

*SECURITY ASSESSMENT OF BIOMETRIC user identification systems should be conducted not only for accuracy of authentication, but also for **security against fraud!***

-Matsumoto

Matsumoto Fingerprint Paper

- Therefore, **biometric systems** must protect the information for biometrics against abuse, and they must also **prevent fake biometrics.**

Fingerprints can be Cloned!

- “We have used the moulds, which we made by pressing our live fingers against them, **or by processing fingerprint images from prints on glass surfaces**, or by processing impression of inked fingers.
- We describe how to make the moulds, and then show that the gummy fingers and conductive silicone fingers which are made with these moulds, can fool the fingerprint devices.”

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Final Notes on Authentication

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- **Combining** various authentication techniques is **more effective** than using a single authentication technique.
- We have discussed some disadvantages of using biometric authentication alone.
- However, if you **combine biometric authentication** with another technique, such as **a password or a token**, then the authentication process **becomes more effective**.
- The term ***two-factor authentication (2FA)*** is used to describe the case in which a user is to be authenticated based upon **two (independent) methods**.
- ATM cards- another example of two-factor authentication at work.

Final Notes on Authentication

- ATM cards have magnetic stripes that have the user's name and account number.
- When the card is used, the user is required to **enter not only the card** into the teller machine, **but also a PIN**, which can basically be thought of as a password.
- In such an example of *2FA*, the bank requires the user to be **authenticated based upon two methods**—in this case, **something that the user has** and **something that the user knows**.

Final Notes on Authentication

- There are other factors that can be taken into account when conducting authentication. E.g. Alice's location.
- Alice may carry around a cellphone that has a GPS chip inside of it.
- When Alice stands in front of an ATM requesting to withdraw money, Alice's bank could ask her cellphone company's computer system where she currently is.
- If the cellphone company's computer responds with a latitude and longitude that corresponds to the expected location of the ATM, the bank can approve the withdrawal request.

Final Notes on Authentication

- However, if Alice's ATM card and PIN were stolen by a bad guy who is trying to withdraw money, then **taking Alice's location** (or specifically, the location of her cell phone) **into account** could help **thwart such a fraudulent withdrawal request**.