
Australian SmartGate

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

James L. Wayman, Ph.D., FIET, FIEEE

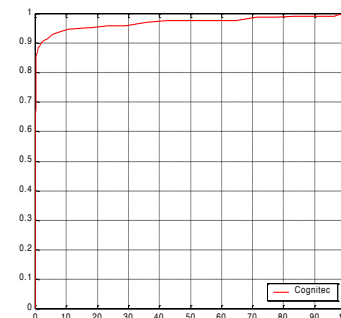
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SmartGate: Facilitating Air Travel since 2003

- 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
 - **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”.



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” - 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

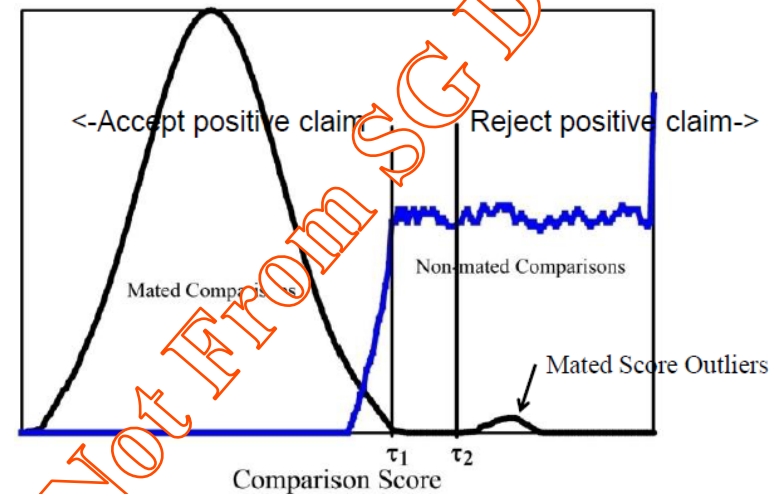
- Mandatory for all travelers, regardless of age or passport
- Installed at all major international airports in 2015
- 5Mth passenger processed on April 8, 2016
- Two step process at the gate
- Both chip and print image are captured
 - Non e-Passport holders always referred to primary processing
- 3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





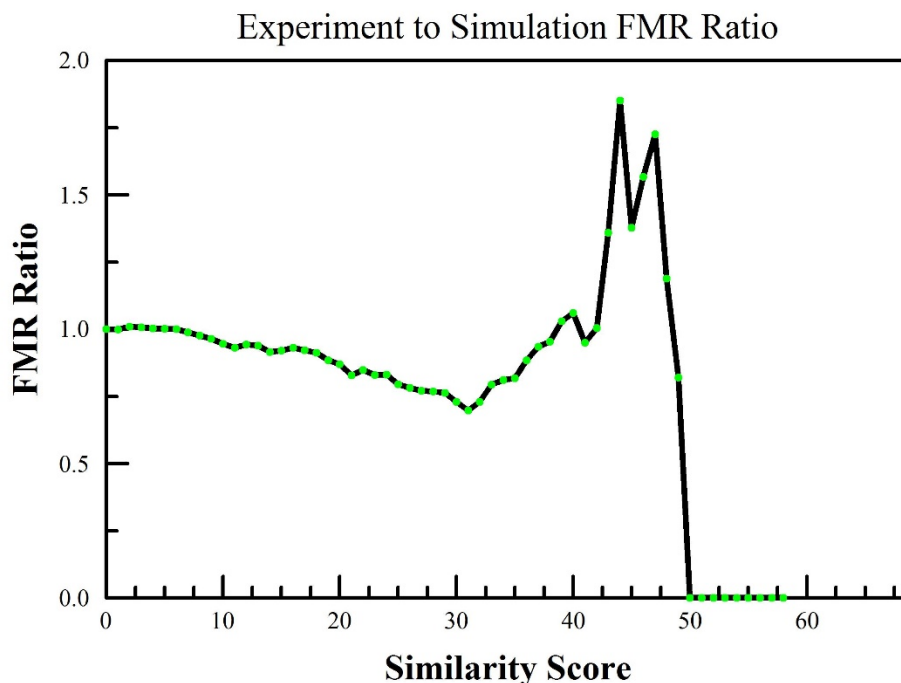
Setting Thresholds

- FMR is strong function of threshold
 - Monotonically increasing
- FNMR is very weak function of threshold
 - Monotonically ~~decreasing~~ non-increasing
- $P(\text{Score}|\text{ground truth})$
 - 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



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?



Comments?