Master's Thesis Preparation

Empowering Users' Privacy Rights in the Internet of Things

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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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Privacy

What is privacy?

Figure 1: Privacy history [1]

Privacy $\neq$ Security

Internet of Things

Figure 2: Mark Weiser [2]

Figure 3: Kevin Ashton [3]

Privacy Paradox

What is it?

Why even worry about privacy?

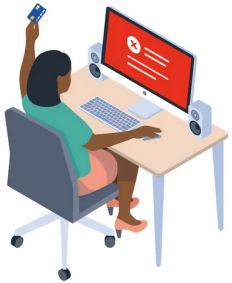

Figure 4: How much privacy are we willing to give up online? [4]

Differential Privacy

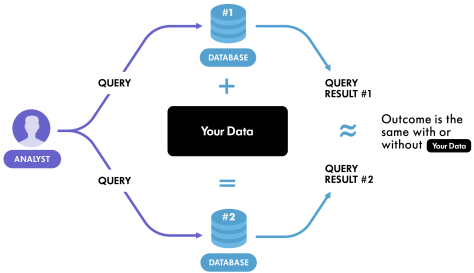

Figure 5: Differential Privacy [5]

Literature Approaches

- User awareness;
- Privacy through security;
- Framework proposals;
- Blockchain;

- Interactive theatre experience Skirpan et al. [6]

Literature Approaches

- User awareness;
- Privacy through security;
- Framework proposals;
- Blockchain;

- Communication strategy for a remote-control system
  Sun et al. [7]

Literature Approaches

- User awareness;
- Privacy through security;
- Framework proposals;
- Blockchain;

- Domain-specific ontology for modeling IoT security and privacy policies
  Opara et al. [8]

Literature Approaches

- User awareness;
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- Blockchain;

- Software stack that combines peer-to-peer file sharing with blockchain smart contracts Ali et al. [9]

Privacy Assistants

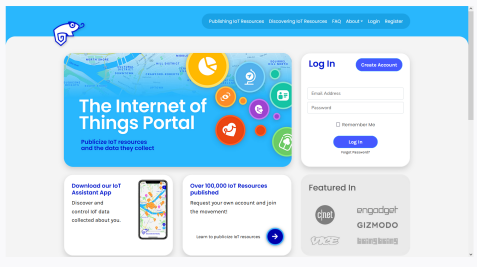

Figure 6: Internet of Things Portal [10]

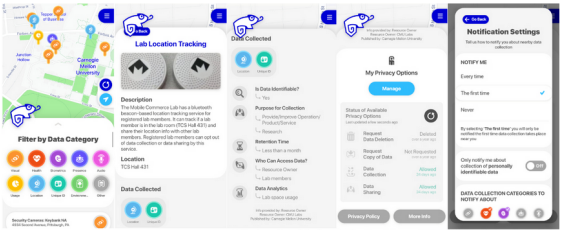

Figure 7: Internet of Things Assistant [11]

Research Questions

- **Phase 1:**
  - **RQ1:** What approaches are being considered for privacy issues in IoT in the currently available literature?
  - **RQ2:** What are user perceptions on online privacy?
- **Phase 2:**
  - **RQ3:** How to empower users to protect their privacy rights?
  - **RQ4:** What issues are prevalent in IoT that make it difficult to address privacy and security problems?

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Survey

92 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

amazon mechanical turk

Application

Will be composed of the following things:

- Show the geolocation of the IoT devices;
- What type of device it is;
- What type of data is being collect by the device;
- Insert IoT devices and associated information about them.

Future Work

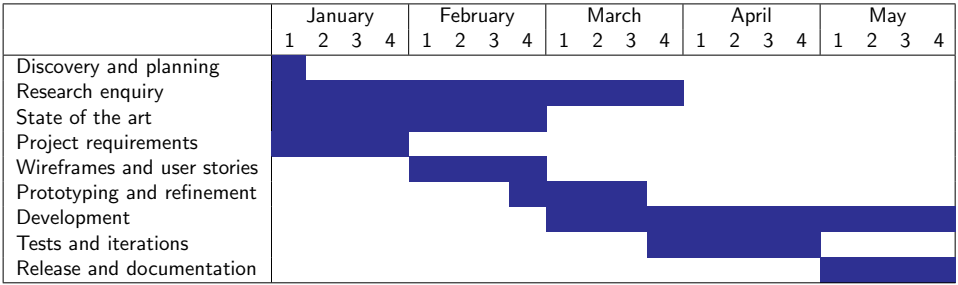

Table 1: Gantt chart showing project timeline

Conclusion

This project aims to do an exploratory analysis of privacy in IoT systems. It proposes a survey to better understand user's knowledge on this subject and an application that aims to create more users awareness and better inform about their environment, as well as the IoT devices that inhabit it and how they can respond accordingly.

Questions and Comments

Thank you for your attention. Any questions?

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