

Behavioral Biometrics-based identity verification for new generation devices

Attaullah Buriro

The 28th ACM Symposium on Access Control Models and Technologies Trento, Italy

09.06.2023

How do we identify people?

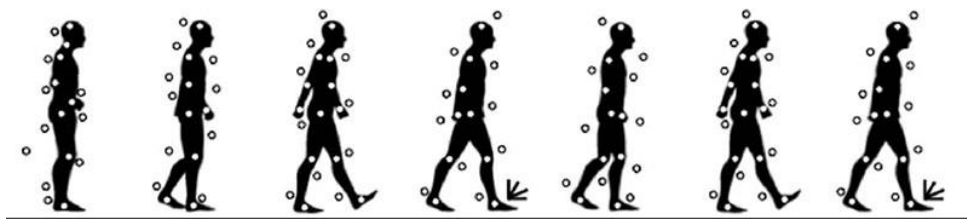


Photo Source: Spencer Alexander

How smart-devices identify their owners?

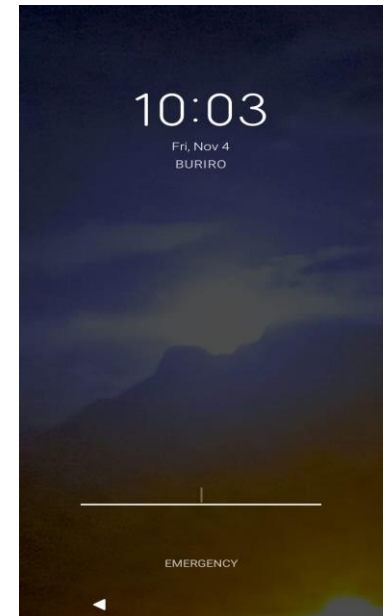
Face
Recognition



Fingerprint
Recognition

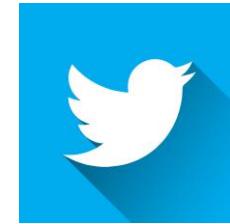


Asking for a
secret

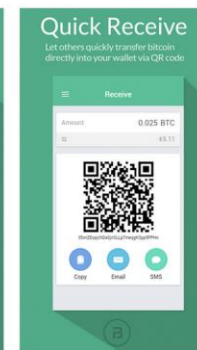
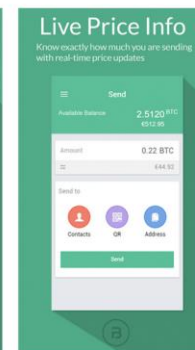
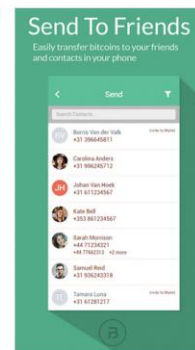
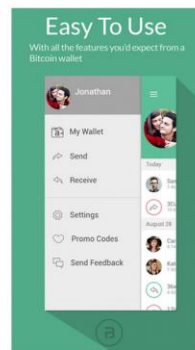
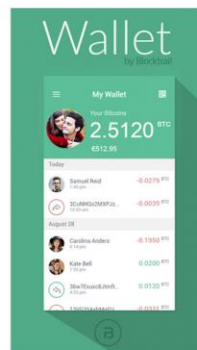


Why is the Authentication important?

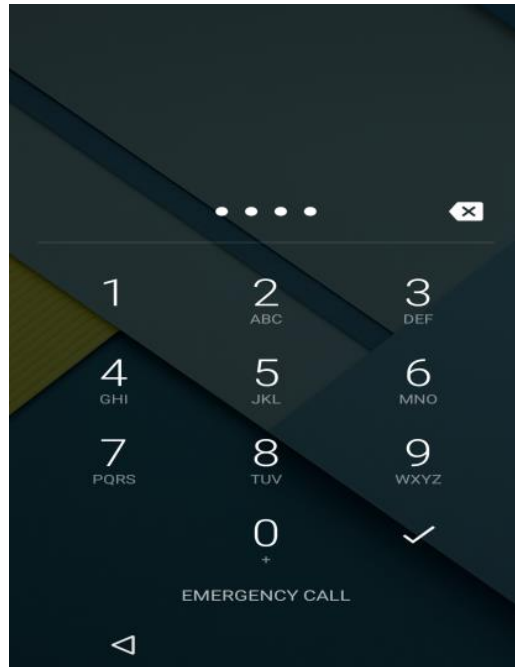
Social
Networking



Online
Transactions



Existing Authentication Methods



Are they secure?

