

Notes for CMSC 498N  
March 29, 2007

Semantic Web Overview

- Started in 1991 (used for academics, government papers, etc)
  - Html used for scientific papers
- 1993 – still had a web phone book
- Purpose: Information is out there but hard to get. People want more than a search engine, they want a better understanding of what’s out there.

Basic Web:

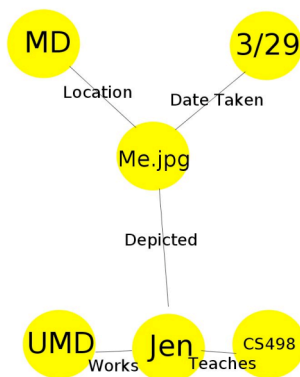
- http
- html (xml)/css
- browsers
- search engines

The problem with this is its hard for computers to understand – especially with more and more media appearing (how can you digest information about a certain video, picture or song).

Semantic Web adds on to the basic web (hooks together distributed information:

- xml
- rdf
- rdfs
- owl

URI = Uniform Resource Identifier (http://....)  
-used as unique identifiers



<rdf: Description

    rdf.about = “http://www.cs.umd.edu/me.jpg //describes thing at this URI

Turns into one giant graph where the information from the web is held

### Languages:

- RDF: resource description framework
  - Based on xml
  - Describes objects and gives properties (edges – “depicted,” “work,” etc)
- RDFS: RDF Schema
  - All of RDF and
  - Classes, domains and ranges

### Semantic Web

- Owl -> RDFS -> RDF -> XML

Example:

### Classes/Structure:

- Person
  - Student
    - Graduate
    - Undergraduate
- Furniture
  - Chair

### Properties

- Age (data property)
- Height (data property)
- Homepage (data property)
- Knows (object property)
  - Knows well
- Domain: Person

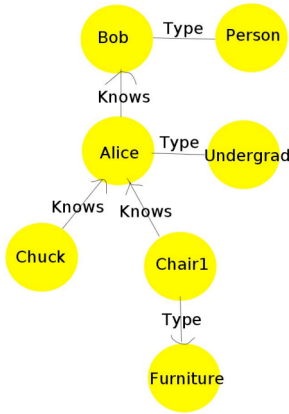
Domain = type of subject

Range = type of object

Instantiate the class:

<u>Subject:</u>	<u>Predicate:</u>	<u>Object</u>
• Bob	type	Person
• Alice	type	Undergrad
• Alice	knows	Bob
• Chuck	knows	Alice

These are called triples.



- “Chuck knows Alice” is allowed even though Chuck is not explicitly defined as a person. You can infer that he is a person from the domain restriction (Domain: Person).
- If you added: “Chair1 Type Furniture” and “Chair1 knows Alice.” Then this would be allowed you have to deal with it.

You can’t disjoin classes.

You can have multiple domains/ranges. You get an intersection of all of them not the union.

Owl – Web Ontology Language

Unions, inverses, intersections, transitives, local range restrictions

Ontology:

- Classes/Properties
- Data: knowledge base
  - Interactions

Syntax

<rdf: RDF

xmlns: rdf = “http://www.w3.org/RDF...”

xmlns: foaf = “http://foaf.org/...”>

. Insert descriptions and definitions here, such as:

.<owl: class rdf: ID = “Person”\>

class = type of thing

rdf: ID = syntax for assigning a name

Person = name of class

</rdf:RDF>

```
<foaf: Person rdf: ID = "Bob">  
  <foaf: homepage (Object property)  
    rdf:resource = "http://..." />  
  <foaf: firstName > Bob </foaf: firstName> (Data property)  
</foaf: Person>
```

Bob = literal value

#### Good resources

- <http://www.w3.org> - Tutorial available
- <http://foaf-project.org>

#### Main points to remember about Semantic Web

- Make logical inferences
- Aggregate distributed data in unified models