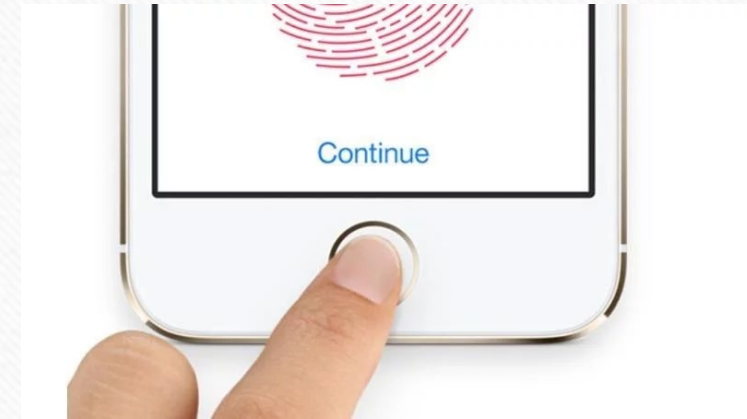


Biometrics



What are Biometrics?

- Physiological or behavioural characteristics of a human being that can distinguish one person from another
- Unique identifiers
 - Examples: fingerprints, hand geometry, earlobe geometry, retina and iris patterns, voice waves, DNA and signatures

The metrics of Biometrics

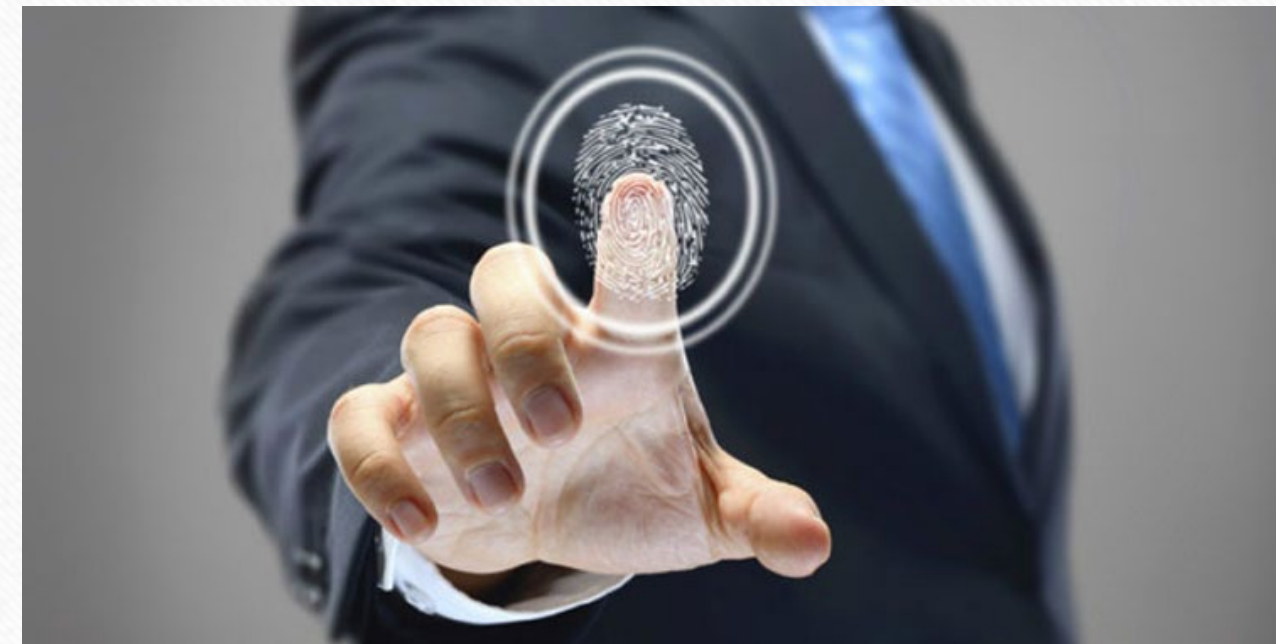
- FTE – Failure to enroll
- FTA – Failure to accept
- FAR – False acceptance rates
- FRR – False Reject rates

