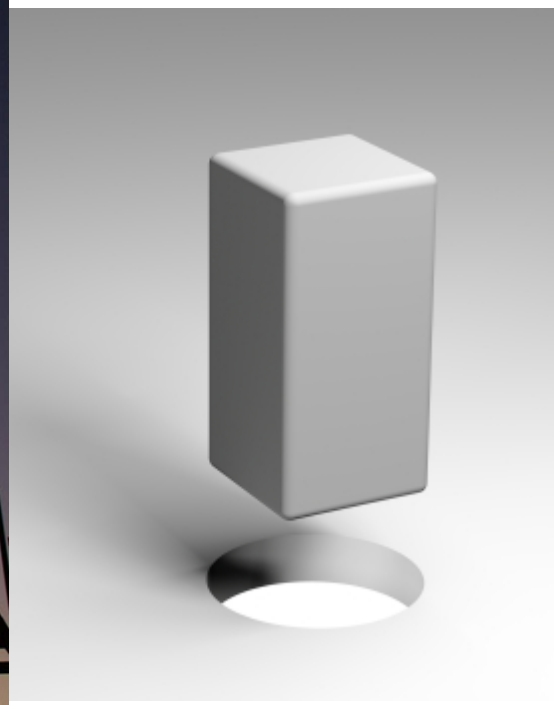
IBPC 2010 NIST

Terry Hartmann
Vice President,
Identity Solutions

4 March 2010

The Integrator Perspective



What is an integrator ?

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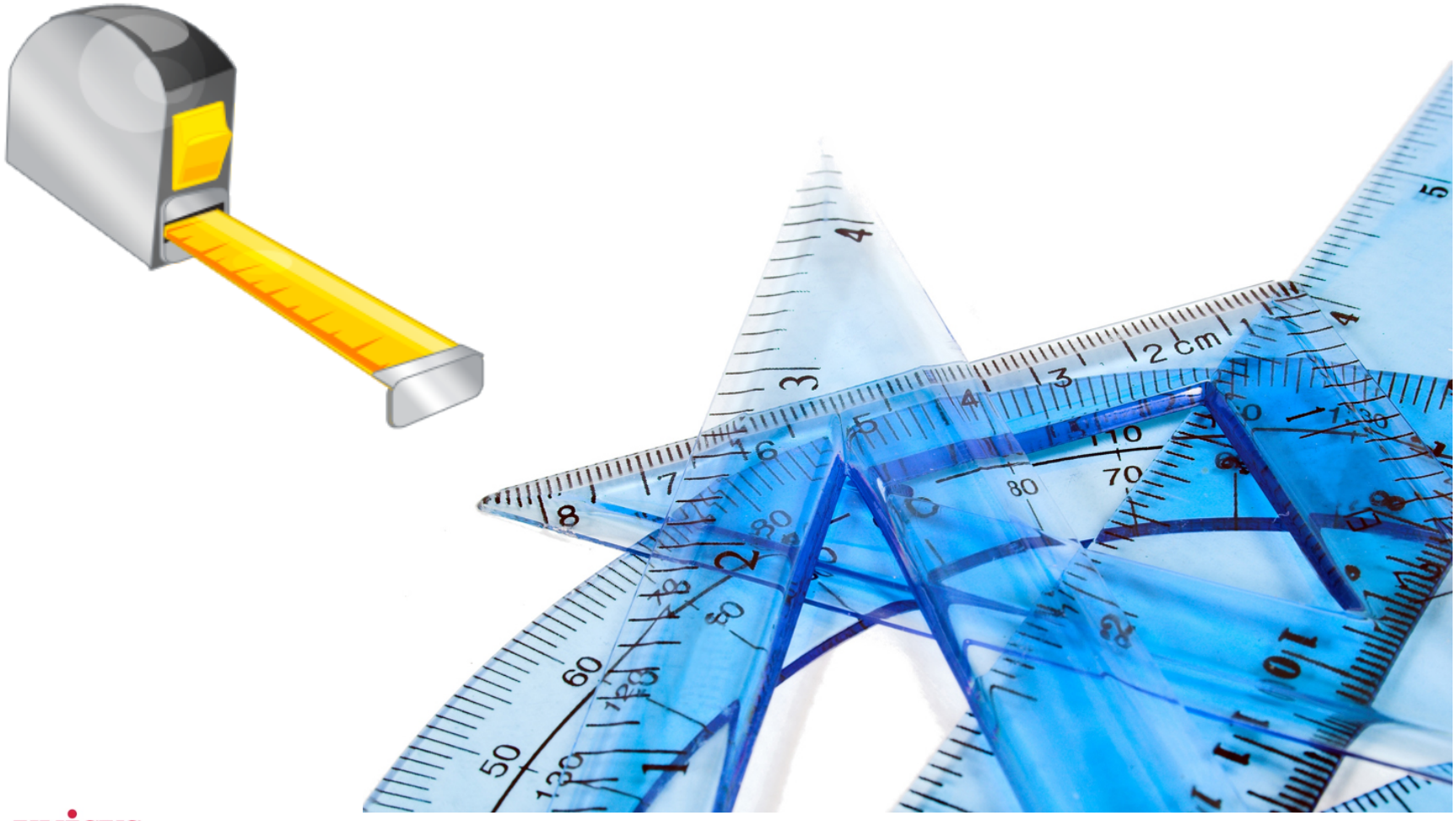
What I wish I knew the Metrics for ?!



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Opening Address Recap

PATRICK

- Integrator = Risk Mitigation
- Integrator Biometrics Interest
  - Scientific Discovery
  - Technical Discovery
  - R&D
  - Capability of vendor (reliability, avail)
  - Comparative
  - Interoperability
  - Conformance (Reqmts, Stds)
  - Regression (should we update)
  - Calibration (what threshold)
  - Jim (Useability, Vulnerability, ROI)

Tony

- Have tests been driven by what can be done, rather than what should be done ?
- Are tests missing the point ?

It's all about money !

