SmartExit

Facilitating Optimal Containment and Exit Strategies with Minimal Disclosure Access Control and Tracking

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Outline

Project SmartExit

Project Data:

Title:	Facilitating optimal containment and exit strategies with minimal disclosure access control and tracking
Acronym:	SmartExit
Duration:	May-October 2020
Funding:	Fonds Nationale de Recherche Luxembourg

Project SmartExit

Background:

- Two types of IT solutions are most often mentioned during the current pandemic
- Contact tracing apps: use location tracing or proximity tracing to identify people likely to be infected
- Immunity passports: impose access control based on immunity to the virus
- Already too many proposed solutions (especially for CT apps)

Project SmartExit

Main idea:

- Look at IT solutions as elements of a deconfinement strategy
- Focus on requirements, modeling and analysis
- ...and not on the design and implementation of yet another app!

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- For immunity passports, we might actually propose a privacy-preserving protocol

Outline

Motivation

- **Covid-19** poses a number of serious threats
- At the same time, characterized by unusually large degree of scientific uncertainty:
  - no good models
  - little reliable data
  - very few definite results of medical studies
  - lack of unified methodology of data collection and analysis
  - a lot of info noise in the public space

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  - very few definite results of medical studies
  - lack of unified methodology of data collection and analysis
  - a lot of info noise in the public space
- Depending on where the authors come from, they focus on different requirements and arguments, and draw different conclusions

Motivation

- Computer scientists and IT specialists have a tendency to jump in and start programming a technical solution to what they think the problem is
- Different understanding of the goals and requirements by different communities
- Need for reflection and analysis in the broadest possible scope, in order to balance different needs

Motivation

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- Need for reflection and analysis in the broadest possible scope, in order to balance different needs
- Analysis: both **informal** and **formal**

Outline

Project Goals and Methodology

Main Goal:

To propose and analyse strategies for
effective and trustworthy exit from the lockdown

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Main Goal:

To propose and analyse strategies for
effective and trustworthy containment of the epidemic

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Technically, the focus of the project is on minimal disclosure protocols supporting epidemic effectiveness, economic functionality, and (to the best possible degree) privacy, unlinkability and GDPR compliance.

Project Goals and Methodology

The analysis takes into account three essential factors:

- **Effectiveness:** the solution must hold the promise of containing the spread of the disease to the best possible extent. Moreover, it should minimize the impact of the epidemic on the risk groups (e.g., the elderly) and medical personnel

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- **Pareto-optimal privacy:** while it might be necessary to waive users' privacy to contain the epidemic in the short term, we will look for mechanisms that impact it to the least possible extent

Project Goals and Methodology

Planned tasks:

1. Survey of existing solutions for access-control based on immunity and contact tracing apps
2. Passport-based access control: design and demo
3. Formal analysis of access control-based strategies
4. Preliminary analysis of contact-tracing apps and advice to Luxembourg government and ministries

Note: the situation is very dynamic and at this point the focus is shifting towards analysis of CT apps

Outline

Immunity Passports

Objectives:

- Access control based on the individual COVID-19 immunity and/or infection status
- Concerns access to public spaces, border crossings, or critical areas such as hospitals, retirement homes, etc.
- Mechanism based on passports, ID cards, smart cards, or even smartphone apps
- Secondary criteria: low cost, interoperability, and minimal changes to support infrastructure

Immunity Passports

Tasks:

- Propose a mechanism
- Produce a prototype implementation
- Present a preliminary formal analysis of the proposed solution

Outline

Summary

- **Covid-19** characteristics: serious threats, little knowledge
- Public space is full of subjective opinions and biased inferences
- Technical solutions are needed...
- ...but they must be well understood in the context of: goals they try to achieve, criteria to measure their success, and constraints they must obey
- Situation is very dynamic and the focus needs to be adapted at runtime


Questions?