Designing for Pragmatists and Fundamentalists:

Privacy Concerns and Attitudes

on the Internet of Things

PUC Minas

LABORATÓRIO DE SISTEMAS DISTRIBUÍDOS

The Rise of the INTERNET OF THINGS

Internet of Things (IoT)

A two-sided technology

UTILITY | RISK

Privacy

"The right to be let alone"

"The right to exert control over your personal information"

Privacy Attitude Profiles

I'm not worried about sharing information or about how it is used

Unconcerned

I'm too much worried about sharing information or about how it is used

Fundamentalist

I care about the risk-benefit trade-off in information sharing

Pragmatist

Westin's and Sheehan's privacy typology

Research Questions

Understanding

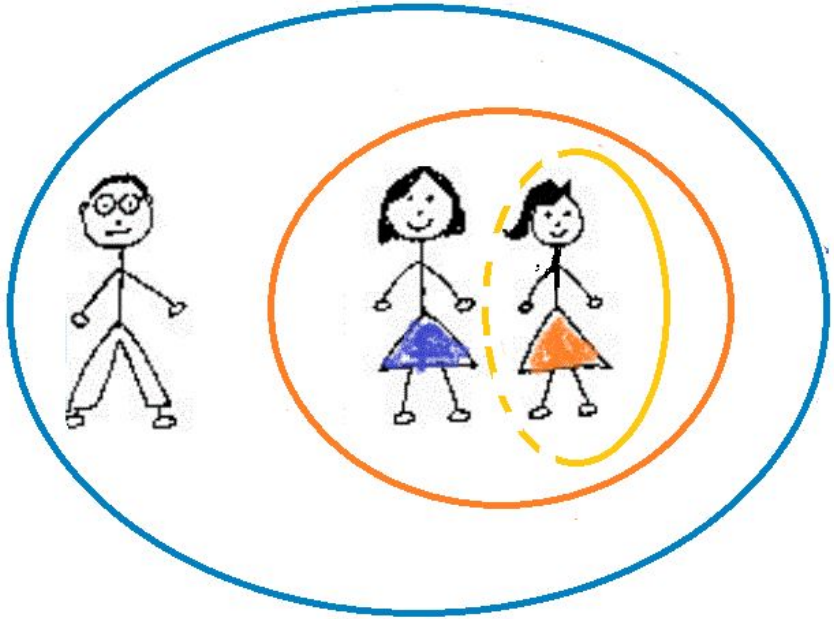
1. what is the occurrence and characteristics of fundamentalist, pragmatist and unconcerned users in IoT systems

2. which components of IoT systems that can cause more privacy concern

3. how do users perceive the risk-utility trade-off posed by features of IoT systems