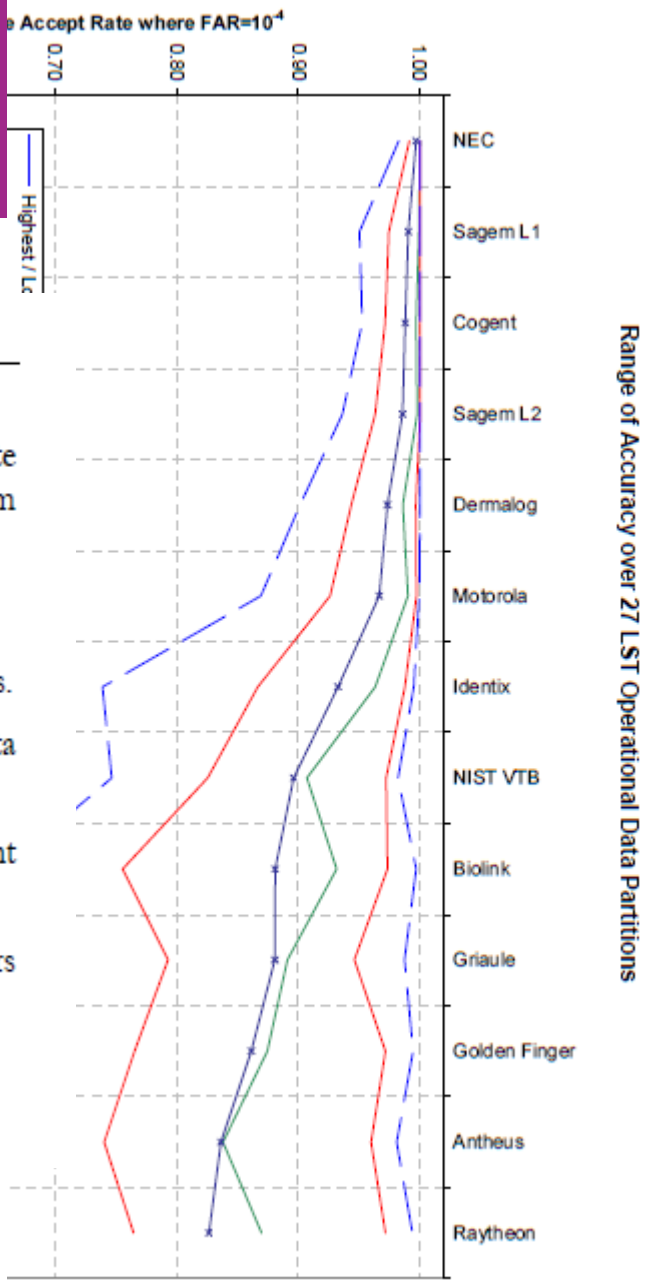
NIST FP Vendor Tech Eval 2003

FpVTE 2003 Summary of Results

FpVTE 2003 included operational fingerprint data from a variety of U.S. and State Government sources. The test used 48,105 sets of flat slap or rolled fingerprint sets from 25,309 individuals, with a total of 393,370 distinct fingerprint images.

The FpVTE Analysis Report concludes:

1. Of the systems tested, NEC, SAGEM, and Cogent produced the most accurate results.
2. These systems performed consistently well over a variety of image types and data sources
3. These systems produced matching accuracy results that were substantially different than the rest of the systems
4. The variables that had the largest effect on system accuracy were the number of fingers used and fingerprint quality:
   - Additional fingers greatly improve accuracy
   - Poor quality fingerprints greatly reduce accuracy



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The turn of the century …

FACIAL RECOGNITION VENDOR TEST 2000

Participants

Banque-Tec Internatior

C-Vis Computer Vision

eTrue (formerly Miros) (

Lau Technologies (www

Visionics Corporation (w

Lautechnologies.com

network solutions

This Page Is Under Construction - Coming Soon!

Why am I seeing this 'Under Construction' page?

The Promise Movie | Vietnamese DVD | Hk Movie

- Vietnamese Music
- Nhac Phim
- Phim Hai
- Dowload Phim
- Vietnamese Videos
- Infernal Affairs 2

Oops! This link appears to be broken.

Google toolbar

Suggestion:

- Search on Google:

banque tec | Google Search

FRVT2002

Company: AcSys Biometrics Corp
Web Site: http://www.acsysbiometricscorp.com

Company: C-VIS Computer Vision und Automation GmbH
Web Site: http://www.c-vis.com

Company: Cognitec Systems GmbH
Web Site: http://www.cognitec-systems.com

Company: Dream Mirh Co., Ltd
Web Site: http://www.dreammirh.com

Company: Eyematic Interfaces Inc.
Web Site: http://www.eyematic.com

Company: Iconquest
Web Site: http://www.iconquesttech.com

Company: Identix
Web Site: http://www.identix.com

Company: Imagis Technologies Inc.
Web Site: http://www.imagistechnologies.com

Company: Viisage Technology
Web Site: http://www.viisage.com

Company: VisionSphere Technologies Inc.
Web Site: http://www.visionspheretech.com

FRVT2006

Participants

The following organizations are participating in the FRVT 2006 evaluation:

- Animetrics, Inc.
- Carnegie Mellon University
- Cognitec Systems GmbH
- Diamond Information Systems (DIS)
- Geometrix, Inc.
- Guardia
- Identix, Inc.
- Neven Vision
- New Jersey Institute of Technology (NJIT)
- Nivis, LLC
- Old Dominion University
- Panvista Limited
- Peking University, Center for Information Science
- PeopleSpot Inc.
- Rafael Armament Development Authority Ltd.
- SAGEM SA
- Samsung Advanced Institute of Technology (SAIT)
- Tsinghua University
- Tili Technology Limited
- Toshiba Corporation
- University of Houston
- Viisage

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FRVT2006

FRVT 2006

- Verification rate =.99 at FAR =0.001
- Frontal
- Controlled illumination
- High resolution (400 pixels between the eyes)
- Large scale laboratory collection
- 6 MP camera

FRVT2002 vs FRVT2006

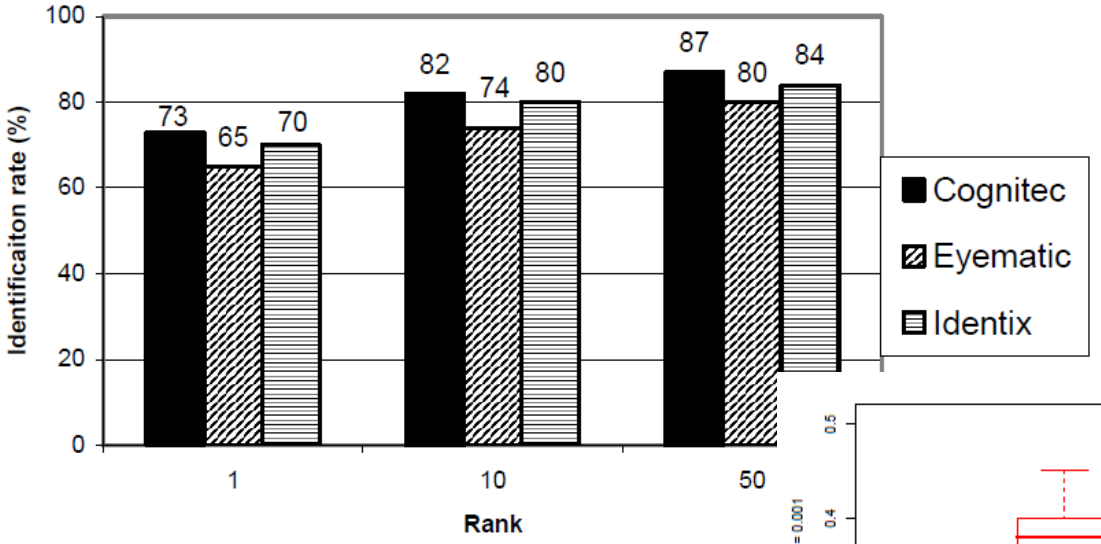
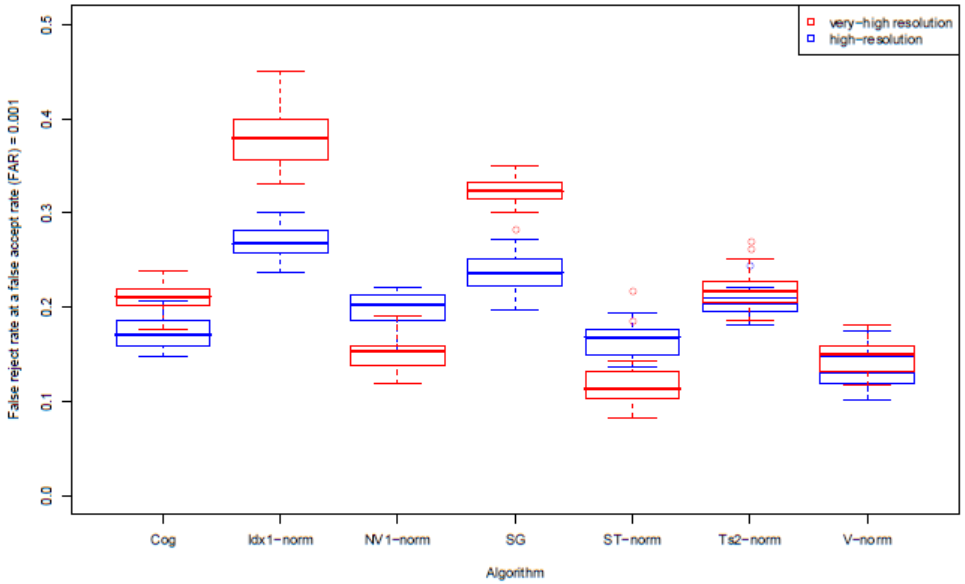


Figure 7. Identification performance for the three best system on
database consisted of 37,437 individuals. Identification rates are rep



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e 7: Summary of still face recognition performance across illumination changes on the very
lution and high resolution datasets. For Cognitec and Sagem, results for the Cog1-norm and
algorithms are reported on the very-high resolution dataset, and results for the Cog1-1to
1to1 algorithms are reported on the high-resolution dataset.

MBGC Still Face Goals

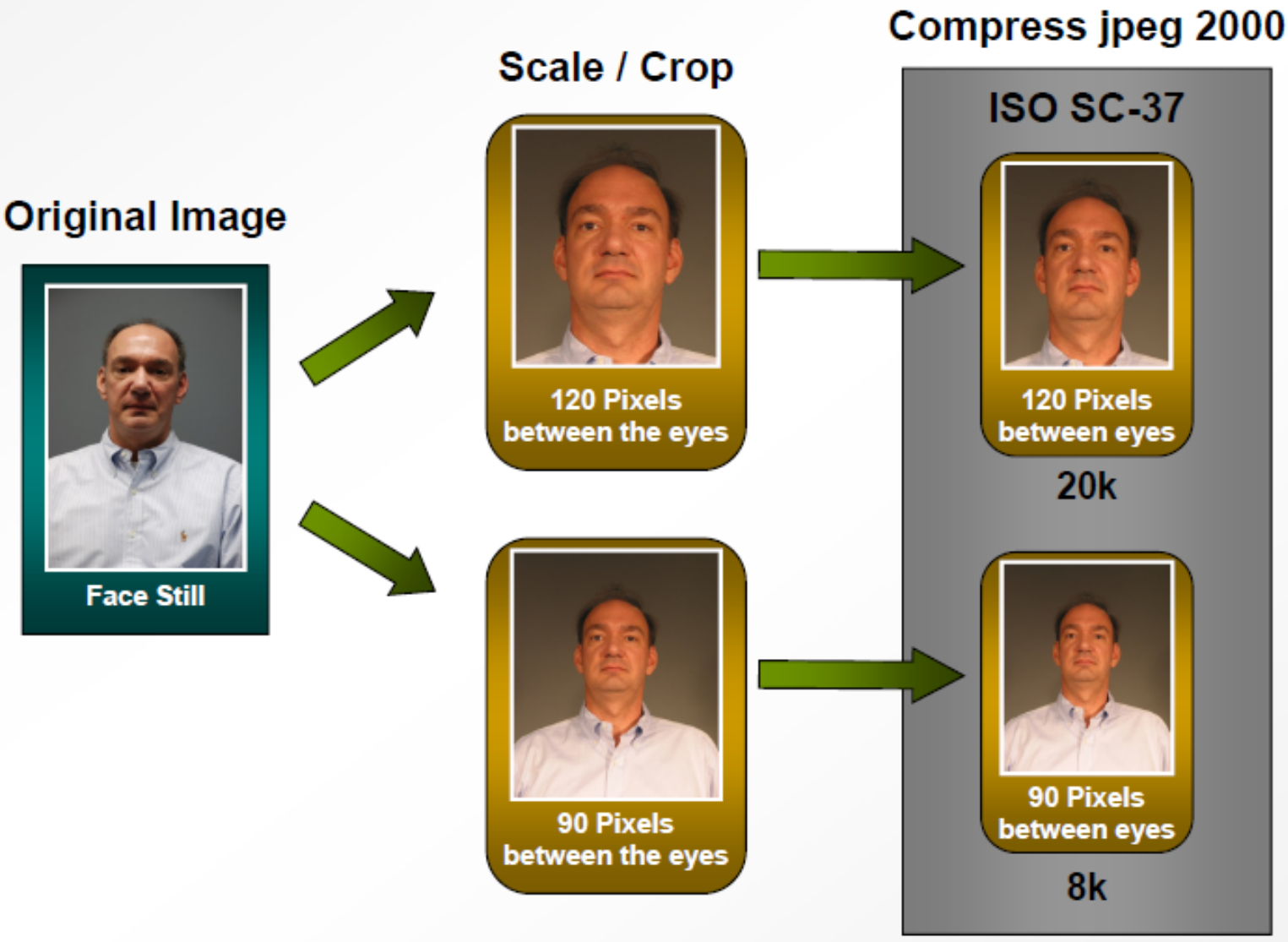
- ICAO Passport Standard
  - Low resolution (90-120 pixels between the eyes)
  - Compressed imagery (8KB to 20KB)

- Many applications of still face involve:
  - Unconstrained illumination
  - Low resolution
  - Compressed imagery
  - Non-frontal

MBGC Still Face challenge problem addresses these constraints.

NIST

Still Face Processing

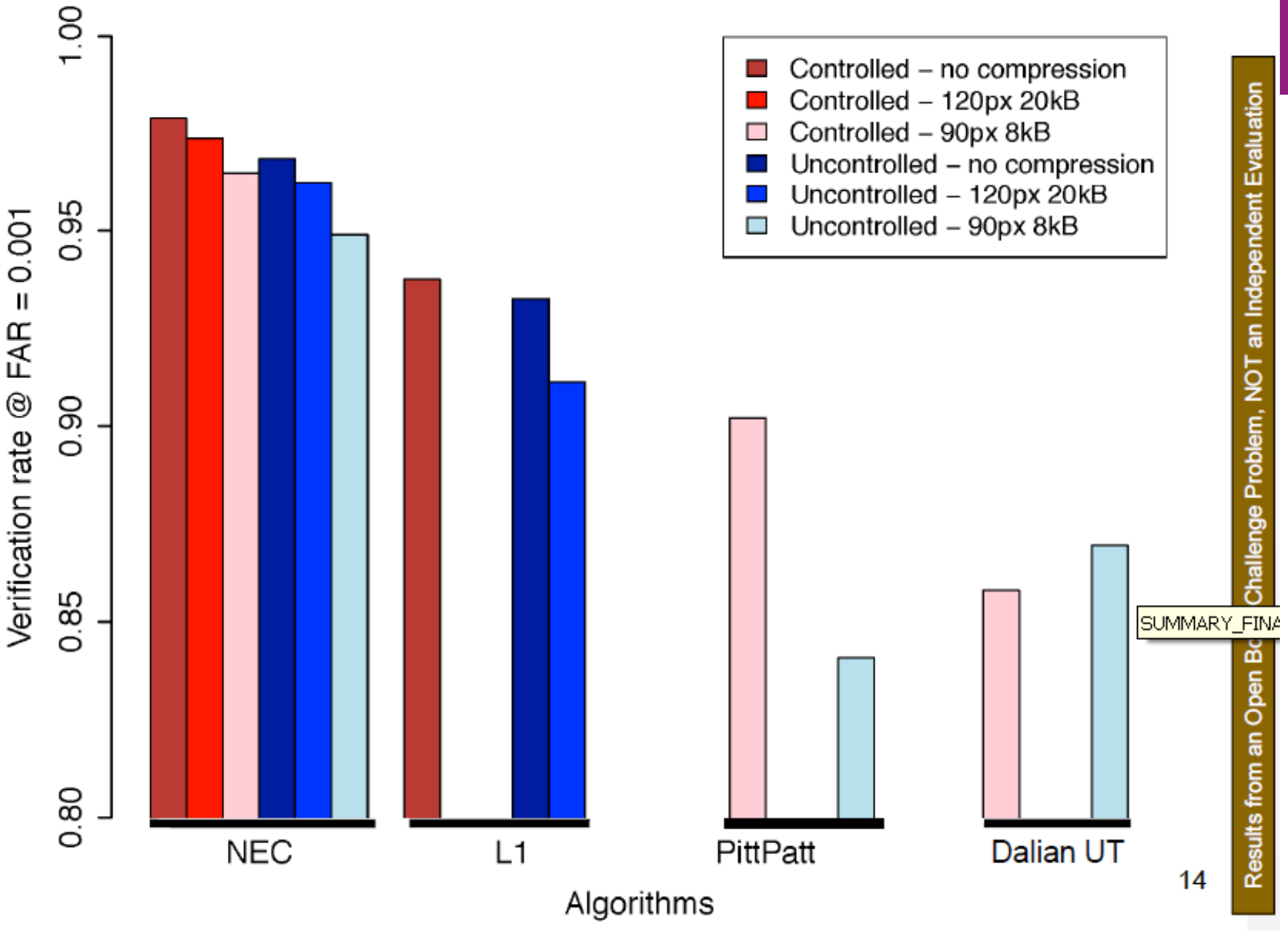


Uncontrolled vs. Uncontrolled

Number of Images 8,014		Number of Images 10,687
	No Compression	
	Compression 120 pixels 20 KB	
	Compression 90 pixels 8 KB	

NIST

Summary Frontal



Customers use NIST tests in Evals

"If the proposed FR Solution product(s) have been tested in the National Institute of Standards and Technology's (NIST) Facial Recognition Test FRVT 2006, the results of the test can be used as a substantiation of compliance with requirements."

"Certification that the proposed AFIS underwent the Fingerprint Vendor Technology Evaluation of 2003 (FPVTE 2003) – Large Scale Test Category by the National Institute of Standards & Technology (NIST)."

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???

- How many times in the last 2 days have we heard presenters only ask questions ?
- Customers look to industry (integrators and vendors) for answers, and end up in frustration doing tests themselves disguised as PoC
- Jim: “Disconnect between lab performance and field results”
- BSI: “all world is ignoring spoofs”

Tell me the answers !

- terry.hartmann@unisys.com
- Phone +1 267-475-7618
- Reston, Virginia, USA

Have you ever bought a PC ?

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Maybe you bought this once ?

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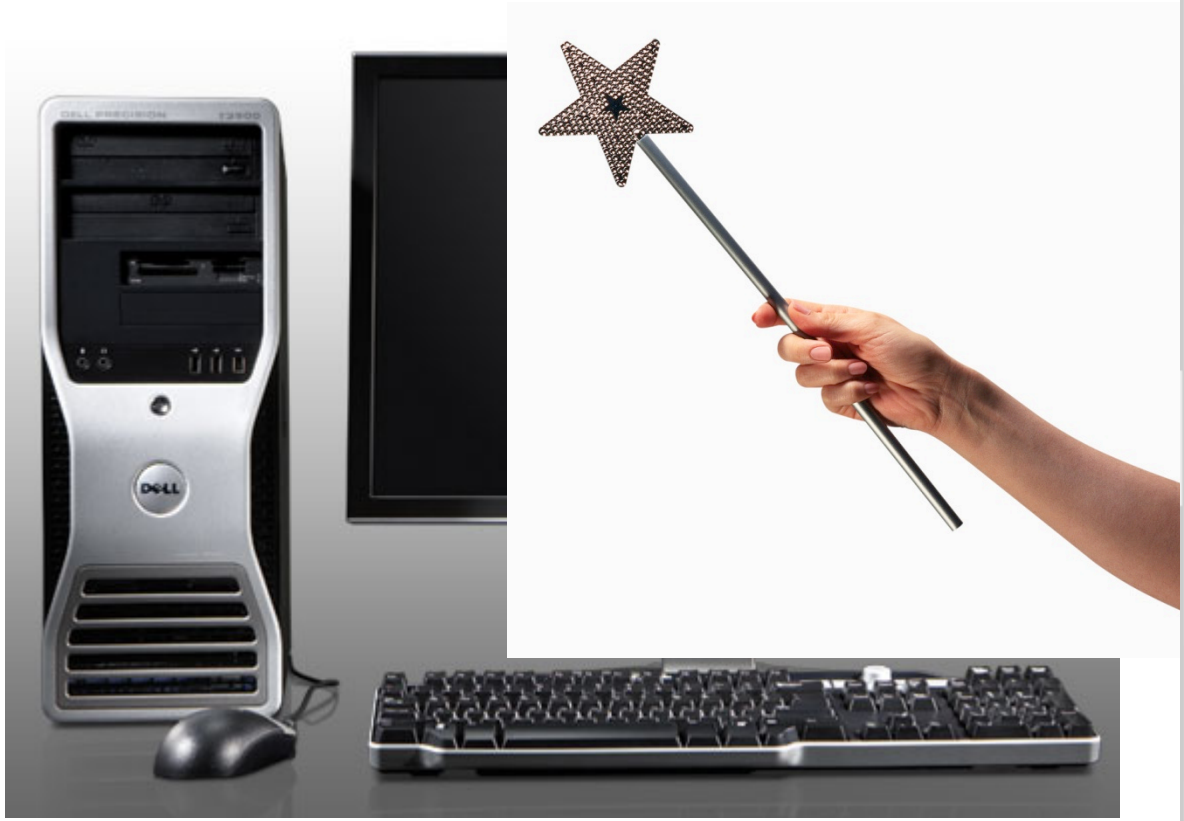
www.pc-vendor.com



Processor

Dual Core Intel® Xeon® W3503 2.40GHz, 4M L3, 4.8GT/s

Operating System

Genuine Windows® 7 Professional Bonus-Windows XP Professional downgrade

Monitor

3rd Party Monitor Included

Memory

2GB, 1066MHz, DDR3 SDRAM, NECC (2 DIMMS)

Boot Hard Drive

250GB[2] SATA 3.0Gb/s with NCQ and 8MB DataBurst Cache™

CD-ROM, DVD and Read-Write Devices

16X DVD+/-RW w/ Cyberlink PowerDVD™ and Roxio Creator™ Dell Ed

Graphics

512MB NVIDIA® Quadro® FX 580, DUAL MON, 2 DP & 1 DVI

Resource DVD

Resource DVD - contains Diagnostics and Drivers

Hardware Support Services

3 Year Basic Limited Warranty[3] and 3 Year NBD On-Site Service[4]

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Integrator Metric Wish # 1

That I could buy my biometric algorithm online

But my competitors couldn't ☺

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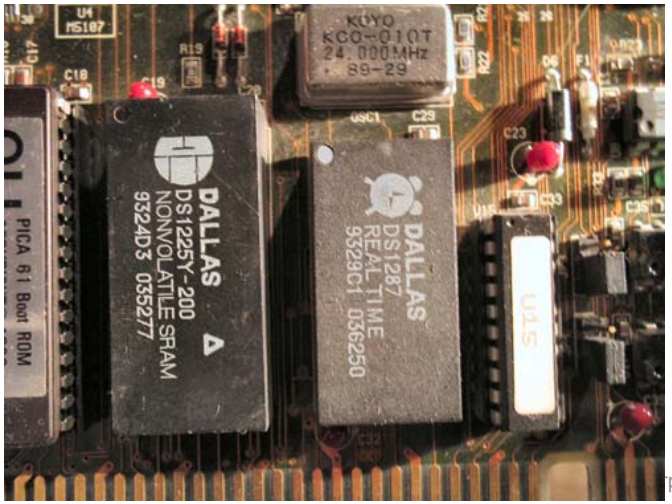
STAR WARS
THE
CLONE
WARS
REPUBLIC HEROES

What's under the covers ?



Metric Wish # 2

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Government

- Conduct Funded Tests
- Conduct Bakeoffs
- Speak at conferences about
  - what their program is
  - what they tested for
  - what they did
  - how they did it
  - lessons learned
- Test labs a bit more open but NDA constrained

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But Government

Don’t speak at conferences about

- which vendors were in the field
- how they downselected
- quantitative measures
- what the relative results were between vendors
- what’s their “biometric” FRR
- what’s their operational FAR

Metric Wish # 3

That Public Sector testors would publish/ circulate definitive comparative results

and that the media would ignore them ;)

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Face … the final frontier

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Is this the Same Person ?

1. Yes
2. No
3. It’s a stupid, ill-formed question

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Real People Performance vs Auto FR

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ISO 19794-5

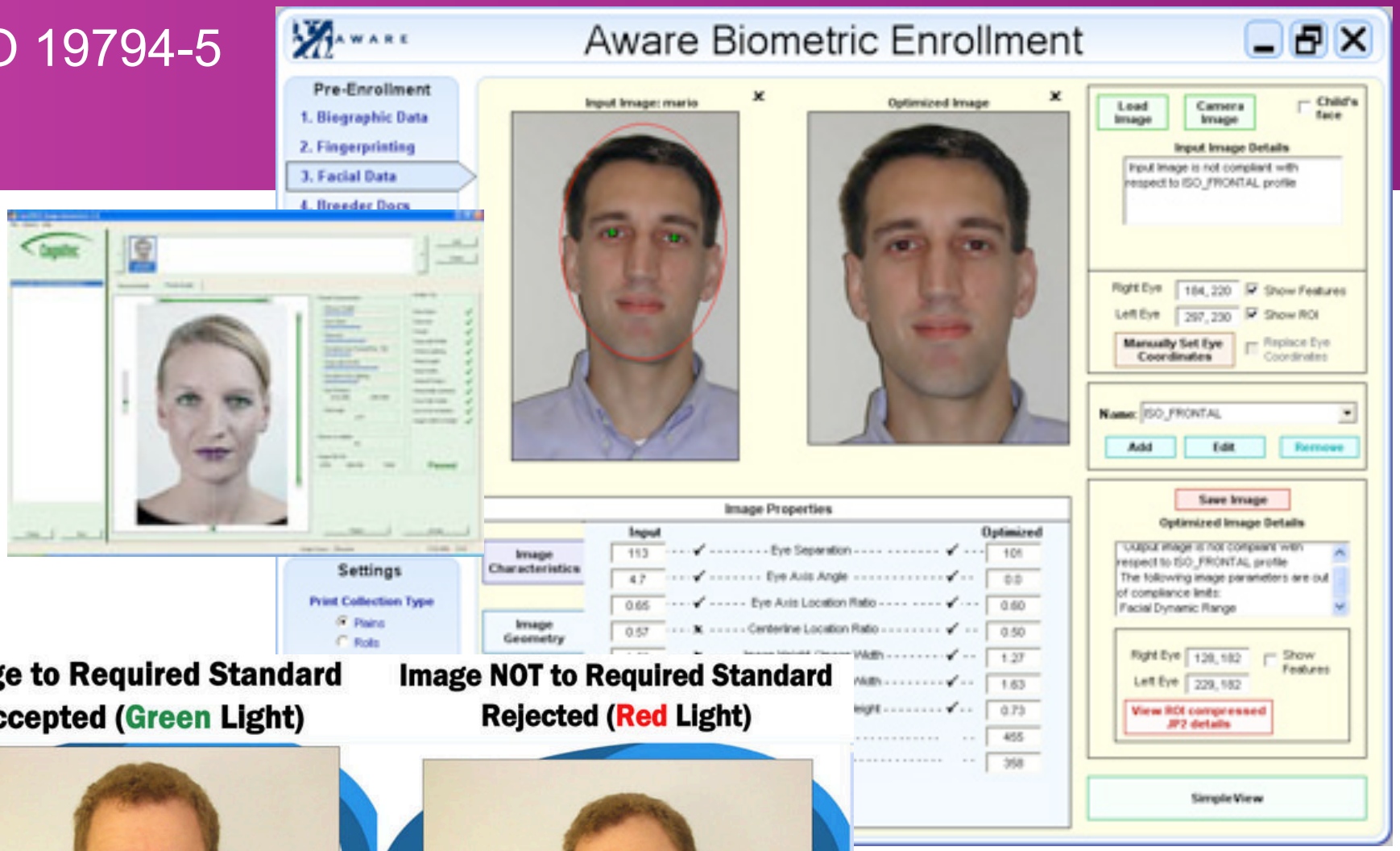
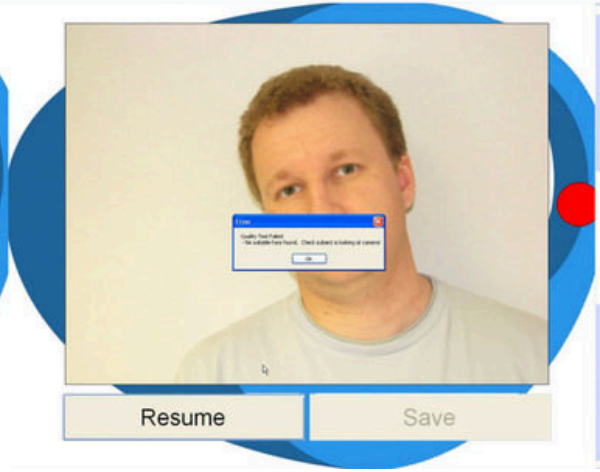
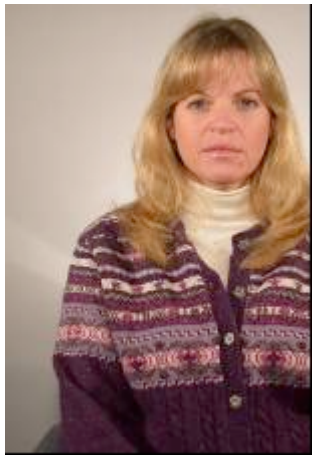


Image to Required Standard
Accepted (Green Light)

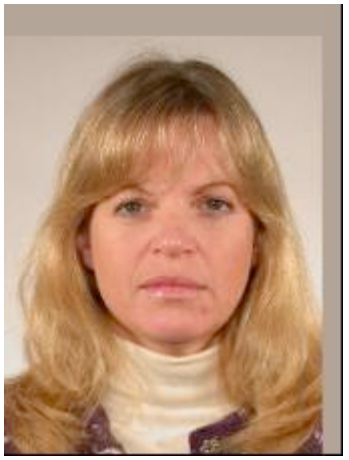
Image NOT to Required Standard
Rejected (Red Light)



Auto-fixing Positioning



Centre head



Eyes horizontal

Metric Wish # 4

Facial Image Quality Software Comparative Test

- Do they really meet ISO 19794-5 ?
- Are they algorithm independent ?
- Is there value in auto-correction ?
- Is it an enrolment tool or a matching tool ?
- Is it ‘safe’ to do so?
- How do we quantify it’s worthwhile ?
- QA the eyefinder ?

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Have you ever bought a digital camera ?

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Now tell me …

- Now you have it
- How many Megapixels do you capture at ?
- How many Megapixels do you save at ?
- Email ?, Facebook ?

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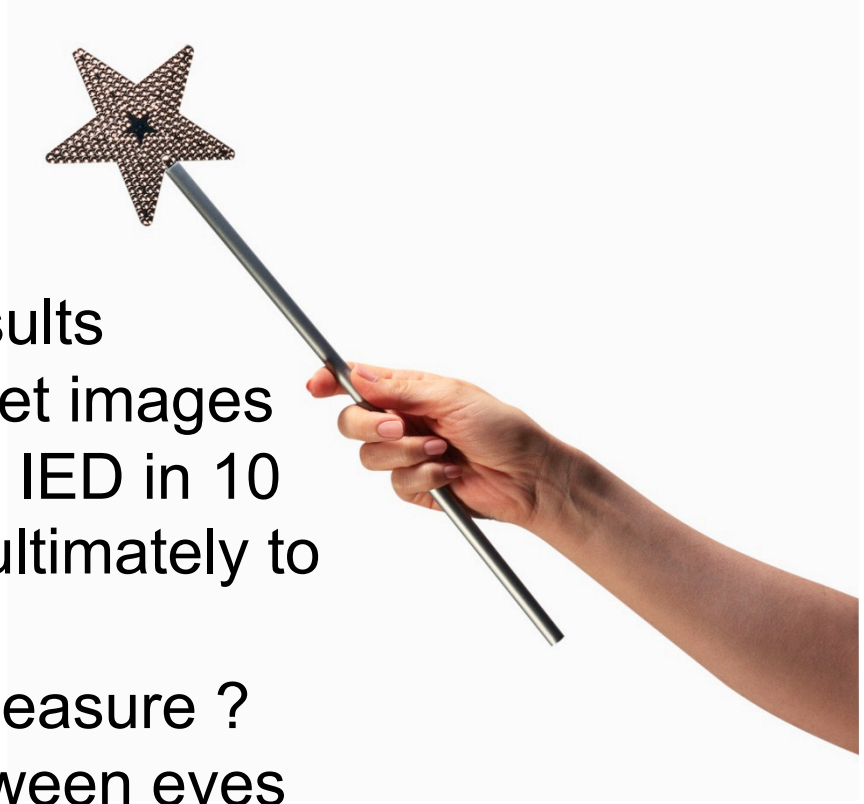
Metric Wish # 5

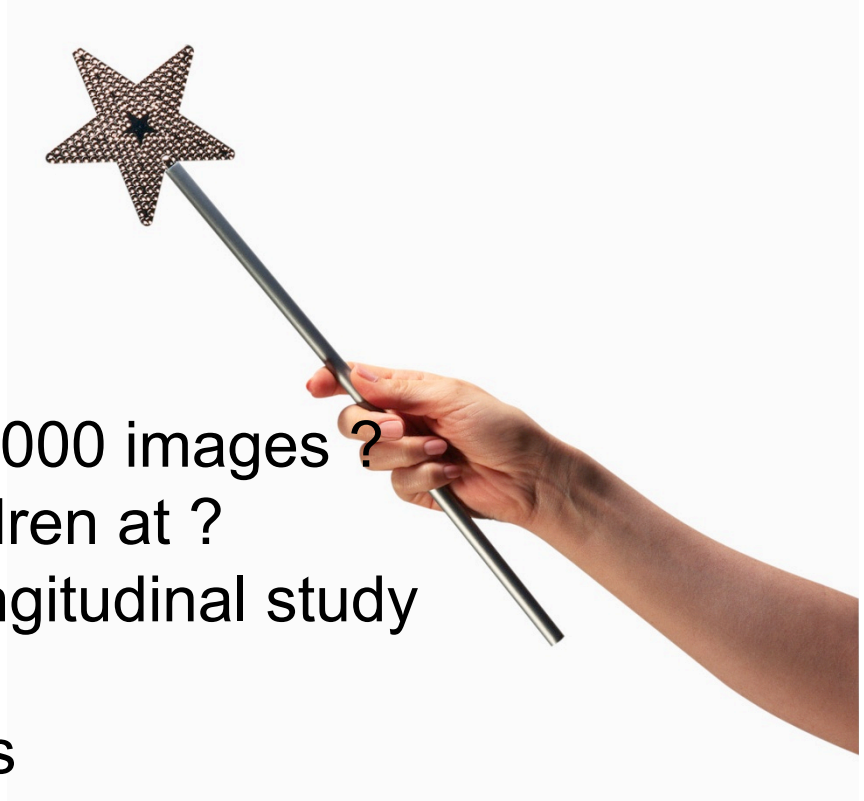
What resolution to capture, save, compress ?



- Low resolution image matching results comparisons – study of resolution set images ranging from 20 pixels to 120 pixels IED in 10 pixel increments – plot the curves, ultimately to 400dpi
- Can we set a “resolution” quality measure ? eg FRVT2006: 6MP, 400 pixels between eyes

Metric Wish # 6

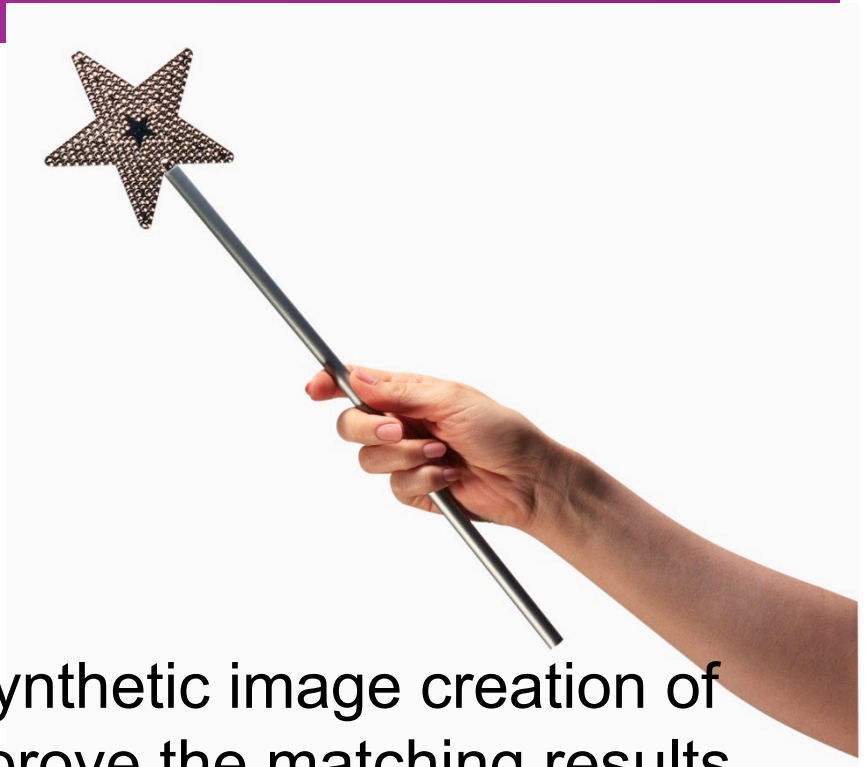
Typical customer questions



- How long does it take to enrol 100,000 images ?
- What age can I reliably match children at ?
- Effects of aging on FR results – longitudinal study over 0-20 years
- Effects of dramatic weight gain/loss

Metric Wish # 7

Sophisticated customer questions



- To what extent can/cannot 2D-3D synthetic image creation of the [probe or gallery or watchlist] improve the matching results (1:n and 1:1) ?
- What do the FRVT2002 graphs look like in 2010 ?
- Where can I buy morphed Facial Image detection software ?

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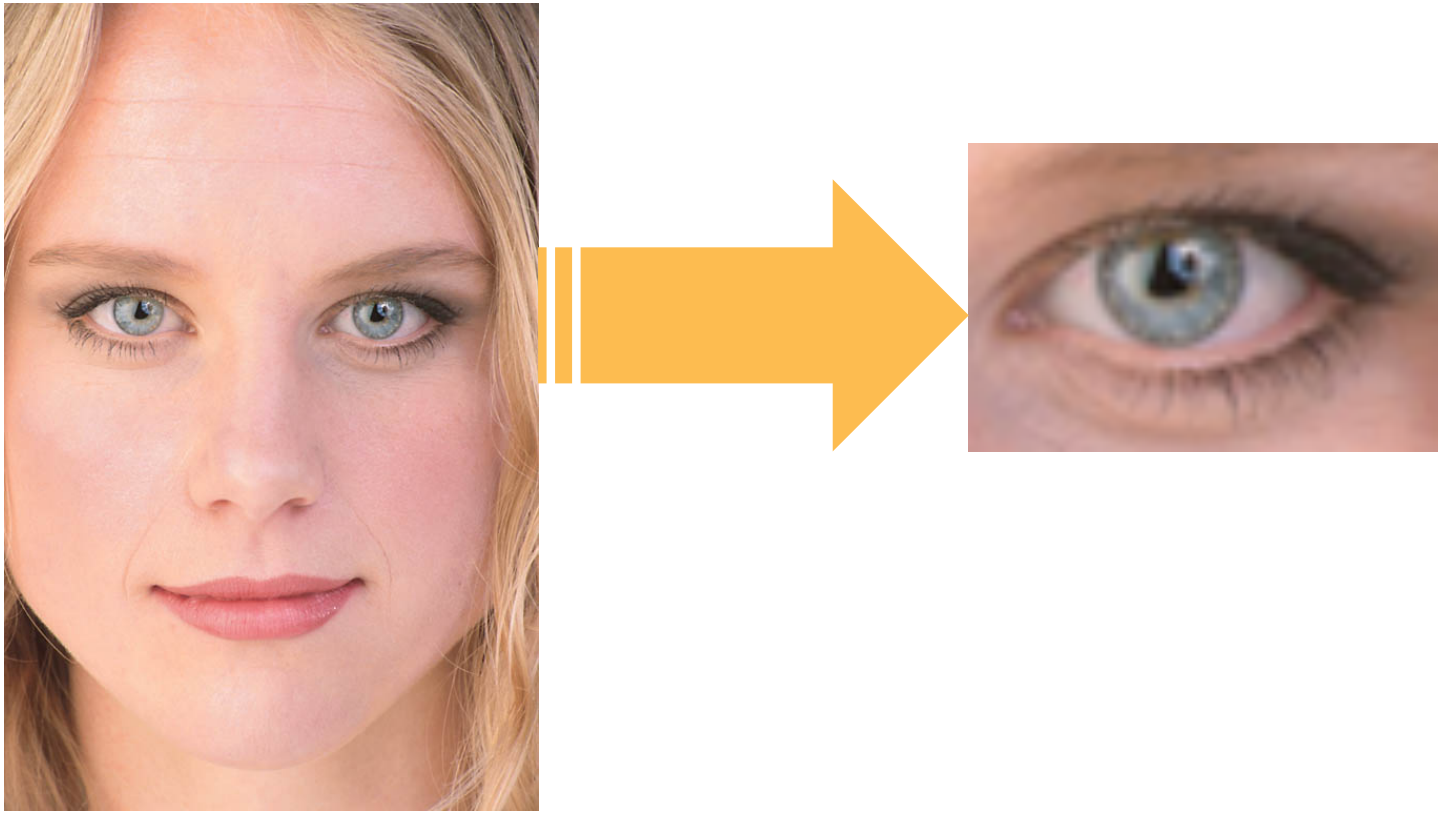
Face and Iris



Metric Wish # 8

What image attributes (eg resolution) do you need to capture a facial image to zoom/crop out an iris acceptable for iris recognition ?

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Metric Wish # 9

Iris Global Implementations

- What's the largest ?
- Have False Matches been detected ?
- What's the operational FAR ?

Metric Wish # 10

Iris
(still, motion, distance)

- Results vs Iris Still
- Interoperability ?
- Relative verification performance results ?

