Some Issues for Semantic-Enabled Privacy Protection Policies in the Ambient Networks

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Outline I

1. Unsolvable Issues
2. Privacy Protection on the Web
3. Privacy Protection in the Ambient Networks
4. Challenges
Need to be Clarified!

Please tell me *where/what/why/how* are possible privacy invasions in the ambient networks or other similar sensor, ubiquitous, pervasive, or invisible computing networks
Need to be Clarified!

- Please tell me where/what/why/how are possible privacy invasions in the ambient networks or other similar sensor, ubiquitous, pervasive, or invisible computing networks.

- Then, I will tell you how to represent and enforce the associated semantic-enabled privacy protection languages, policies, and systems in the ambient networks.
Need to be Clarified!

- Please tell me *where/what/why/how* are possible privacy invasions in the ambient networks or other similar sensor, ubiquitous, pervasive, or invisible computing networks.

- Then, I will tell you how to represent and enforce the associated *semantic-enabled* privacy protection languages, policies, and systems in the ambient networks.

- Finally, I will demonstrate how to proceed auditing and verification of semantic-enable privacy protection policies and systems compliant to the real world’s privacy laws or regulations.
Privacy Protection on the Web

Privacy Protection on Web 1.0

- Privacy protection policy representation through natural language
- Static personal profile and digital traces collection
- Information disclosure policies and mechanisms are embedded in a data model, such as relational database.
- Do the website’s privacy protection mechanisms comply with its policy announcement? People don’t know!
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Privacy Protection on Web 2.0

- P3P/APPEL provides information disclosure’s opt-in/opt-out and negotiation mechanisms
- More challenging to protect a variety of dynamic digital traces but not so many physical traces
- Do the website’s privacy protection mechanisms comply with its policy announcement? People don’t know either!
Privacy Protection on the Web (conti.)

Privacy Protection on Web 3.0

- We have a separation of privacy protection protection policies and mechanisms.
- Personal profile and digital traces are semantic-enabled data model.
- Automatic enforcement of the semantic-enabled privacy protection policies and systems.
- Do we have sound and complete semantic-enabled policies with respect to the privacy protection laws? I don’t think so!
- Auditing and verifying the compliance of privacy policies for privacy laws are still very hard! Why?
Privacy Protection for Web 1.0, Web 2.0, and Web 3.0

Semantic Web

Data User

Purpose Ontology

Role Ontology

Data Access Engine

Data Object Ontology

Record any access log

Ontology data model
Storing digital trace, transaction data and P3P ontology

Server

Communicate with APPEL

Client A3

P3P (OWL/RDF)

Web 2.0

Data access by Law

Government

Data Access by E-P3P

Department of Enterprise

Data Access by E-P3P

Enterprise

Database

Communicate with APPEL

Client A2

P3P (XML-Based)

Web 1.0

Data access by Law

Government

Data Access

Department of Enterprise

Direct Access

Enterprise

Communicate with user agreement

Client A1

Data access and transfer by enterprise contract

3rd party

Data Access by E-P3P

3rd party

Data Access by E-P3P

Enterprise

Database

Storing digital trace log, transaction data and P3P

Server

Communicate with APPEL

Client A2

P3P (XML-Based)
A Unifying Semantic REL
Computers will provide us the right information at the right time based on conditions of interest (COI)? But you don’t know my personal concern so it turns out to be conflicts of interest (COI)?
Privacy Protection for Ambient Networks

- Computers will provide *us* the right information at the right time based on conditions of interest (COI)? But you don’t know my personal concern so it turns out to be conflicts of interest (COI)?

- Furthermore, we are unaware of who/why/what/how our personal profiles, *physical traces*, and digital traces are collected and used, which means the privacy invasion is much more easy! Is that true, I think so.
Do you think people in the Ubicomp community seriously consider the privacy protection issues in the first place? I don’t think so. Maybe they think it is not so important or is not so urgent. The truth is, privacy protection issues are contrary to the Ubicomp system’s data collection and usage purposes.
Privacy Protection for Ambient Networks (conti.)

- Do you think people in the Ubicomp community seriously consider the privacy protection issues in the first place? I don’t think so. Maybe they think it is not so important or is not so urgent. The truth is, privacy protection issues are contrary to the Ubicomp system’s data collection and usage purposes.

- I would said your Ubicomp’s system does not possibly to know my concerns while collecting and using my own data!

- In fact, resolving the problem of semantic-enabled privacy protection policies and systems in the ambient networks is almost impossible! Why?

- Conclusion: The ambient networks or other similar networks and systems cannot be possibly widely deployed in the real world for serving human activities!
Semantic-Enabled Privacy Protection in the Ambient Networks revised from [3]
Challenges
Semantic-Enabled Privacy Protection in the Ambient Networks

- How to exploit the semantic-enabled policy languages for privacy protection in the ambient networks?
- How to design/implement the semantic-enabled language, policies, and systems for the ambient networks?
- How to demonstrate the semantic-enabled of privacy protection systems in the ambient networks?
Challenges (conti.)
Semantic-Enabled Privacy Protection in the Ambient Networks

- Can we also apply formal semantic P3P/EPAL to the ambient networks? Yes/No!
- How to construct a formal semantics model on P3P/EPAL for the ambient networks?
- How to exploit the semantic enforcement of privacy protection policies for the ambient networks?
- How to implement a semantic-enabled privacy protection system for the ambient networks?
References I


References II

J. D. Tygar.
Privacy in sensor webs and distributed information systems.