Sr. #	PIN	Frequency (%)
1	1234	10.713 %
2	1111	6.016 %
3	0000	1.881 %
4	1212	1.197 %



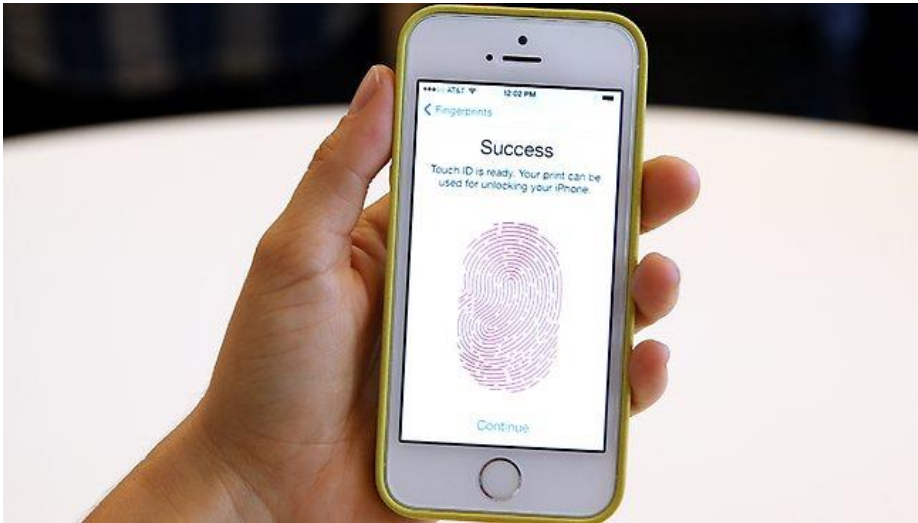
Authentication Methods: Problems



Source: Android SmartLock



Authentication Methods: Problems

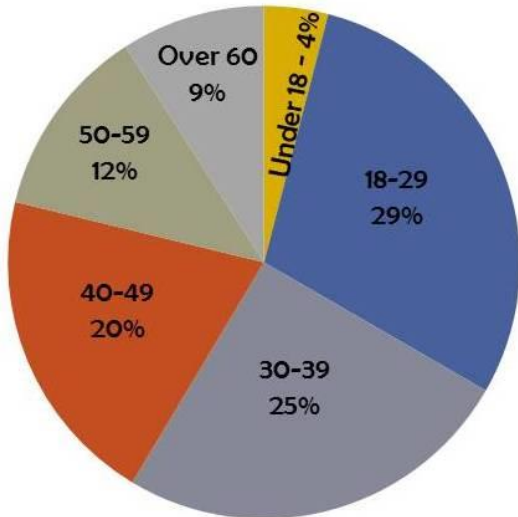


Apple's iPhone 5S Fingerprint Sensor hacked just after two days of its release by Germany's Chaos Computer Club