Physical Biometrics

- Fingerprint recognition
- Hand geometry
- Retinal scanning
- Iris scanning
- Facial recognition

Fingerprint Recognition

- A live acquisition of a person's fingerprint
- Divides print into loops, whorls and arch
- Calculates minutiae points (ridge endings)
- Types
 - Optical
 - Capacitive
 - Thermal
 - Ultrasonic
- Disadvantages
 - Dirt, grime and wounds
 - Placement of finger
 - Can be spoofed



Hand Geometry

- Automated measurement of many dimensions of the hand and fingers
- More reliable than fingerprinting
- Advantages
 - Low cost
 - Simple setup
- Disadvantages
 - Scanners are very large



Retinal Scanning

- Images back of the eye and compares this with blood vessels with existing data
- Scans into retinal database
- Advantages
 - Very efficient
 - Cannot be spoofed
- Disadvantages
 - User must look straight into retina scanner/reader
 - FTE ratio high
 - Acceptability concerns (i.e. light exposure and hygiene)



Iris Scanning

- Measures iris pattern in the coloured part of the eye
- Scans unique patterns of iris
- No touch required
- Advantages
 - Overcomes retina scanner issues
 - Iris patterns possess a high degree of randomness
- Disadvantages
 - Small, moving target
 - Can be obscured by eyelashes, lenses and reflections



Facial recognition

- Uses face camera
 - Popular in smart phones
 - Used by Law Enforcement Agencies
- Advantages
 - Can be acquired from a long distance
- Disadvantages
 - Facial expressions
 - Easily spoofed
 - FFR or FAR fluctuate



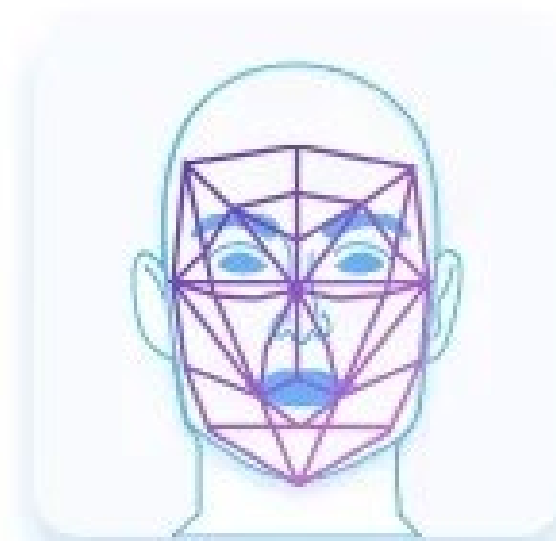
How facial recognition works



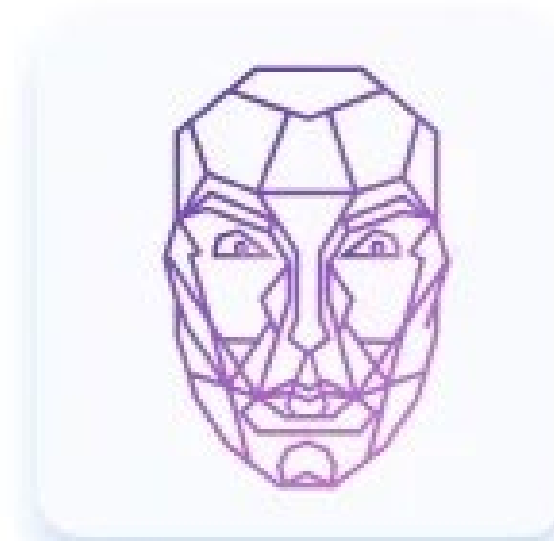
CAPTURE



EXTRACTION



COMPARISON



MATCHING

Voice recognition

- Uses vocal characteristics to identify individuals using a pass-phrase
- Speech input
 - Tone, frequency, duration, cadence
- Advantages
 - User friendly
- Disadvantages
 - Acoustics
 - Device quality
 - Background noise
 - Time consuming enrolment

