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Master's Dissertation

Privacy in the Internet of Things: Fostering User Empowerment through Digital Literacy

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Introduction

Internet of Things (IoT) devices are everywhere. These devices create new ways of collecting and process personal data from users and non-users. Most end users are not even aware or have little control over the information that is being collected by these systems.
This work takes an holistic approach to this problem by doing:

- Systematic literature review;
- A survey;
- A mobile application.

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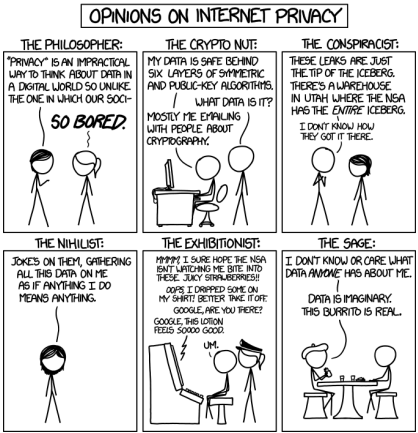
What is privacy?



$$\text{Privacy} \neq \text{Security}$$

Literature Approaches

- Blockchain;
- AI;
- Legislation;
- Framework;
- Privacy notices.

State of the Art

There are two main ways to provide privacy in IoT systems, through security or providing in some way user awareness like the in the case of using privacy notices, other ways like through legislation or with the creation/usage of a framework or architecture that provides privacy mainly fall into one these two categories.

Survey

86 Questions

- General knowledge and attitudes towards privacy
- Disposition for sharing personal information
- Privacy concerns
- Current online habits and practices
- Profile identification
- Knowledge and habits regarding the Internet of Things
- Demographic data

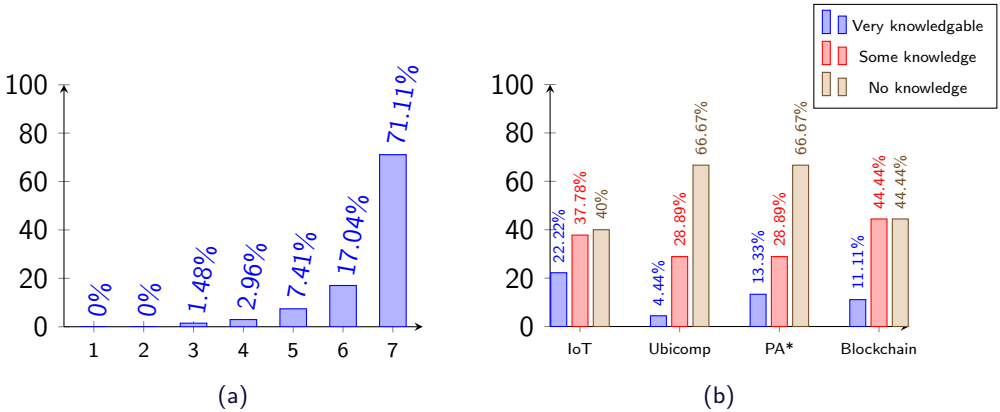


Figure 1: Participant responses regarding: (a) privacy importance and (b) IT knowledge.

*PA - Privacy Assistant

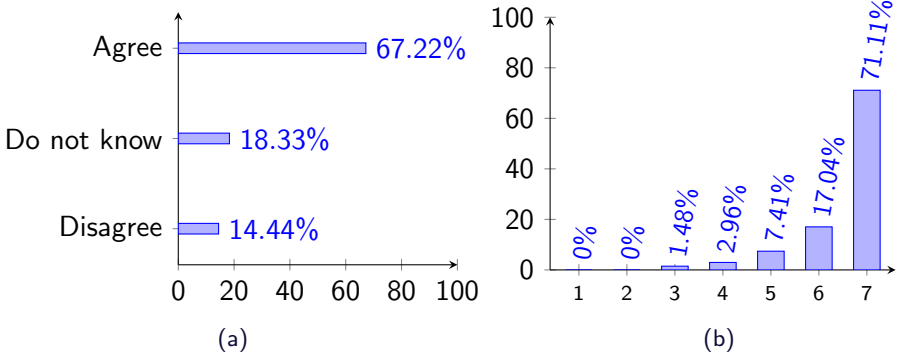


Figure 2: Participant responses regarding: (a) willingness to read privacy notices and (b) IoT usage.

Application

What can the application do?

- Show the geolocation of the IoT devices;
- Information about the devices, like category, collection purpose, stored time, owner, etc.;
- Information about IoT privacy;
- Addition and editing of device's information.

Demonstration

Future Work

- Privacy literacy in IoT systems;
- Application of privacy in the design/development of IoT systems;
- Interoperability standards;
- User-centric approaches to IoT privacy.

Conclusion

This work contributed to the overall body of research by compiling and reviewing other works with the perspective of privacy as a distinct subject matter rather than an extension of security, as many publications imply. The survey conducted on the perception of individuals on privacy in IoT systems portrays the majority viewpoint of portuguese people, since 60% of participants were portuguese. Additionally, a mobile application was developed and tested revealing that it performs as it was initially designed and envisioned since it reaches its purpose on its own without having to rely on additional platforms.

Questions and Comments

Thank you for your attention. Any questions?