Australian SmartGate
(An unofficial, unauthorized report representing only the views of the author)

James L. Wayman, Ph.D., FIET, FIEEE
jlwayman@aol.com
SmartGate: Facilitating Air Travel since 2003

• Original drivers:
  – Implementation decision pre-ICAO Berlin Resolution of 28 June, 2002 selecting face recognition for MRTDs
  – Increasing passenger numbers
    • (18M in/out in 2003; 25M in 2015)
    • Airbus 380
  – **Limited airport infrastructure**
  – AM intensive international arrivals
  – Need for added security
  – Rejection of fingerprinting for civil applications
  – Face recognition consistent with current processes
The Nay-Sayers

- “Facial recognition is not sufficiently mature for border crossing applications” – James L. Wayman
- March 2003 Trial
  - Single enrolment image
  - 12.4% FRR at 1% FAR
  - “OK, better than I thought, but not ready for prime time” - JLW
- August, 2003 – Australian privacy blogger
  “… both theoretically and demonstrably utterly ineffectual. It augurs ill for western democracies that a single strike could so dramatically undermine both managerial competencies and democratic freedoms”.

6 May, 2016
International Biometric Performance Testing Conference
Reducing Expectations: The Initial Trial

• Restricted to 3900 Qantas aircrew
• 5 photo enrolment
• Re-enrolment of aircrew experiencing recognition problems
• Single installation with carefully controlled light
• FRR $\approx 2\%$
• “This isn’t scalable” - JLB
SmartGate 2016: Inward and Outward Passenger Processing

- Adelaide
- Brisbane
- Cairns
- Darwin
- Gold Coast
- Melbourne
- Perth
- Sydney
Eligibility to Use Arrivals SmartGate

• hold an ePassport
• are aged 16 years* or older
  – Australian children 10 to 15 years (inclusive) if accompanied by a minimum of two adults
• are from one of the following countries:
  – Australia
  – Canada
  – China
  – Hong Kong SAR
  – Ireland
  – Japan
  – Macau SAR
  – New Zealand
  – Singapore
  – Switzerland
  – United Kingdom
  – United States of America
Arrivals: A two step process (for now)
The Challenges

- Airport lighting and signage controlled by airport owner
- Collections cannot be “ICAO compliant”
- AU passports photos currently submitted by applicants
- Passengers expecting different process
- Ongoing human factors development
Departures SmartGate

- Mandatory for all travelers, regardless of age or passport
- Installed at all major international airports in 2015
- 5M\textsuperscript{th} passenger processed on April 8, 2016
- Two step process at the gate
- Both chip and print image are captured
  - Non e-Passport holders always referred to primary processing
- 3 customs officers for every 6 gates
  - Clearance
  - Escort
  - Primary line
Setting Thresholds

- FMR is a strong function of threshold
  - Monotonically increasing
- FNMR is a very weak function of threshold
  - Monotonically decreasing non-increasing
- \( P(\text{Score}|\text{ground truth}) \)
  Cannot be inverted
- Thresholds cannot be "optimized"
  Priors and costs cannot be modeled
- Set threshold to meet political requirement for zero-effort FMR
- Seek improvement in resulting FNMR through human factors

6 May, 2016
International Biometric Performance Testing Conference
Testing

• Experimental FMR
  – 80+ volunteers with 100/2 real ANZ passports
• Simulation FMR
  – Stored passport images and video sequences
• Gate dependent FNMR
  – < 3%
  – Are we at algorithmic limit?

Experiment to Simulation FMR Ratio

6 May, 2016
International Biometric Performance Testing Conference
Comments?