Impact of Globalisation on Data Security – Authentication Issues

University of Pardubice
Faculty of Economics and Administration

Authors: **doc. Ing. Miloslav Hub, Ph.D.**
Ing. Kateřina Příhodová

Pardubice 2020

Contents

- Introduction
- Information security
- Biometric authentication
- Knowledge authentication
- Conclusions

This paper aims to identify and describe the impact of globalisation on selected types of authentication.

Introduction

- Globalisation has brought people many new opportunities, services and benefits.
- Globalisation has created ways in which dangerous and harmful events can spread rapidly.
- Economic risks, Geopolitical risks, Environmental risks, Societal risks, **Technological risks.**
- Technological risks (online data and **information security**, critical information infrastructure breakdown, threats from new technologies).

Information security

- The basic requirements for secure information are :
  - **Confidentiality,**
  - Integrity,
  - Availability.
- Confidentiality can be done by subject authentication.
- There are different types of authentication:
  - Knowledge authentication (password, PIN),
  - Authentication using an authentication object (magnetic card),
  - Biometric authentication (fingerprint, iris, walking).

Biometric authentication

- Biometric authentication is often considered synonymous with biometric recognition.
- Definition: *“biometrics automated recognition of individuals based on their biological and behavioural characteristics“.*
- *Biological characteristics (e.g.fingerprint, face, iris,* ***hand geometry****).*
- *Behavioural characteristics (e.g. walking, signature, the dynamics of typing on the keyboard).*

Hand base biometric systems (1)

- Efforts to improve the reliability of hand-based biometric systems => use the infrared part of the electromagnetic spectrum => Thermogram.
- Thermograms advantages:
  - complexity of imitating an uneven temperature map of the body or the ability to detect liveliness
  - check whether a person has a fever - Elevated temperature is one of the hallmarks of infectious diseases such as COV-19, and this pandemic already has a global dimension.

Hand base biometric systems (2)

- Given the current global threats, such as information security and the worldwide spread of infectious diseases, it is proposed the use of hand-based biometric recognition using multispectral images.
- Multispectral images will be created using an image from the visible part of the electromagnetic spectrum and an infrared image.

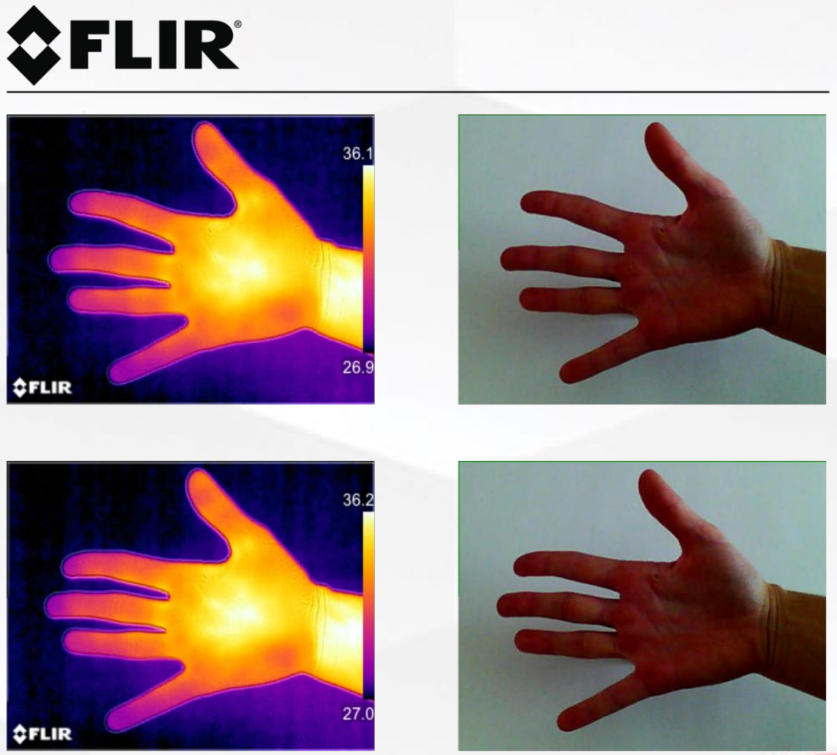

Figure: Multispectral images - hand

Knowledge authentication (1)

- Our research aims to analyse the long-term trend of choice of passwords by end-users and to discuss the effects of global social trends on this trend.

