

Professional Issues in Computing

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Ethics and the Semantic Web

- What is the Semantic Web?
- Ethical issues:
 - Accuracy of information in “Information”
Technology: provenance and authenticity
 - Information “loss”
 - Degradable media
 - Programmers forgetting how data is packaged
- Search Engine “grooming”
- Information and resource re-use
- Informed consent

What is the Semantic Web?

- What does the Semantic Web mean to you?

What is the Semantic Web?

- Tim Berners-Lee's vision of the Semantic Web...
- ... and more recently

Data, metadata, information, and knowledge

- Existing problems with data and information:
 - Degradable media
 - provenance and authenticity
 - What does this program do?
- Search engine “grooming”
 - and spam
 - and PageRank and related algorithms
- Bluejacking and bluesnarfing

Berners-Lee's example

- Lucy accesses her mom's medical history from a handheld device via an agent

Trust

- Who do you trust in 'real life' and why?
- How do you know what to trust on the Web?

Trust

- Informally, “*trust is the belief that data is accurate, or fulfils criteria which the consumer believes it should.*” Trust on the Semantic Web

Trust

- From Trust on the Semantic Web:
 - Trust is subjective, so Trust Authority is not likely to be valid approach
 - Trust is important in actions that we cannot monitor
 - Trust is contextual - how will our actions be affected by our agent's actions?
 - Trust is used in situations in which we are uncertain or ignorant
 - Trust may be or may need to be reciprocal (e.g. in situations that require co-operation)

Blind Trust

- Trusting (or distrusting) the other party even though the opposite should hold!
 - Telling a secret to someone known to be a gossip
 - E.g., giving a service provider more personal info than is needed for a transaction
 - Coercion: if the service will not be provided if you refuse to give all requested personal information
 - Not being completely honest with, e.g., your doctor, lawyer
 - Paranoia

Trust and Services

- The nature of most e-Commerce is to pay for goods or a service before the goods or service is received
 - Compare with 'real' commerce!
- Sometimes, service provider may request personal information (as part of registration) even just to browse on-line
 - Compare with walking into a shop/store and browsing

When do we trust?

- Possibly, when the cost to us is not too high, even if the partner 'defects' (Prisoners Dilemma)
- Sometimes, we are coerced into a situation of trust because the cost of losing the service is greater than the perceived cost of distrusting the 'partner'
- How do we choose a restaurant in an unfamiliar city?

Why Phishing Works

- Because we are used to dealing with (have built up a trustful relationship with) the legitimate service provider, and we do not recognise an impersonator.

Properties of Trust

- **Transitivity:** A trusts B, B trusts C, A can probably trust C too, though probably not as much as B does (e.g., recommender systems)
- **Composability:** A may know many people who trust C to varying degrees. These may be composed into a single value
- **Personalisation:** Trust is personal, so A trusts, B, B trusts C, A can decide to not trust C, despite transitivity
- **Asymmetry:** Just because A trusts B, B does not have to trust A!

Trust and Web Services

- Trust on the Semantic Web also describes why people trust web sites, recommender systems, and distributed systems:
 - Perceived quality of layout and design
 - Belief that the entity is not malicious
 - Quality of recommendations: i.e., if user agrees with the recommendation, then the system will be trusted

Implications for the Semantic Web

- Information and resource re-use
 - Can the information/resource be trusted?
- Informed Consent on the Semantic Web
 - What information about me does the SW need to allow me to consume the information/use (or re-use) the resource, and how can my agent know when to trust the provider? When should I be informed that personal information needs to be disclosed (if every time, then where is the benefit of the Semantic Web?)

Implications...

- We 'visit' Web sites (on the ordinary Web) to establish *prima facie* levels of trust, but can an autonomous agent do the same?
 - Data (its accuracy, credibility, trustworthiness) needs to be assessed before it is processed
 - Will autonomous agents be fooled by spam and phishing attacks, and perhaps other problems/attacks created by our removal from the site of interaction?

Trust and Security

- “The security, trust, information quality and privacy issues arising from the vision of the Semantic Web as a global information integration infrastructure are mainly unsolved.”

[Semantic Web: Trust and Security Resource Guide](#)

- <http://www.uncyclopedia.org>