Privacy Frameworks

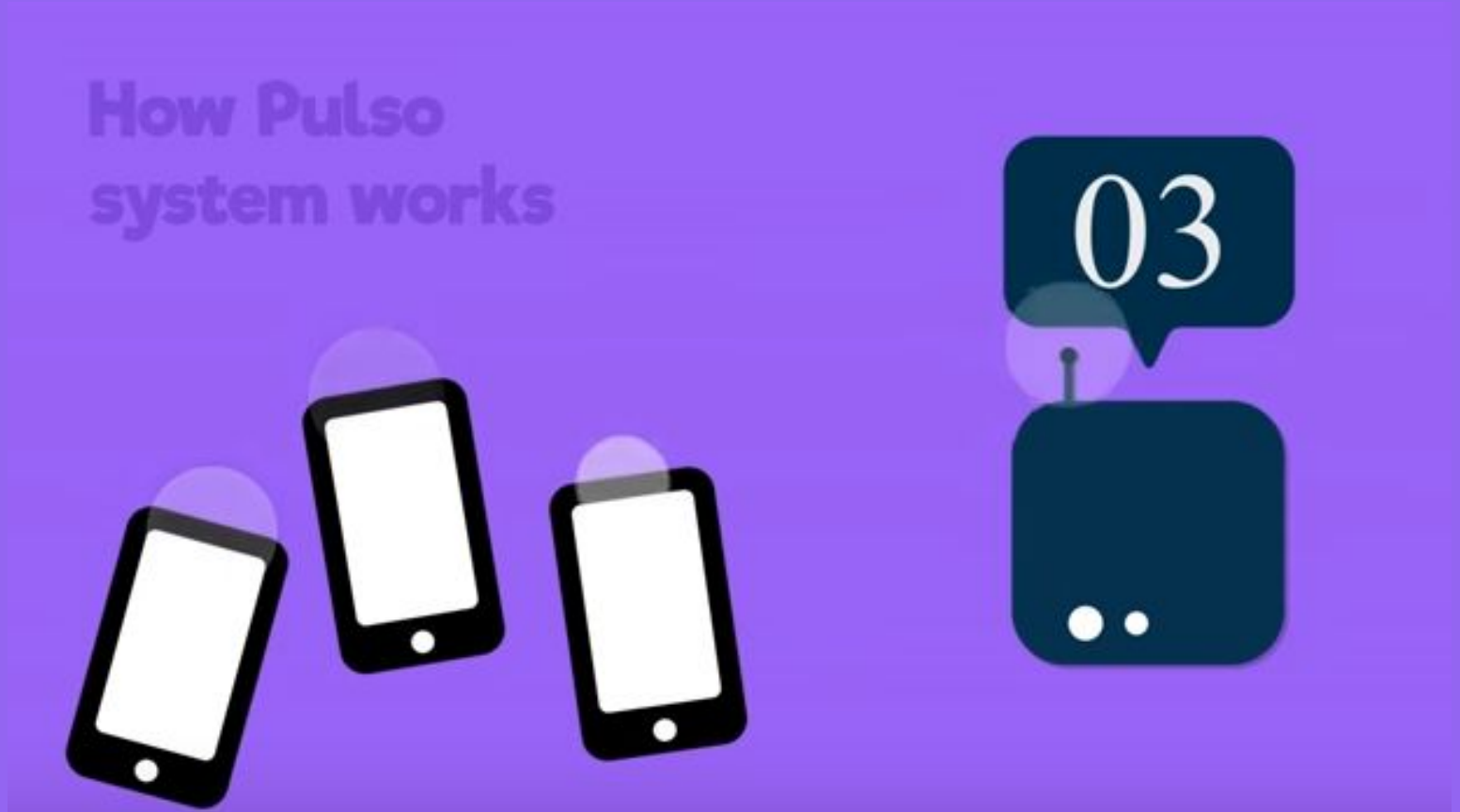
“Face Keeping” and “Privacy Management Theory”



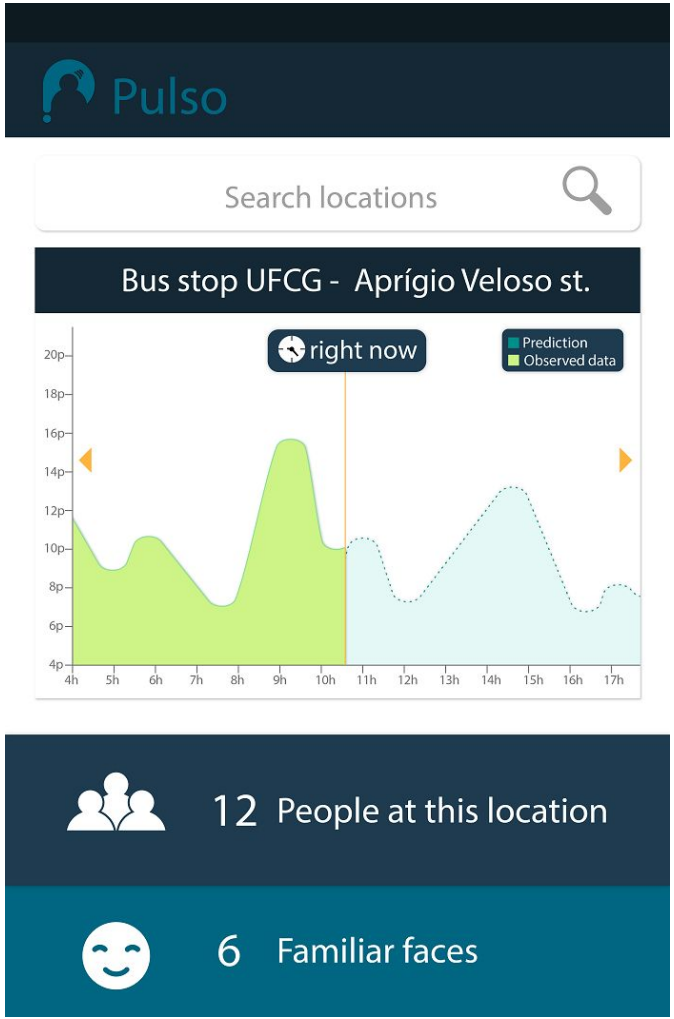
Our Privacy Dimensions for the Internet of Things

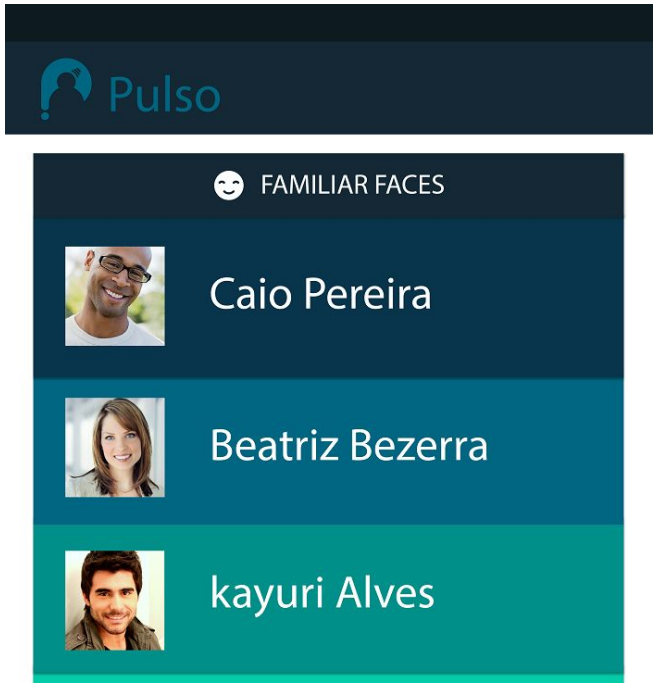
Privacy is **context** dependent

Scenario #1: Pulso System

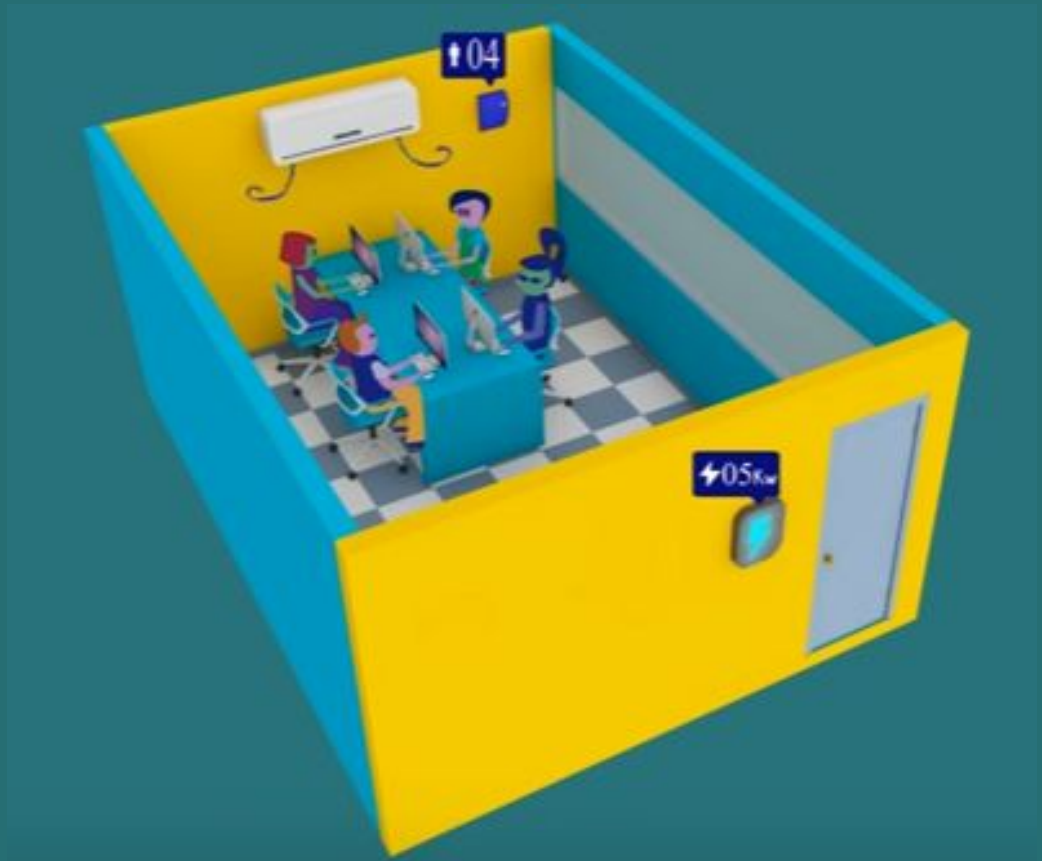


Pulso user interface