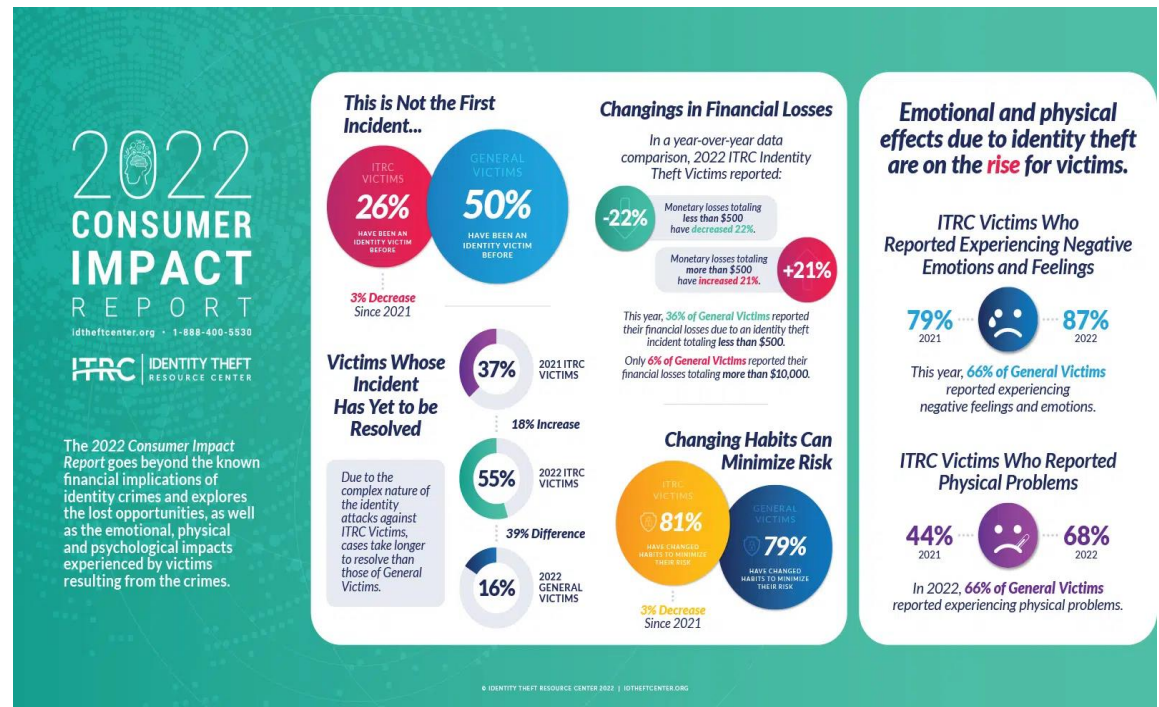
Consequences



Source: Americanbanker

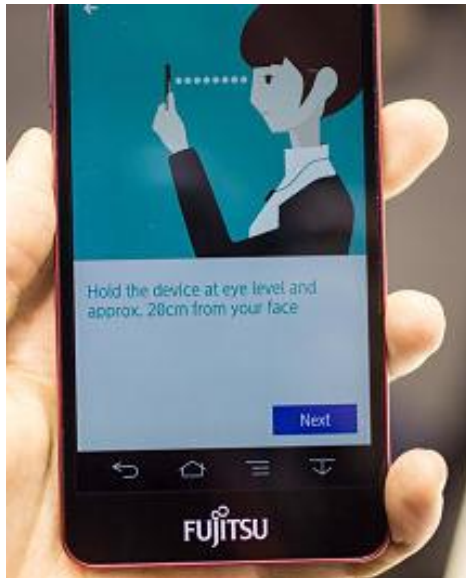








From Consumer Sentinel Identity Theft Data Clearinghouse



<https://www.idtheftcenter.org/>

Are they usable?



-  Iris Verification
-  Bluetooth Connection
-  Near Field Communication
-  Notification for Call, SMS, Email & SNS
-  Music Playing
-  Heart Monitor - Pedometer & Heart Rate



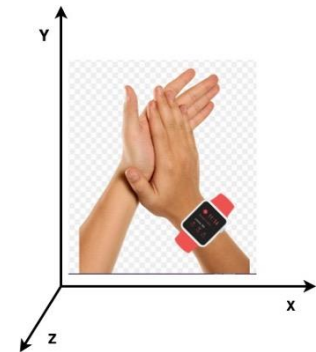
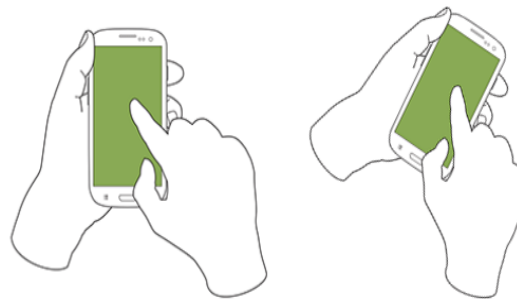
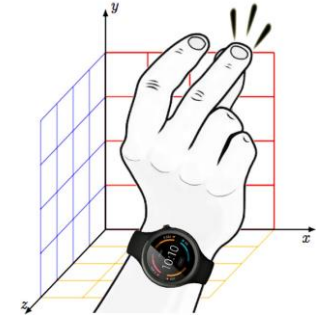
Alexander De Luca et al,
I Feel Like I'm Taking Selfies All Day!: Towards Understanding Biometric Authentication on Smartphones, CHI 2015.

Is there any alternate?

