SLIS L597 - Topics in Library and Information Science

The Semantic Web

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Wednesdays, 5:45-8:30 PM, LI 002

Office	Hours
LI 030A	T 4:30-6:00, R 4:00-5:30
Eigenman 912	TBA

Quick Links

- PDF version of syllabus Δ (current 8-30-2007)
- Course wiki discussion of readings, assignments, etc.

Course Description

The size and growth of the World-Wide Web has brought with it the immense challenge of managing and sifting through the information that has since become available. Traditional search engines have limited effectiveness in this environment, now that the web holds in excess of eight billion documents. The World-Wide Web Consortium's proposed answer to these challenges is known as the Semantic Web.

The Semantic Web comprises a set of new technologies for metadata definition and markup nested within an architecture of resource sharing among servers, clients and Artificial Intelligence "agents". These technologies promise to allow individual and corporate users to exercise control over the collection and presentation of information resources. The underlying principles of these technologies are found in computing and logic, and in order to appreciate their capabilities and limitations, it is necessary to understand their basis in the fundamentals of computation and logic. At the same time, their impacts need to be evaluated in terms of the social and other goals that they are intended to address.

This course explores the technologies of the Semantic Web by illustrating, through readings from current literature and application of the technologies to concrete problems of WWW information delivery, the properties and principles of formal logic and computation guiding their development, and their consequent effects, as can be assessed at the present time.

Prerequisites

Knowledge of HTML and familiarity with Unix are requred for this course. Programming background is not necessary, but can be helpful.

Course Objectives

This course aims to develop a critical appreciation of Semantic Web technologies as they are currently being developed. At the end of this course, students should be able to

- sketch the overall architecture of the Semantic Web, and say how it is different from the rest of the World-Wide Web
- identify the component technologies of the Semantic Web and explain their roles
- illustrate the design principles of the Semantic Web by applying the technologies
- understand certain key limitations of the Semantic Web technologies, and be aware of the kinds of services it can and cannot deliver

Textbooks

- Passin, T.B. 2004. Explorer's Guide to the Semantic Web. Greenwich, CT: Manning.
- Clocksin, W. F.; and C.S. Mellish. 2003. Programming in Prolog: Using the ISO Standard (5th Edition). Berlin: Springer.

All above texts are required. In addition, students will select additional readings from suggested readings lists, or by searching for pertinent scholarly articles, to be used as described below. The following are recommended books that may help some students with different aspects of the course, depending on the student's goals:

- Prolog
  - Clocksin, W.F. 1997. Clause and Effect: Prolog Programming for the Working Programmer. Berlin: Springer.
- RDF and XML
  - Antoniou, G. and F. van Harmelen. 2004. A Semantic Web Primer. Cambridge, MA: MIT Press.
  - Daconts, M.C., L.J. Orbst, and K.T. Smith. 2003. The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management. New York: Wiley.
  - Harold, E.R., and W.S. Means. 2002. XML in a Nutshell, 2nd edition. Sebastopol, CA: O'Reilly & Associates.
  - Powers, S. 2003. Practical RDF. Sebastopol, CA: O'Reilly.
- Semantic Web (scholarly, suitable for readings component)
  - Davies, J., D. Fensel and F. van Harmelen, eds. 2003. Towards the Semantic Web: Ontology-Driven Knowledge Management. New York: Wiley.
  - Fensel, D., J. Hendler, H. Lieberman and W. Wahlster, eds. 2003. Spinning the Semantic Web: Bringing the World-Wide Web to its Full Potential. Cambridge: MIT Press.

Requirements

The course aims are achieved through:

- Readings from literature generated by current research and development projects related to the semantic web
- Assignments applying semantic web technologies to concrete problems of information delivery and use

The graded work in this course comprises

- **six programming exercises** (worth five points each). These are short and introduce various aspects of Prolog and Semantic Web programming, culminating in a collection of interoperable resources based on real-world data, and usable for final projects
- **a final presentation** (10 points) explaining the final paper or project
- **a final paper or project** (35 points) being a written explanation of the culminating work for the course
- **classroom/wiki participation** (15 points) for each day indicated with an additional readings link, the student should select one of the indicated readings or a closely related one (found by searching), which s/he posts a summary of on the course wiki; In-class discussion is based in part on students sharing their responses to these readings as well.

