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

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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
  - **<u>Limited airport infrastructure</u>**
  - 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".
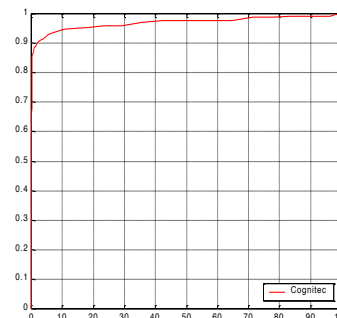
Reducing Expectations: The Initial Trial

- Restricted to 3900 Qantas aircrew
- 5 photo enrolment
- Re-enrolment of aircrew experiencing
   recognition problems
- Single installation with
   carefully controlled light
- FRR ≈2%
- "This isn't scalable" - JLW

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
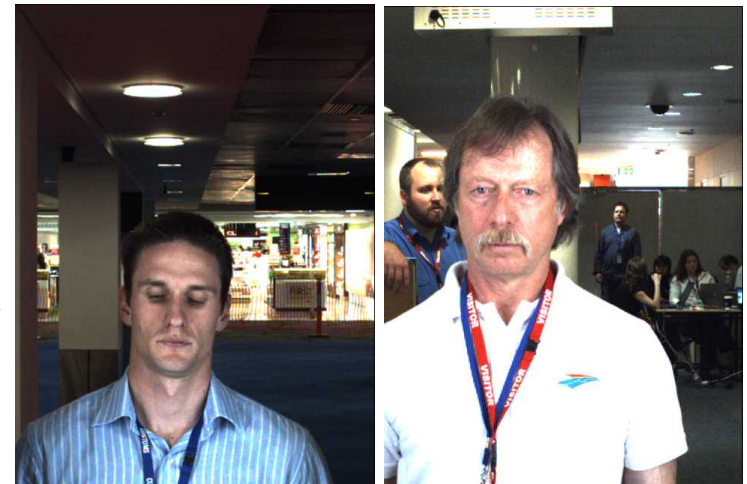 - United States of America

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
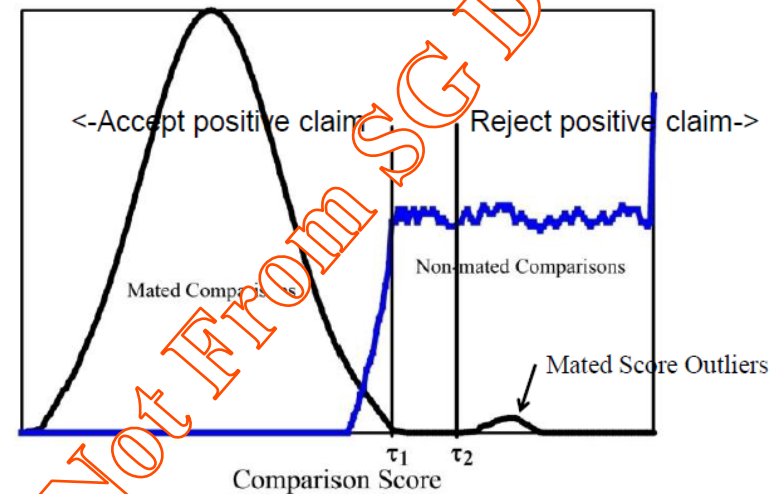- Ongoing human factors development

Departures SmartGate

- Mandatory for all travelers, regardless of age or passport
- Installed at all major international airports in 2015
- 5Mth 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
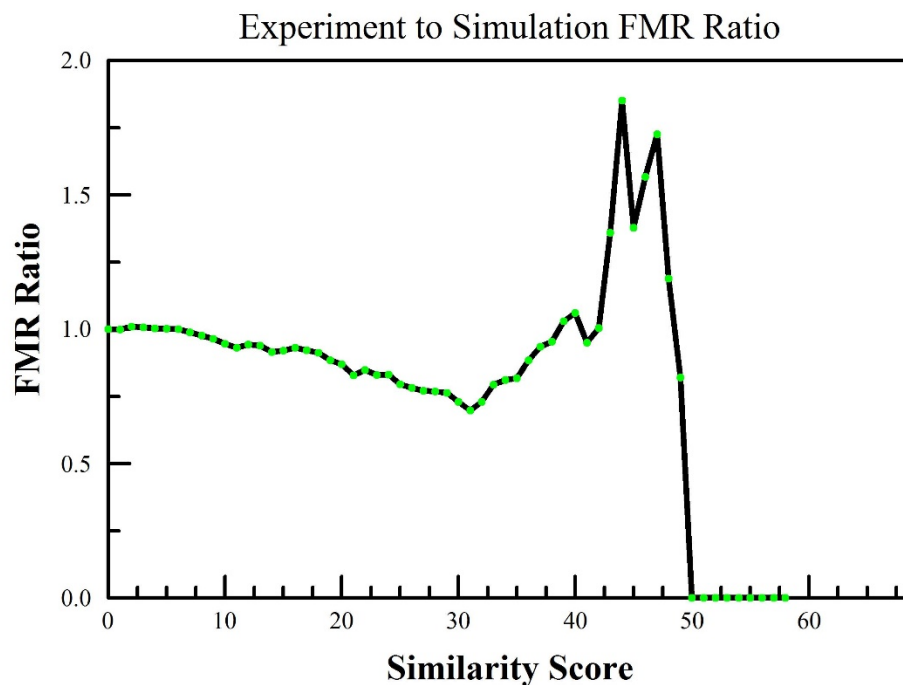 - Clearance
  - Escort
  - Primary line

Setting Thresholds

- FMR is strong function of threshold
  - Monotonically increasing
- FNMR is very weak function of threshold
  - Monotonically ~~decreasing~~ non-increasing
- P(Score|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

<-Accept positive claim   Reject positive claim->

Mated Comparisons

Non-mated Comparisons

Mated Score Outliers

τ_1 τ_2

Comparison Score

Not From SG Data

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

Comments?