Behavioral Biometrics

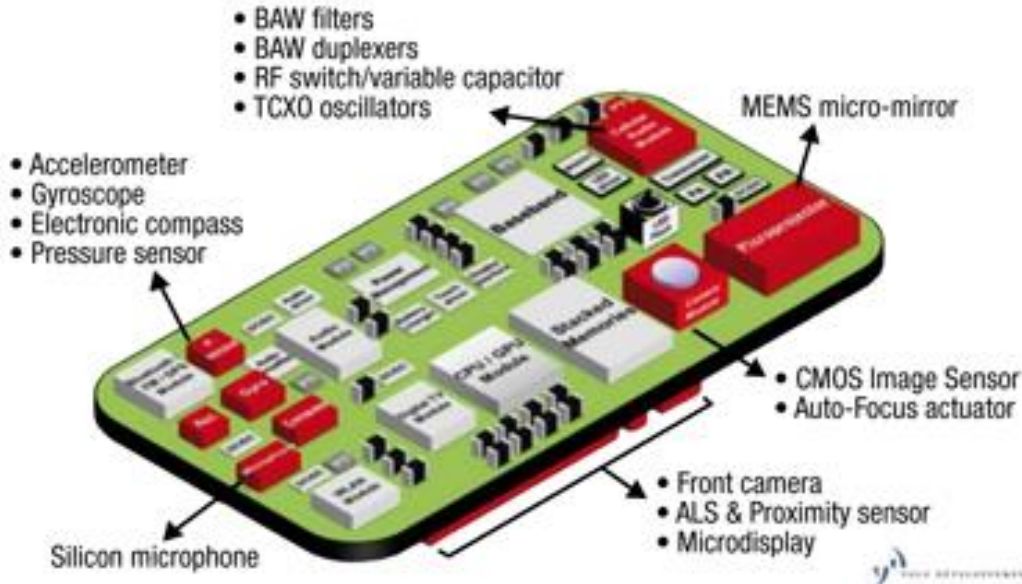


Barack Obama



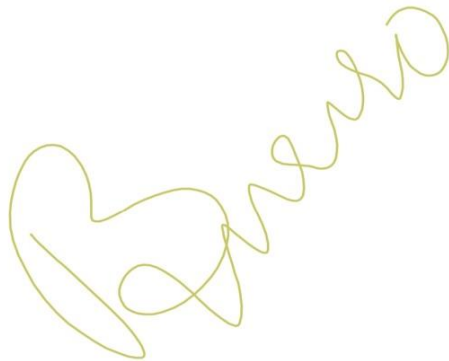
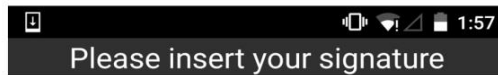
Available Sensors

Simplified view of a smart-phone board
MEMS & Sensors in red (scope of this report)

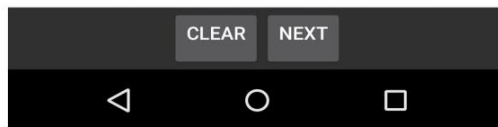


Our Solution – Hold & Sign

How a user holds & writes her own Name on the Screen

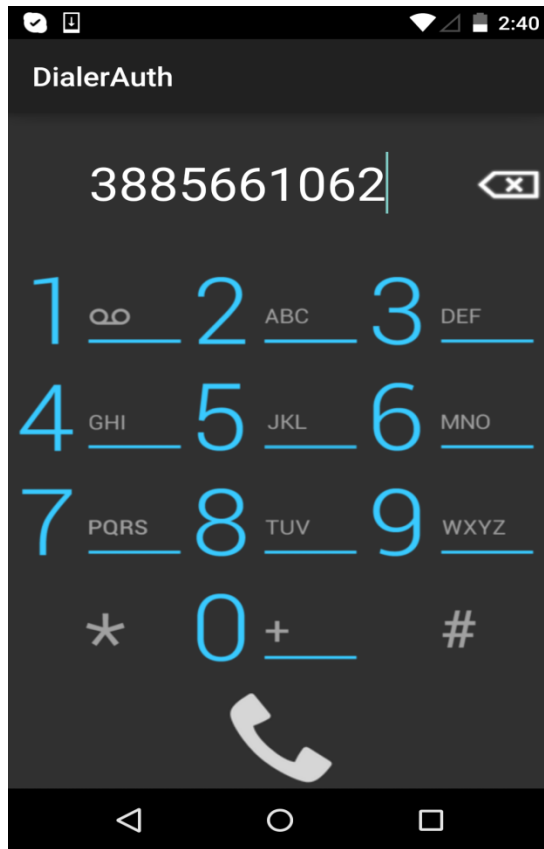


Attaullah Buriro, et al. "Hold and sign: A novel behavioral biometrics for smartphone user authentication." *"2016 IEEE security and privacy workshops (SPW)*. IEEE, 2016.