The topic of the final presentation and the final paper or project are the same, and will be chosen by each student in consultation with the instructor.

Calendar

The following calendar outlines our activities for the semester. More detail will be provided on an ongoing basis on the archives page.

Date	Topics and Readings	Assignments
Aug 30	What is the Semantic Web? (SWE 1)	
Sept 6	RDF and XML (SWE 2); Prolog (CM 1,2) Specs	Ex 1. Facts and Rules
Sept 13	Annotation and searching (SWE 4,5); Prolog data structures (CM 3) Annotation	Ex 2. Recursive rules and data
Sept 20	Logic (SWE 6); Prolog I/O (CM 5) Logic	Ex 3. XML I/O, API handling
Sept 27	Ontologies (SWE7); Prolog built-ins (CM 6); Ontologies OWL specification; RDF Schema (RDF-S)	
Oct 4	Web Services (SWE 8); Control & debugging (CM 4,8) WebServices	Ex 4. Templates for transforming RDF/XML
Oct 11	Agents and Trust (SWE 9,10); Solution patterns (CM 7) Agents Trust	
Oct 18	QueryLanguages	Ex 5. Ontologies for mapping RDF
Oct 25	Search	
Nov 1	EmergentSemantics	
Nov 8	OtherApplications?	
Nov 15	The larger vision (SWE 11)	
Nov 22	Thanksgiving Break (no class)	

Nov 29	Presentations	Presentations
Dec 6	Presentations	Final paper due

Course Requirements

To receive a passing grade in this course, you must turn in all of the assignments and the term project and do your presentations. You cannot pass this course without doing all of the assigned work, however, turning in all of the work is not a guarantee that you will pass the course. All papers and assignments must be submitted on the dates specified in this syllabus. If you cannot submit an assignment or cannot deliver a presentation on the date it is due, it is your responsibility to discuss your situation with the instructor, in advance of the assigned date.

Your written, web-based, and oral work will be evaluated according to four criteria; it must:

1. Be clearly written, marked up, and/or presented, and checked for spelling and grammar;
2. Demonstrate a degree of insight into the concepts, issues, and trends in both the areas you investigate in the assignments and in the course content;
3. Demonstrate a degree of originality in your reviews, analyses and projects; and
4. Display familiarity with the appropriate literature.

Borderline grades will be decided (up or down) on the basis of class contributions and participation throughout the semester.

The following definitions of letter grades have been defined by student and faculty members of the Committee on Improvement of Instruction and have been approved by the faculty (November 11,1996) as an aid in evaluation of academic performance and to assist students by giving them an understanding of the grading standards of the School of Library and Information Science:

Grade	GPA	Meaning
A	4.0	Outstanding achievement. Student performance demonstrates full command of he course materials and evinces a high level of originality and/or creativity that far surpasses course expectations
A-	3.7	Excellent achievement. Student performance demonstrates thorough knowledge of the course materials and exceeds course expectations by completing all requirements in a superior manner
B+	3.3	Very good work. Student performance demonstrates above-average comprehension of the course materials and exceeds course expectations on all tasks as defined in the course syllabus
B	3.0	Good work. Student performance meets designated course expectations, demonstrates understanding of the course materials and is at an acceptable level
B-	2.7	Marginal work. Student performance demonstrates incomplete understanding of course materials.
C+	2.3	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course materials
C	2.0	

C-	1.7	Unacceptable work. Course work performed at this level will not count toward the MLS or MIS degree. For the course to count towards the degree, the student must repeat the course with a passing grade.
D+	1.3	
D	1.0	
D-	0.7	
F	0.0	Failing. Student may continue in program only with permission of the Dean.

Indiana University and School of Library and Information Science policies on academic dishonesty will be followed. Students found to be engaging in plagiarism, cheating, and other types of dishonesty can expect to receive an F for the course.

This page maintained by John C. Paolillo