Metric Wish # 11

FTE:
Finding the iris

- Enrolling with/without glasses
- Effect of glasses
- Polarised lenses
- Occlusion
- Jetlag
- Hangovers

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Metric Wish # 12

Legacy and Upgrade Conversion Times

- Face per million
- Finger per million
- Iris per Million

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Metric Wish # 13

Liveness Detection

- How does it actually work ?
- Prove it works .. well to what extent ;)

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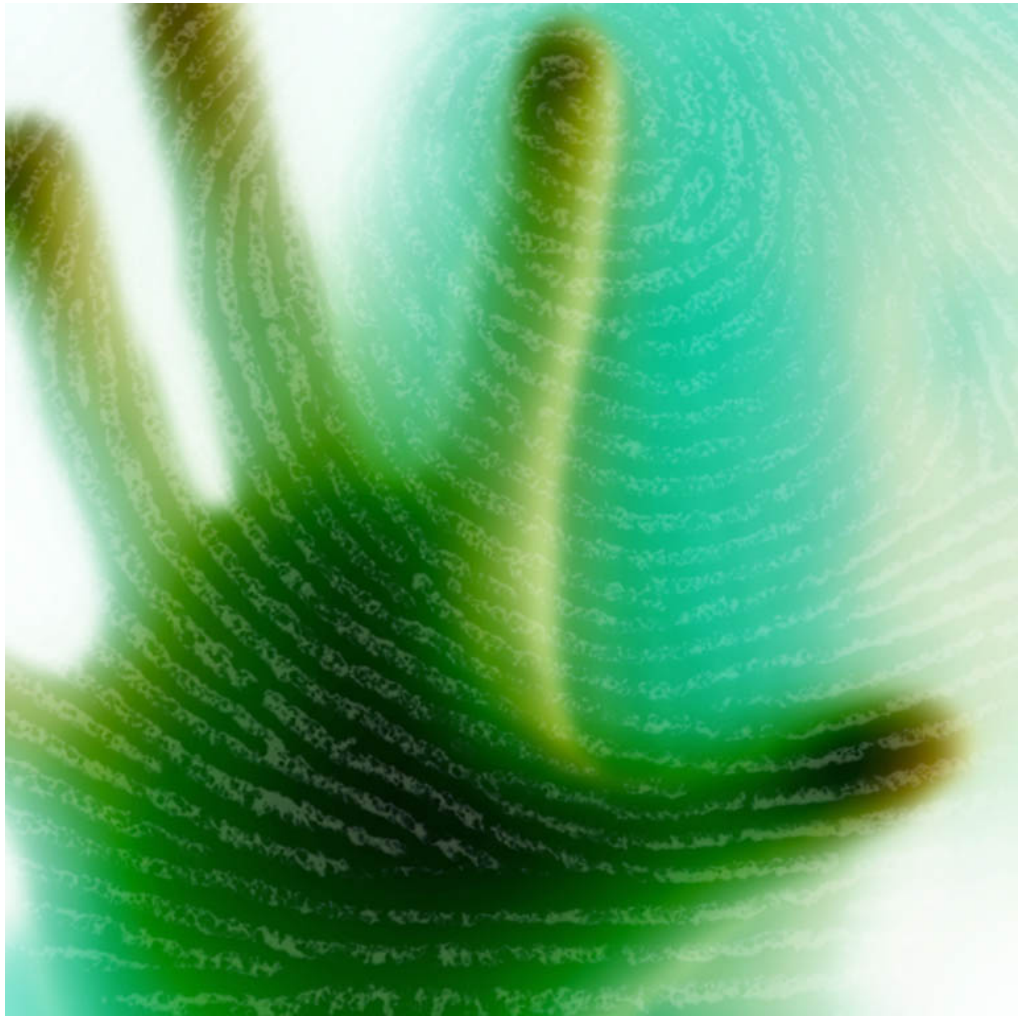

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Finger

- What is the “maximum” size of a large AFIS system (before it ceases to “work”) ?
- Fingerprint quality and interoperability: is it possible to design a standard that is algorithm independent **and** good enough for large databases ?
- What is the matching performance for ISO standard template matching in larger databases? Which vendors support this standard template (long/short variant)
- Difference in FAR/FRR between 250/500/1000 dpi sensors for 1:N matches
- Touch vs no-touch sensors

In the Vein of Vascular …

- Whats the largest global implementation ?
- What veins? (palm, finger, back of hand...)
- Effects of aging for vein recognition eg moving to surface
- At what age do the vein patterns become stable enough to use – ie use for children/teenagers/adults

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Metric Wish # 14

Demystifying Vasular

- Operational Results (FAR, FRR) ?
- 1:1 rates vs other biometrics ?
- 1:1 Results on children .. A key potential market
- 1..N ?

Voice

- Comparative testing (FRVT-like) of various products = NIST SRE10 ?
- 1:N ?

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All - Multimodal & Fusion

- Fusing face/fingerprint: what is the impact on performance in terms of speed and accuracy, what is the optimum and what to do to prevent weakening the system
- The same question for face/iris and fingerprint/iris
- 2 for the price of one ? (face/iris, finger/vein)
- How fuse ?
  - 1:N for reducing search times in multimodal env
  - 1:1 for increasing confidence in the match

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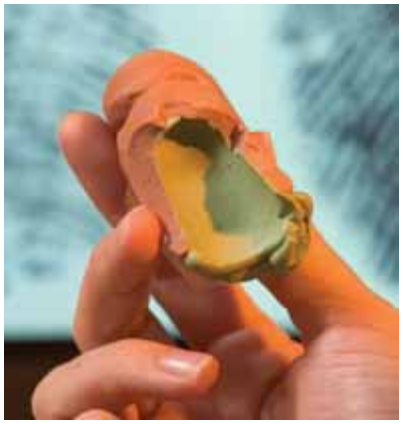
All - Template sizes

- What is template size in for this vendor for a given raw image ?
  - At rest
  - In cache
- Can be bigger than the raw image
- Is growing and growing year-on-year and while storage is not an issue, it is an issue for mobile devices, transmission speeds etc
- Multiple pass options (fusing your own matcher)

All - Spoofing

- Fingerprint is targeted – eg BSI yesterday
- What about Face ?
- What about Iris ?
- What about Vein (and those claims it can't be spoofed) ?



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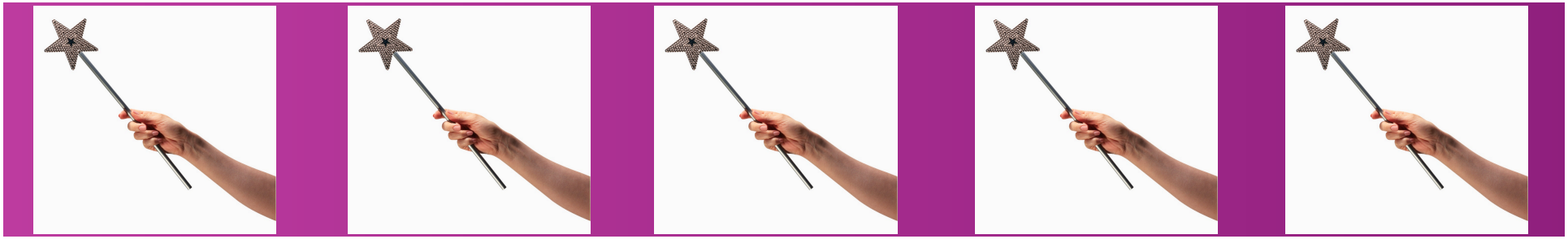

Are tests missing the point?

or

Is it just that the answers are jealously guarded ?

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Please send all the answers to:

terry.hartmann@unisys.com