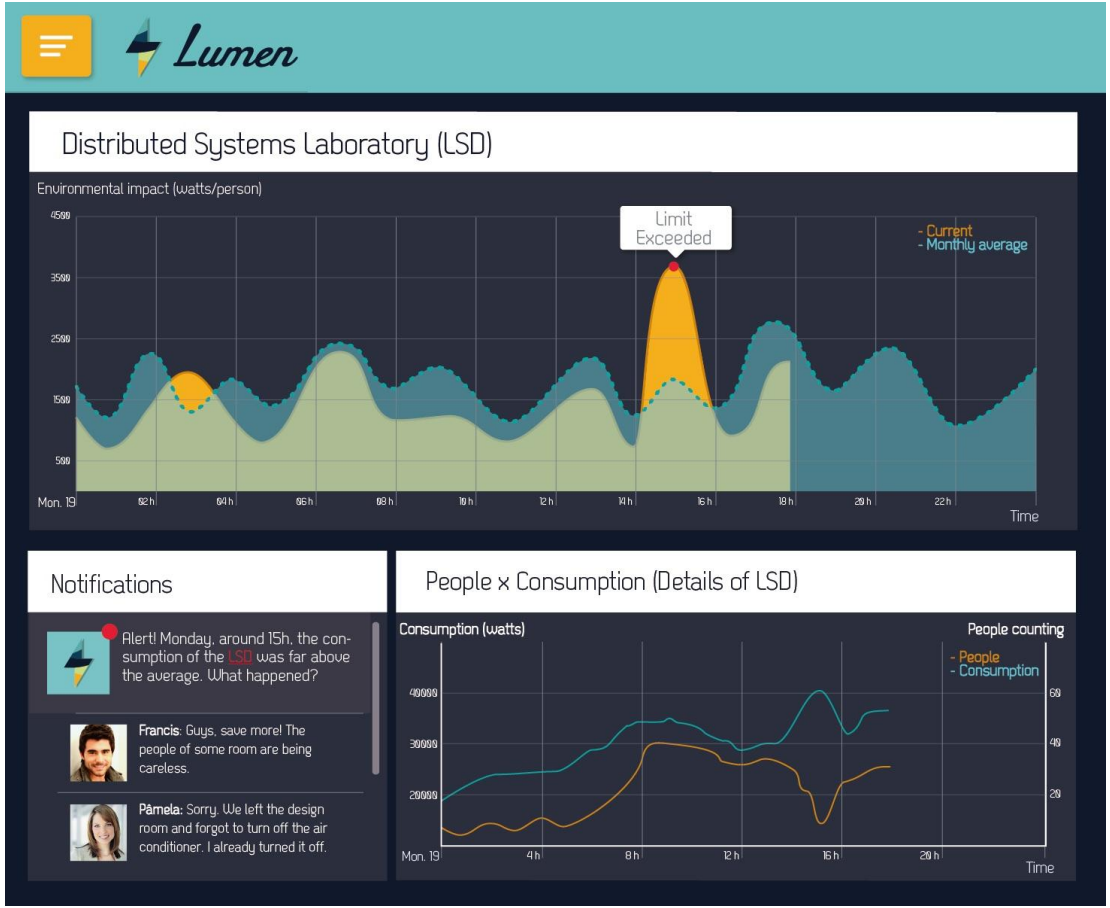


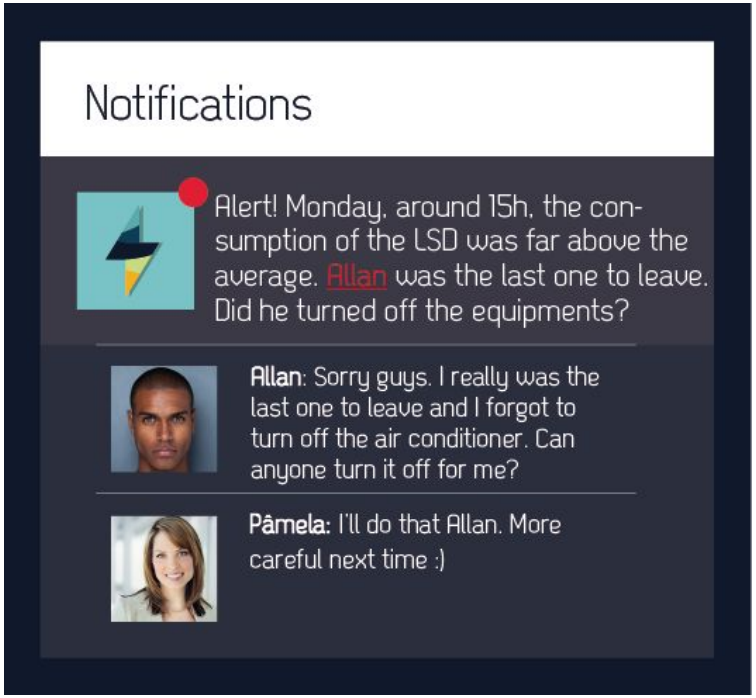


Scenario #2: Lumen System



Lumen user interface



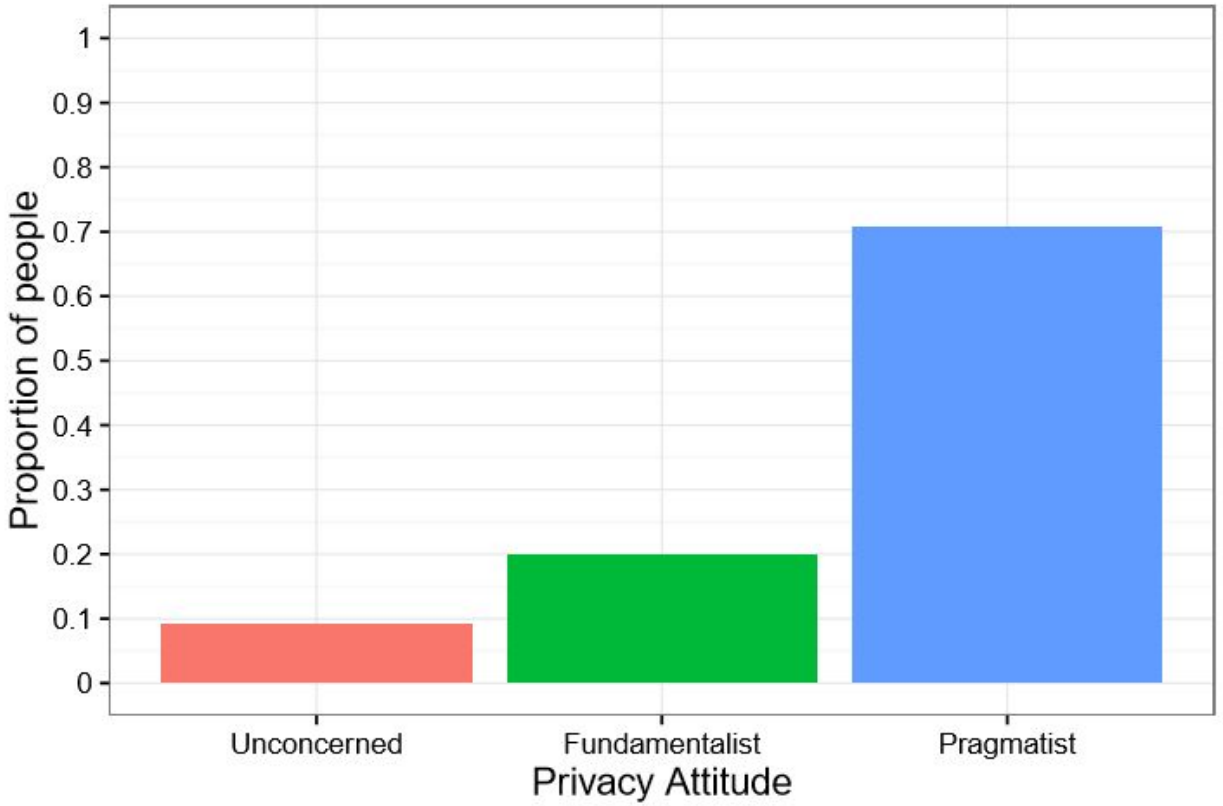


Materials and Methods

- Survey instrument
  - “Face Keeping” and “Information Management Theory”
  - Approx. 23 5-point Likert scale questions
  - Almost 10 minutes to answer

- Sample of 113 individuals in Campina Grande, Brazil
  - 58 answered about the Pulso system in a transportation hub
  - 55 answered about the Lumen system in computer science research labs and in a software development company

Privacy Attitude Profiles



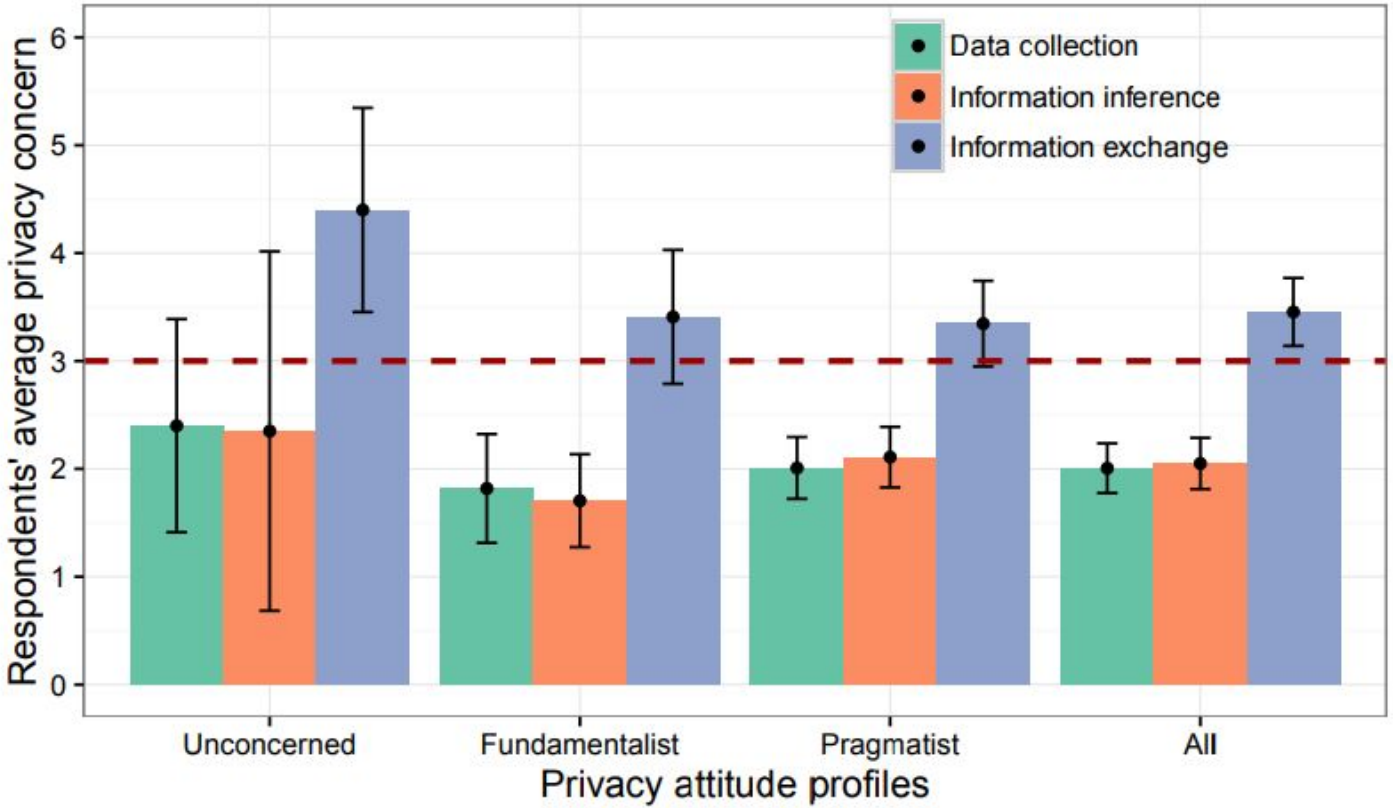
The Risk-Utility Tradeoff

Privacy attitude profiles	Pulso system	Lumen system
Unconcerned	-0.15	-0.37
Fundamentalists	-0.76*	-0.45
Pragmatist	0.03	-0.57**
All together	-0.16	-0.50**

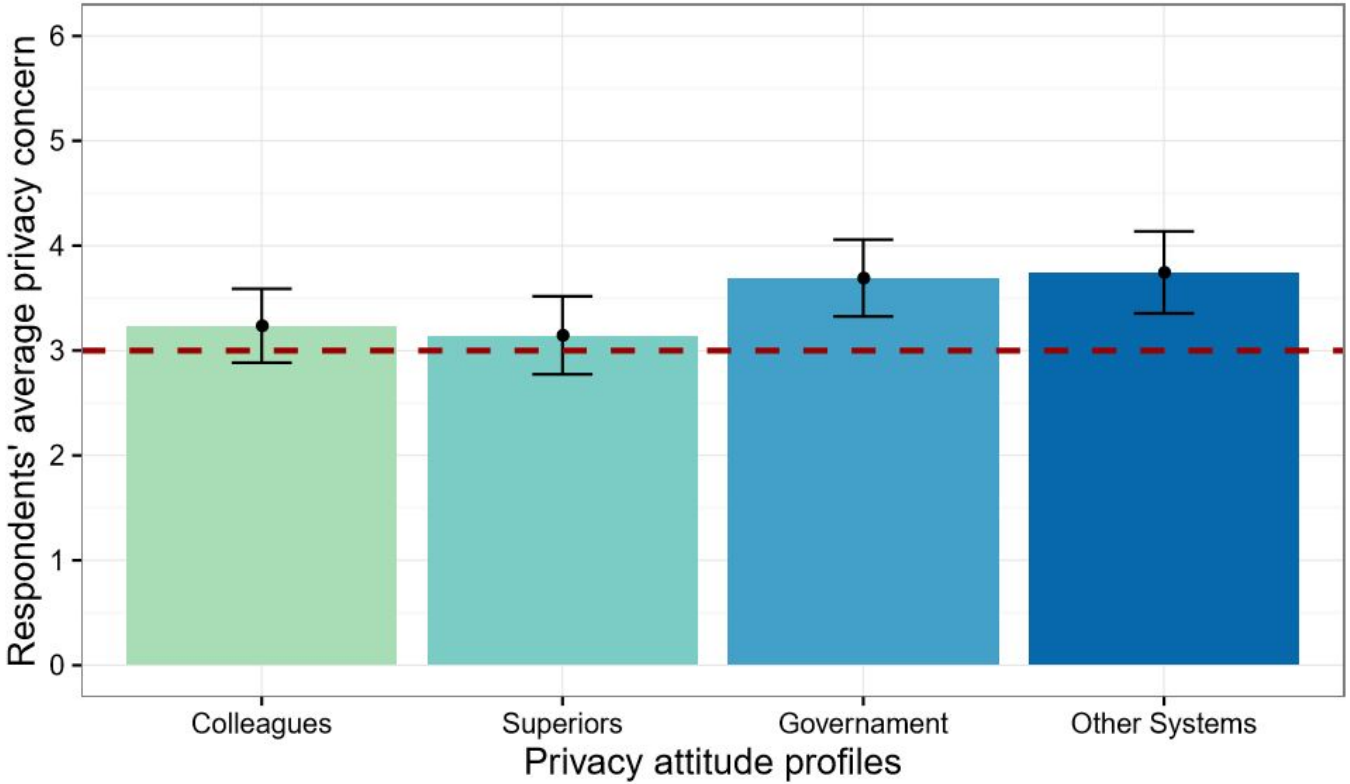
Significance codes: *p-value $<$ 0.05, **p-value$<$0.001.

Fundamentalists: the risk is 4.82-0.75(utility)
Pragmatist: the risk is 4.74-0.52(utility)
All together: the risk is 4.75-0.52(utility)

The Exchange of Information with Third Parties



Government and Other Systems



Take Home Message

Heuristics to cope with privacy concerns in IoT

1. Let users know what information the system has about them
2. Make clear the usefulness of the data for each feature
3. Make the exchange of data with third parties explicit and configurable
4. Conduct empirical assessments of privacy

Current and Future Work

- We are expanding our sample of participants

- We are using our instruments to
  1. investigate privacy perception, concerns, and attitudes in a cross-country perspective
  2. investigate privacy dimensions that are particular to IoT systems
  3. study the privacy paradox

Thank you!

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