

The Impact Of Biometric Technology On Aviation Security And Safety

Brittany Bogan, Milly Cai, Ben Martin, and Eesha Bemra

Our mission is to provide an airport with an accurate, efficient system in order to improve security and prevent criminal activity, identity theft, and unwanted intrusion.



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Security Plan

- Provide airport with efficient, easy-to-use security system
- Using an iris-scanning and fingerprinting program
- Registered criminals - fingerprint in national database; objective is to prevent criminals from entering a flight without permission
- Achieve this objective by taking fingerprints of all individuals (for first entry only), along with iris scan; both will be recorded in airport database and matched with each other
- If fingerprint matches up with criminal fingerprint database, individual will be further questioned, searched, and possibly stopped from entering
- By using fingerprint and iris scanning, prevent forgery and improper usage of travel rights



Science Behind It

- Biometrics - method of identification using parts of body or particular mannerisms of individual; for security plan, planning to use fingerprint and iris scanning as method of biometric identification
- For iris scanning (using for all individuals entering), digital camera captures image of eye; using complex algorithms, computers detect intricate iris patterns (coloring and texture)
- Information stored in airport database; people re-entering can be matched up with existing scan
- Iris scan taken using both visible and infra-red light, allowing camera to take high-contrast, high-quality image
- Computer detects different parts of eye, and records information as code
- Fingerprinting, which will be used only for first-time entry, will be used only to match up fingerprints with iris scans and identify criminals
- For fingerprinting - no-contact scanner will scan 3D image of fingerprint - measures differences of ridges, valleys on surface of finger

http://www.accuratebiometrics.com/images/digital_fingerprint_small.png



Fingerprinting and Iris Scanning

<http://eyetrackingupdate.com/wp-content/uploads/2010/10/iris-scanning1.jpg>



Iris code is stored in bar code-like format,
allowing for easier maintenance of system

Accuracy

- Fingerprinting - not extremely accurate (only matches up 60-70 points of uniqueness); Iris - well-protected, interior organ
- Iris scanning - extremely accurate (matches up over 200 points of uniqueness)
- Chance of mistaking one stored iris code for another - better than 10^{-11} with the usage of John Daugman's commercial IrisCode algorithm (with .26 Hamming distance threshold, meaning that up to 26% of bits of 2 different codes could disagree due to imaging noise, reflection; still have match)
- Iris is mostly flat, geometric shaping (not texture) only determined by 2 complementary muscles - shape much more predictable than, for example, face
- Contacts, glasses easily detected and computers/cameras work around this
- Although surgeries (especially cataract surgery) can alter iris, basic texture and blood vessel patterns remain the same; even different between identical twins
- Scan can be performed up to few meters away - easy-to-use, quick (few seconds, longer for first-time users)
- Technology already applied in UAE, India, Pakistan, Netherlands, UK, Canada, Google data centers

