Program	
MO826 / MC936 – Information System Topics Institute of Computing University of Campinas	1° semester / 2015 Professor: André Santanchè

Schedule

Monday and Wednesday: 16:00 until 18:00 (classroom 351 – IC 3.5)

Summary

This discipline focuses on the subjects: Web and Semantic Web. Web subject: Web science and Web engineering; architecture, models, standards and languages; querying; social Web and social networks; crowdsourcing; content, behavioral and graph analysis; information extraction, mining, searching, matching, entity resolution and Deep Web; Web platform and applications; Web for mobiles; Web services; Web of Things. Semantic Web subject: architecture, models, standards and languages; Web of data, metadata, querying, rules and reasoning; Linked Data, data spaces and data integration; knowledge representation, formalisms and ontologies; semantic Web services.

Program

- **Web Engineering**
  - Architecture
  - Models, standards and languages
    - URL, URN, URI and IRI
    - HTML and XML
    - XPath and XLink
  - Database perspective
    - Querying and XQuery
  - Web platform and applications
    - Web for mobiles
    - Web services
    - Web of Things
  - Linked data
    - