Social Semantic Web

Defining personal information and relationships in the semantic web with XFN and FOAF

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- Two example approaches:
  - FOAF (Friend of a Friend)
  - XFN (XHTML Friends Network)
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Introduction

Background

- The semantic web research has mostly been focused on the description of documents and information
  - Not social relationships or personal information
- Social networking concept employed at hundreds of centralized services:
  - *Orkut*, *Friendster*, *Tribe*, *LinkedIn*, *GoFish*, *My Mates*...
  - Many are quite popular with millions of registered users
  - Inconvenient, shallow, incomplete and closed systems
    - Must sign up separately for each system (incomplete networks)
    - Identity split over multiple systems, not in one natural place (homepage/blog/etc.)
    - Privacy concerns & poor terms of service
- Blogrolls (and services utilizing them like Technorati, Feedster and blogilista.fi) already have links to contacts
  - But these links usually either have no social context or the context is not machine-understandable.

What is it?

- *Social semantic web* *a.k.a.* *semantic social network*
- No clear, agreed definition exists
  - "The social semantics of large net societies"
  - "Combination of content syndication and social networking"
- Born out of combining the *semantic web* and *social networking*
  - View taken in this presentation:
  - *Defining and creating machine-understandable information of people and relationships between them.*

Why do we need it?

Currently the core (slightly exaggerated) problem is:

- **Centralized social networking sites link identities but not content**
- **Blogs and blogrolls link content but not identities**

- Social semantic web aims to solve this discrepancy and bring personal and social information to the semantic web
- Demand is clear from the popularity of the centralized services alone
  - For example, IRC-galleria in Finland is among the most visited websites.
  - Blogs often inherently form social networks
- While online social relationships are less important than “real-life” ones, they are likely to increase in importance
- The lack of wildly successful business models (so far) does not diminish the importance of the concept
- Humans are, after all, social. It’s *all* about friendship, relationships and communities.
- Also in work life, social linking between projects, information and people could prove very valuable.

FOAF

Friend of a Friend - FOAF

- Technically an RDF/XML vocabulary
- Method for describing information about people, things they create and do and relationships between them.
- Focused more on the description of personal information, not relationships
- Split into five categories:
  - Basic information
  - Personal information
  - Online accounts and IM
  - Projects and groups
  - Documents and images
- Dozens of properties with many extensions

FOAF: Some of the most common personal properties

Foaf:person	A construct of a person. All the properties below are children to the person-property.
foaf:name **foaf:surname** **foaf:firstname**	Information of the person's name. Foaf:name is the full name of the person, while foaf:firstname and foaf:surname only provide the first and the family names of the person, respectively.
foaf:nick	Nickname of the person, e.g. "Bill"
foaf:homepage	Specifies a link to the individual's homepage.
foaf:phone	The person's phone number(s) in the tel: URI format. For example: "tel:+1-201-555-0123"
foaf:gender	Gender information; male or female.
foaf:knows	Relationship to another person; another foaf:person construct should specify the known person.
foaf:depiction	URL to an image of the person in question.

Eccentric FOAF properties & ontologies

foaf:geekCode	Textual representation of a person's Geek Code. Example: <foaf:geekCode> GED/J d-- s:++>: a-- C++(++++) ULU++ P+ L++ E---- W+(-) N+++ o+ K+++ w--- O- M+ V-- PS++>$ PE++>$ Y++ PGP++ t- 5+++ X++ R+++>$ tv+ b+ DI+++ D+++ G++++ e++ h r-- y++** </foaf:geekCode>
foaf:myersBriggs	Myers Briggs Type Indicator – a personality classification. Example: <foaf:myersBriggs>ESFP</foaf:myersBriggs>
foaf:tipjar	Describes means for payment and reward. Can include, for example, informal information ("Send me a postcard!") or links to e.g. PayPal
foaf:nearestAirport	The code for the airport that is closest to this person.
lang:reads **lang:writes** **lang:masters**	Specifies the language abilities of the person; what does he/she speak, write or master fluently.
Vegetarian	Ontology for specifying what kind of vegetarian one is; e.g. Ovo-lacto-vegetarian, vegan, omnivore etc.
foaf:dnaChecksum	DNA checksum of the person ("mostly a joke")

FOAF Basic Structure

- Foaf:person
  - “Root” for all personal information
  - All personal details under foaf:person
  - Contacts to other people are foaf:person-constructs under foaf:knows

```
<foaf:person>
        personal details
        <foaf:knows>
                <foaf:person>
                        personal details
                </foaf:person>
        </foaf:knows>
        <foaf:knows>
                <foaf:person>
                        personal details
                </foaf:person>
        </foaf:knows>
</foaf:person>
```

Example of a simple FOAF description

```
<rdf:RDF
      xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
      xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
      xmlns:foaf="http://xmlns.com/foaf/0.1/"
      xmlns:admin="http://webns.net/mvcb/">
<foaf:PersonalProfileDocument rdf:about="">
  <foaf:maker rdf:nodeID="me"/>
  <foaf:primaryTopic rdf:nodeID="me"/>
  <admin:generatorAgent rdf:resource="http://www.ldodds.com/foaf/foaf-a-matic"/>
  <admin:errorReportsTo rdf:resource="mailto:leigh@ldodds.com"/>
</foaf:PersonalProfileDocument>
<foaf:Person rdf:nodeID="me">
   <foaf:name>John Doe</foaf:name>
   <foaf:title>Mr</foaf:title>
   <foaf:givenname>John</foaf:givenname>
   <foaf:family_name>Doe</foaf:family_name>
   <foaf:nick>johnnie</foaf:nick>
   <foaf:mbox_sha1sum>d91d74ab037d6dee1ce0a29d12096d1b074fe014</foaf:mbox_sha1sum>
   <foaf:homepage rdf:resource="http://www.doe.com/john/"/>
   <foaf:depiction rdf:resource="http://www.doe.com/john/face.jpg"/></foaf:Person>
   <foaf:knows>
          <foaf:Person>
                   <foaf:name>Jane Doe</foaf:name>
                   <foaf:mbox_sha1sum>385c068a568ade2b8647ad3acd8f71f6f3e70b5d</foaf:mbox_sha1sum>
                   <rdfs:seeAlso rdf:resource="http://www.doe.com/jane"/>
          </foaf:Person>
   </foaf:knows>
</foaf:Person>
</rdf:RDF>
```

FOAF Discovery

- Not finalized
  - How to publish the profile is a subject of some ongoing discussion
- Assumed that user submits the address to foaf-profile to e.g. search engines
- De facto standard is to save the profile to a file called `foaf.rdf`
  - Specify a link from a web page under <HEAD>:

```
<HEAD>
  . . .
<link rel="meta" type="application/rdf+xml" title="FOAF" href="foaf.rdf" />
  . . .
</HEAD>
<BODY>
  . . .
```

Privacy: E-Mail information

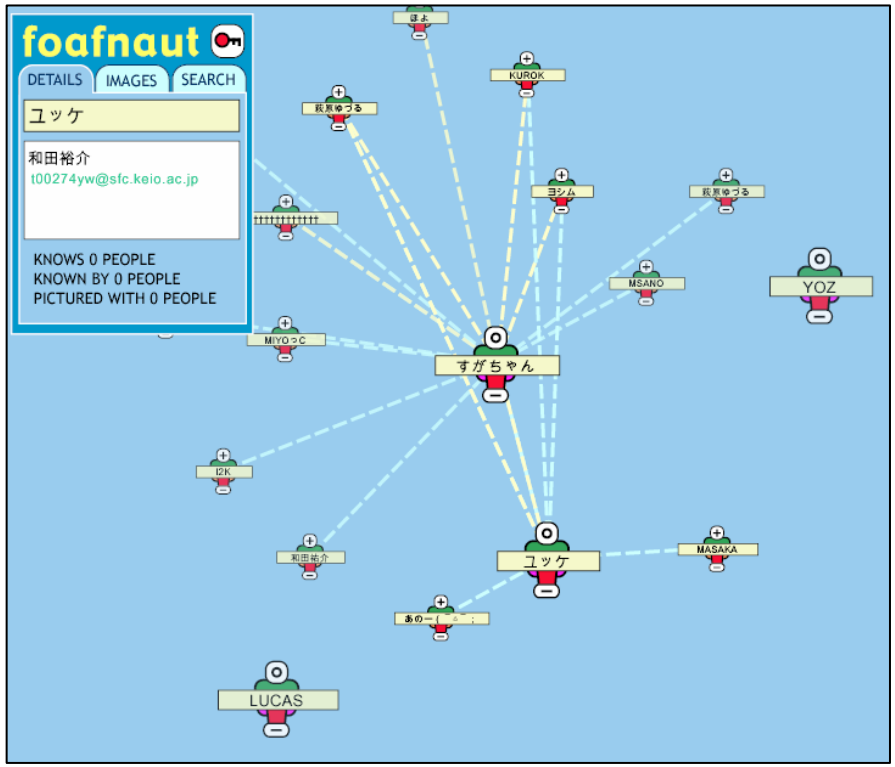
- Having e-mail information publicly available on the web is risky as it attracts spam.
- E-mail address can be obfuscated. For example:

```
<foaf:mbox_sha1sum>385c068a568ade2b8647ad3acd8f71f6f3e70b5d</foaf:mbox_sha1sum>
```

  - Is an SHA-1 sum of the “mailto:” URI
  - *Cannot* be used to discover the e-mail address
  - *Can* be used as an identifier
    - Theoretically, only one person has the same address
  - *Cannot* be trusted as an identifier
    - Knowing an e-mail address also allows faking of the SHA-1 sum

FOAF Applications

- Tools developed for:
  - Visualization
  - FOAF profile generation
  - Search of relationships
- Examples:
  - Foaf-a-matic: web-based tool for generating the FOAF description
  - FOAF Explorer: exploring FOAF descriptions with user-friendly profile presentation
  - FOAFNaut: graphically mapping the relationships



FOAF Challenges

- What does a “foaf:knows” relationship imply?
  - Only one kind of relationships might lead to problems
  - Data-mining more accurate relationships (as originally meant) is time-consuming, difficult and error-prone
- Personal information
  - Anybody can create a profile under anyone’s name
  - No “quality control” specified
  - If falsified FOAF information enters into the “FOAF Space”, it might be difficult or impossible to later remove it
  - False FOAF profile might be more difficult to determine than a false web page
- Jurisdictional issues
  - How are the indexing and using of the personal information controlled?
  - If it’s publicly available, who owns it?
  - What jurisdiction do the service providers fall under?

XFN

XHTML Friends Network - XFN

- Created by Global Multimedia Protocols Group (GMPG) in 2003
  - Tanek Çelik, Eric Meyer and Matthew Mullenweg
- An XHTML meta data profile for providing information about relationships between people.
  - Does not specify any personal information whatsoever
- Extends REL-attribute in (X)HTML links
  - Originally meant to describe (document) relationships
  - Extended by XFN to provide descriptions of social relationships.
- Provides attributes for describing social relationships *only*
  - Does not attempt to describe persons or other things
  - Attributes include a friendship, physical, professional, geographical, family, romantic and identity classifications.
- All relationships one-way
  - A→B
  - Target must reciprocate relationship to create a two-way relationship
  - Depending on relationship, may be symmetric and/or transitive

XFN Profile v1.1

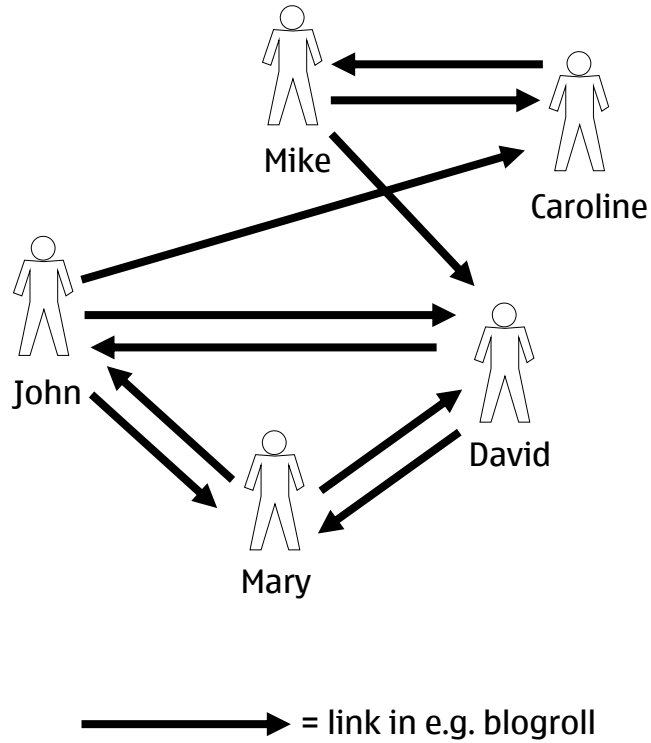
S = symmetric

T = transitive

- Friendship
  - Contact S
  - Acquaintance S
  - Friend S
- Physical
  - Met S
- Professional
  - Co-worker S T
  - Colleague S T
- Geographical
  - Co-resident S T
  - Neighbor S T
- Family
  - Child
  - Parent
  - Sibling S T
  - Spouse S
  - Kin S T
- Romantic
  - Muse
  - Crush
  - Date S
  - Sweetheart S
- Identity
  - Me

Example of normal linkage

- Blogs or websites often have numerous links to other individuals' sites
- However, these links either:
  - Do not carry any social context OR
  - Social context is not machine-understandable
- Next to nothing (especially by programs) can be told of the people's social relationships to each other



Minimal XFN example

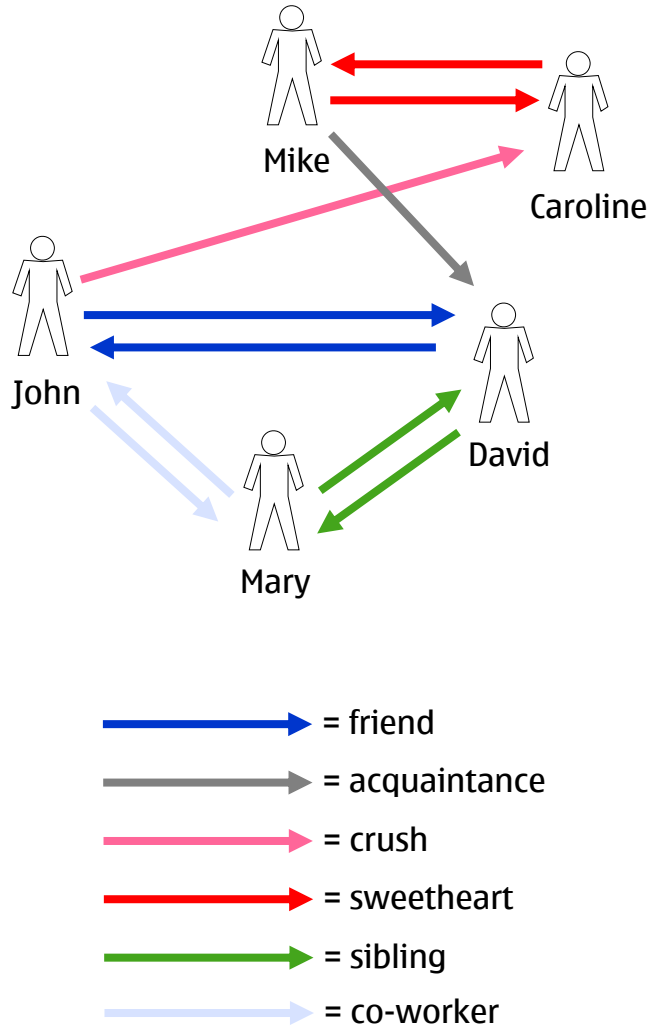
- Example of a normal link:

  <A HREF="http://someone.blogspot.com/"> John</A>
- Example of an XFN-enhanced link:

  <A HREF="http://someone.blogspot.com/" rel="friend met"> John</A>
- Does not break standards
  - Links rendered normally
  - Unless specifically customized by using CSS.
- Machine-understandable and easily human-readable also
  - The social relationship is apparent: the person linking John considers him as his/her friend whom he/she has also met.

Example of a social network using XFN

- Adding XFN information to existing links, detailed relationships can be mapped out:
  - John and David are mutual friends
  - John apparently has a crush on Caroline, but ...
  - ... unfortunately for him, Caroline and Mike seem to be dating.
  - Mary & David are siblings and Mary & John are co-workers.
- For example, David:
  - Is Mary's brother,
  - John's mutual friend and
  - Mike's acquaintance
- More than one classification is allowed (e.g. co-worker+friend)



XFN Applications

- Most support comes relates to blogging tools
  - Wordpress has integrated full support for XFN
    - They share the same creator
  - Support added to e.g. Moveable Type, Bloxsom etc.
- Websites gathering relationship information using XFN:
  - RubHub →
- Not as much application support as FOAF
  - As a simpler specification, does not need as much

XFN Discovery

- Use XFN-enabled search engines
  - For now, XFN-*specific* search engines like Rubhub
- Possibly identify XFN-enabled based on link appearance
  - Show up as regular links...
  - ... unless users specify CSS-rules
  - No standard representation
- Browser-based tools
  - E.g. XFNDumper

XFN Challenges

- No danger of identity thefts or frauds as identity is not specified
- However, relationships can be faked. In the absence of a reciprocating relationship, the following is possible:
  - The other party does not support XFN
  - The other party does not consider the relationship mutual (e.g. friends vs acquaintances)
  - The claimed relationship is indeed fake
- If a reciprocating relationships exists, the situation is clear
- Updating of reciprocating links can be challenging when addresses change
- The linked website may not contain any personal information
  - All “identity” information assumed to exist, but not guaranteed

XFN and FOAF: Comparison

Comparison between FOAF and XFN

	FOAF	XFN
Underlying technology	RDF/XML Vocabulary; FOAF description saved as a separate file.	XHTML meta data profile, uses rel-attribute. Relationships originate from existing pages.
Information described	Wide variety of personal information and basic description of relationships.	Only social relationships.
Manual profile creation possible?	Yes, but format complicated. Obfuscating e-mail address with SHA-1 sum difficult manually.	Yes; relationships defined are purely text-based and simple.
Vulnerability to fraudulent information	Yes; there is no way to “mod” or rate given pieces of FOAF information.	Not serious; alleged relationships remain one-way and not reciprocated.
Identity model	Personal information defined in the FOAF description; additionally pages can be linked to. No assumed relationship to the website hosting the FOAF data.	The originating website (or “me”-sites linked to) is assumed to contain all necessary information about the person.

Comparing descriptions of social relationships in FOAF & XFN

- Example case
  - Name: John Doe
  - Website / blog: http://www.johndoe.com/
  - Image available at http://www.johndoe.com/john.jpg
  - Has the following relationships
    - Susan: friend
      - http://susan.somewhere.com
    - Kendra: sibling
      - http://kendra.elsewhere.com
    - Jack: co-worker, friend
      - http://jack.nowhere.com
    - Brenda: acquaintance

XFN & FOAF Descriptions

- Somewhere on http://www.johndoe.com/ :

  <A HREF="http://susan.somewhere.com" rel="friend">Susan</A>

  <A HREF="http://kendra.elsewhere.com" rel="sibling">Kendra</A>

  <A HREF="http://jack.nowhere.com" rel="co-worker friend">Jack</A>

- Cannot represent personal information, assumed to be available on www.johndoe.com
- Cannot really represent relationships to persons without a URL address!

```
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:foaf="http://xmlns.com/foaf/0.1/"
    xmlns:admin="http://webns.net/mvcb/">
<foaf:Person rdf:nodeID="me">
     <foaf:name>John Doe</foaf:name>
     <foaf:givenname>John</foaf:givenname>
     <foaf:family_name>Doe</foaf:family_name>
     <foaf:homepage rdf:resource="http://www.johndoe.com/"/>
     <foaf:depiction rdf:resource="http://www.johndoe.com/john.jpg"/>
     <foaf:knows>
                <foaf:Person>
                                <foaf:name>Susan</foaf:name>
                                <rdfs:seeAlso rdf:resource="http://susan.somewhere.com/"/>
                </foaf:Person>
     </foaf:knows>
<foaf:knows>
<foaf:Person>
<foaf:name>Kendra</foaf:name>
<rdfs:seeAlso rdf:resource="http://kendra.elsewhere.com/"/></foaf:Person></foaf:knows>
<foaf:knows>
<foaf:Person>
<foaf:name>Jack</foaf:name>
<rdfs:seeAlso rdf:resource="http://jack.nowhere.com/"/></foaf:Person></foaf:knows>
<foaf:knows>
<foaf:Person>
<foaf:name>Brenda</foaf:name>
</foaf:Person></foaf:knows></foaf:Person>
</rdf:RDF>
```

- Cannot represent relationship details

Conclusions

Conclusions

- XFN and FOAF are complementary technologies
  - Describe mostly different things of the social semantic web; can easily be combined
  - FOAF for personal information, XFN for relationships
- Critical mass yet to be achieved by either XFN or FOAF
  - Need more application support
  - Centralized services reluctant to directly support a decentralized approach
- The good:
  - Both essentially good specifications for what they do
  - Enable the construction of a social semantic web
- The bad:
  - Some potential privacy issues especially with FOAF
  - Take up not sufficient to guarantee success for either specification (yet?)
  - FOAF could be heavy for wireless usage

Thank you!

Questions?