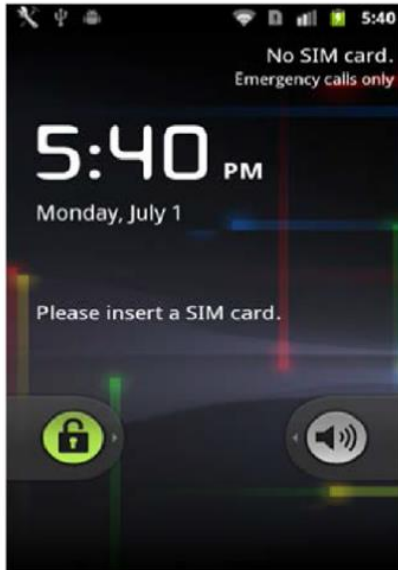
Our Solution – Hold & Dial

How a user holds her phone & dials her own number

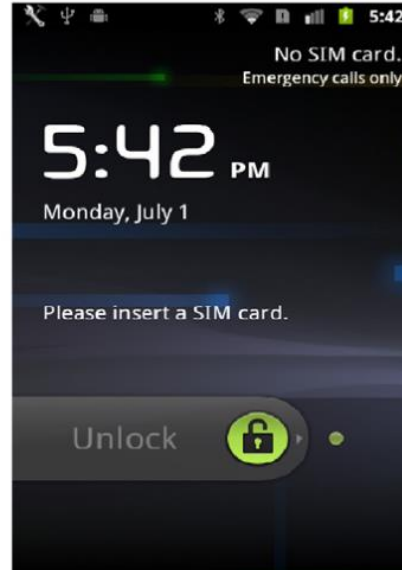


Attaullah Buriro, et al. "Dialerauth: A motion-assisted touch-based smartphone user authentication scheme." *Proceedings of the eighth ACM conference on data and application security and privacy*. 2018.

Our Solution – AnswerAuth



(a) Smartphone in its default state



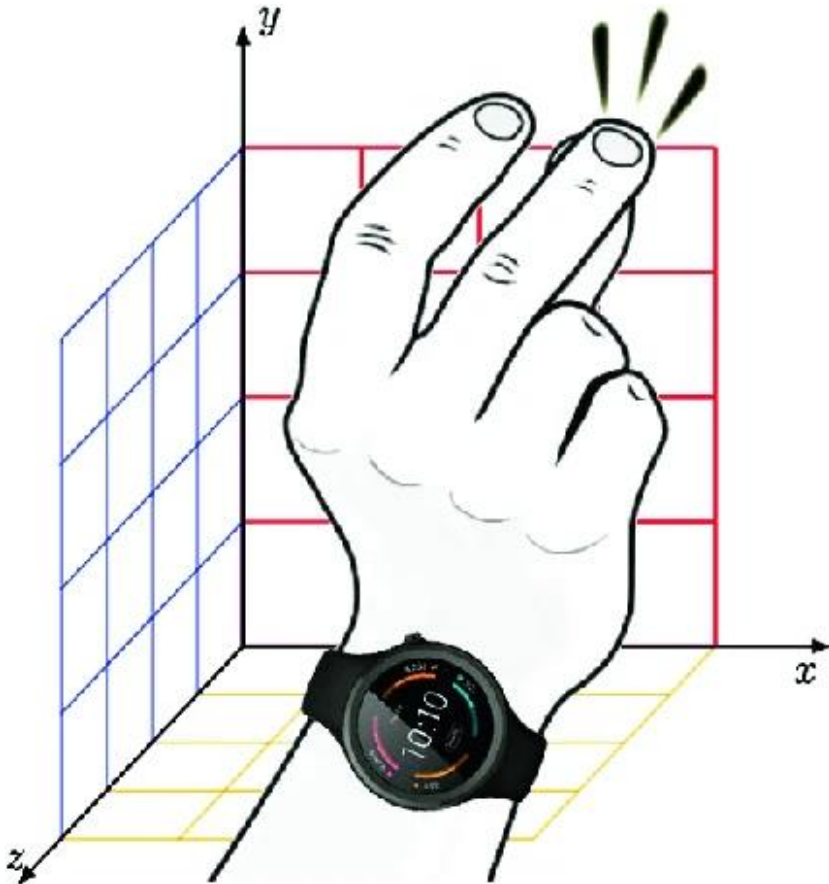
(b) Dragging of lock button



(c) Bringing phone towards ear [69]