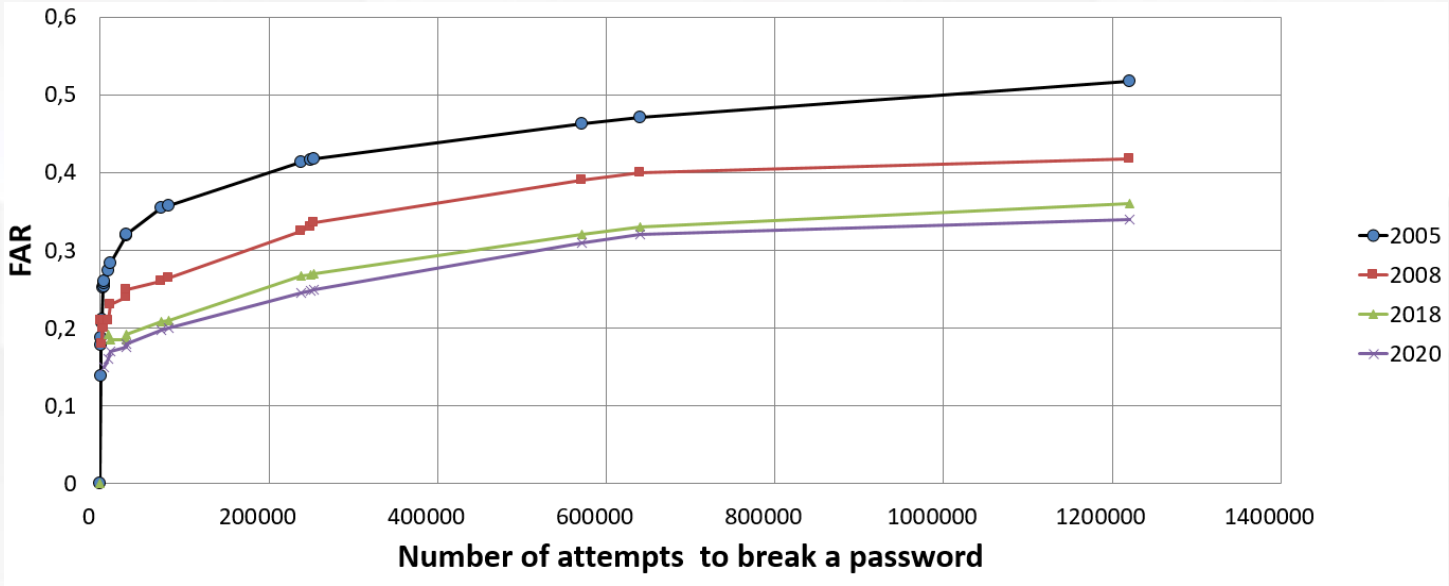

Figure: Security of passwords collected in periods 2005, 2008, 2018, and 2020.

Knowledge authentication (2)

- The correlation between the occurrence of individual letters in passwords and Czech and English languages.

Year	Passwords-Czech	Passwords-English
2005	0.780	0.624
2008	0.625	0.687
2018	0.598	0.712
2020	0.612	0.723

Table: Correlation between the occurrence of individual letters in passwords and selected languages (Kendall Tau)

Conclusions

- Impact of globalisation on data security:
- Hand-based biometric authentication.
  - Increasing security risks on a global scale => efforts to improve the reliability of hand-based biometric systems.
  - Designing the use of multispectral images of the hand.
- Password-based knowledge authentication.
  - Globalisation affects end-user language range and therefore the size of the set of candidate passwords from which a potential attacker must look for the appropriate password.

References

[1] Helbing, D. (2013). Globally networked risks and how to respond. Nature, 497(7447), 51-59.

[2] Wayman, J. (2003). A Definition of “Biometrics”. Collected works 1997-2000. U.S. National Biometric Test Center. San José State University. 20-23.

[3] Unar, J.A., Seng, W., Abbasi, A. (2014). A review of biometric technology along with trends and prospects. Pattern Recognition., 47(8), 2673-2688.

Thank you for your attention