



Facial Recognition and Biometrics – Technology & Ethics 29 January 2020



@FoundSciTech, @AdaLovelaceInst
#biometricsdebate

Trustworthy Facial Recognition and Biometrics

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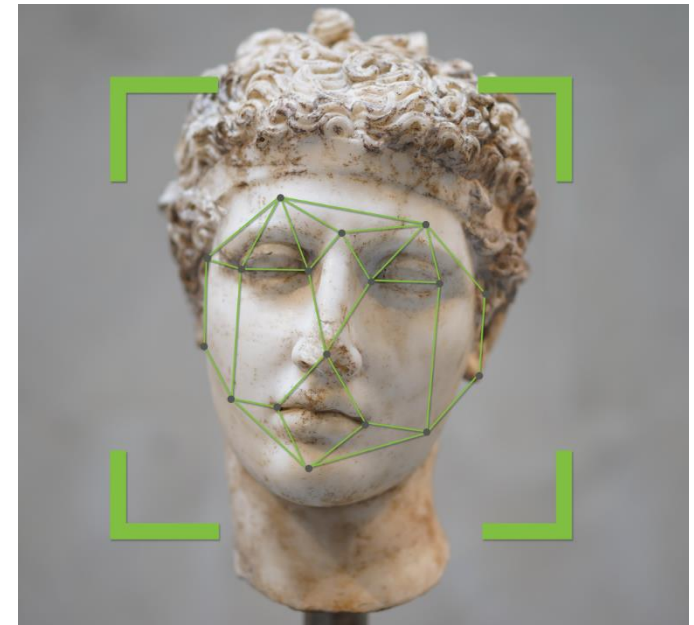
Royal Society

29 January 2020



Biometrics are not a new phenomenon

- ▶ Alphonse Bertillon developed anthropometry for law enforcement - created an identification system based on head length, head breadth, length of middle finger, length of the left foot, and length of the cubit.
- ▶ Anthropometry was the first scientific system used by police to identify criminals.



Uses of Facial Recognition and biometrics

► Identification and authentication



Uses of Facial Recognition and biometrics

▶ Classifying people



Uses of Facial Recognition and biometrics

- ▶ Of course other biometrics can be used for identification and classification



Sensors

- ▶ Not limited to optical
- ▶ Infrared
- ▶ Ultrasonic
- ▶ Capacitive
- ▶

Application areas

- ▶ Security and access controls
- ▶ Crowd-size estimation
- ▶ Crowd management
- ▶ Emergency situations – identify a body on a mountain
- ▶ ...

Efficacy of Biometric systems

► Uniqueness



Efficacy of Biometric systems

► Universality



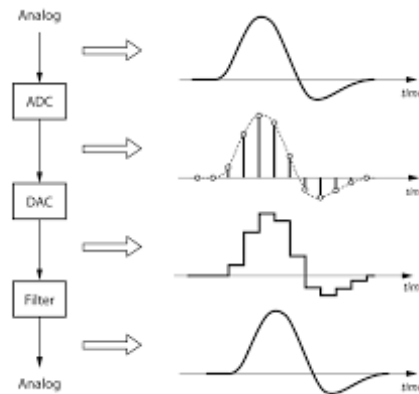
Efficacy of Biometric systems

► Permanence



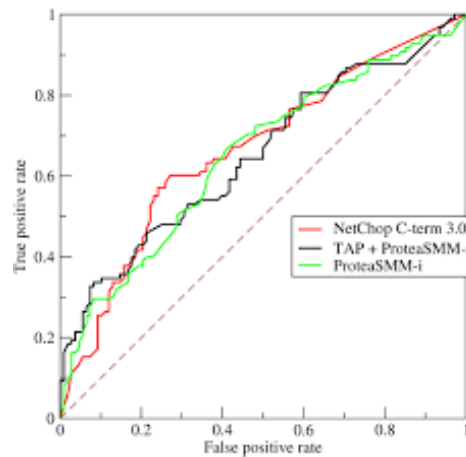
Efficacy of Biometric systems

▶ Collectability



Efficacy of Biometric systems

- ▶ Performance: Accuracy, Speed, Robustness



Efficacy of Biometric systems

▶ Acceptability



Efficacy of Biometric systems

▶ Circumvention



Machine Learning in Biometrics

- ▶ The any biometric presented will not exactly match the stored template
- ▶ ML is used for inexact matching
- ▶ This is working pretty well currently, but we see challenges in everyday occurrence (borders)



Trustworthiness in biometrics systems

- ▶ Security
- ▶ Privacy
- ▶ Transparency
- ▶ Reliability
- ▶ Robustness

Techniques being developed

- ▶ Secure systems development
- ▶ PETs
- ▶ Explainable AI
- ▶ New methods for systems verification
- ▶ Threat modelling

Summary

- ▶ We need to understand the use and application of any biometric system
- ▶ We need to understand that people may try to compromise systems
- ▶ We need to be able to measure the trustworthiness of biometric systems