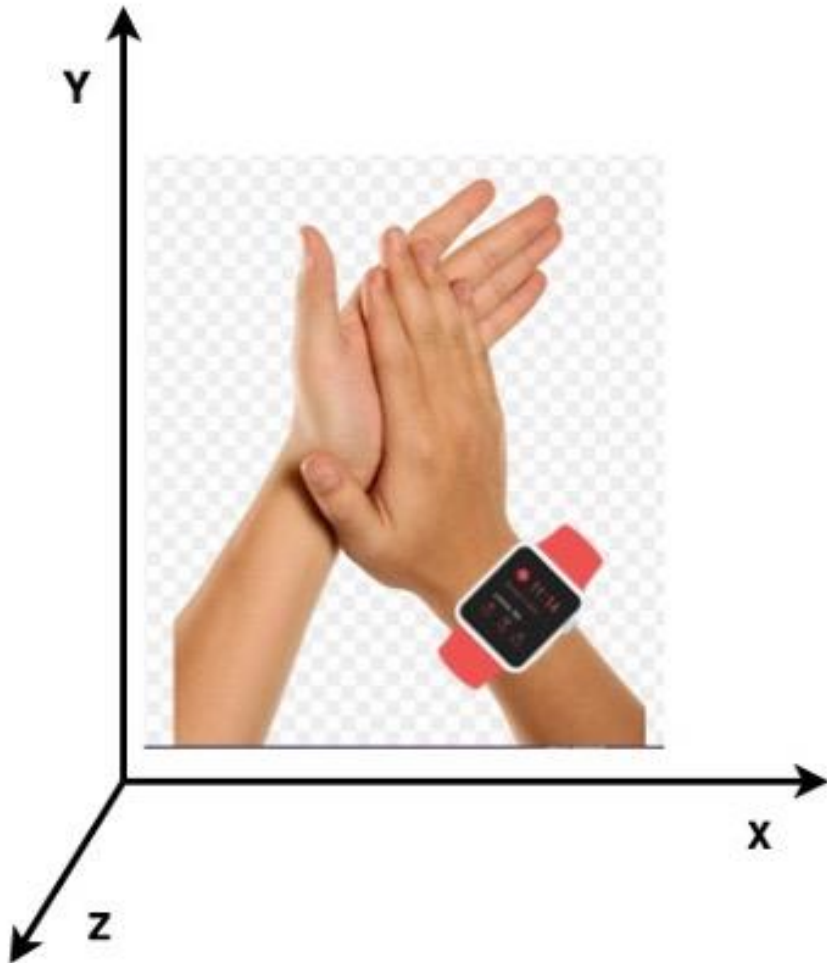
Attaullah Buriro, et al. "AnswerAuth: A bimodal behavioral biometric-based user authentication scheme for smartphones." *Journal of information security and applications* 44 (2019): 89-103.

Our Solution - SnapAuth



Attaullah Buriro, et al. "SnapAuth: a gesture-based unobtrusive smartwatch user authentication scheme." *International Workshop on Emerging Technologies for Authorization and Authentication*. Springer, Cham, 2018.

Our Solution - ClapAuth

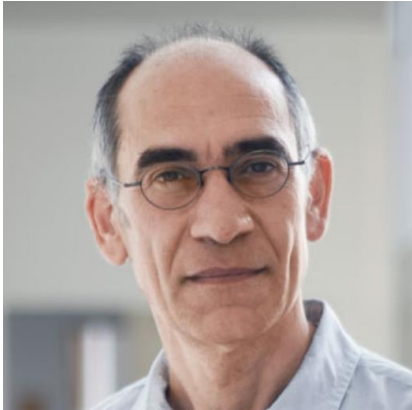


Attaullah Buriro, et al. "ClapAuth: A Gesture-based User-friendly Authentication Scheme to Access a Secure Infrastructure". *International Workshop on Emerging Technologies for Authorization and Authentication*. Springer, Cham, 2022.

Conclusions

- The use of behavioral biometrics makes the solutions user-friendly, hardware-friendly and secure.
- User are not needed to remember complex passwords/patterns and could use the same gesture across multiple platforms.
- Behavioral biometrics has been considered to provide physical security as well.

Aknowledgment



- All the participants

Thanks!

Questions: aburiro@unibz.it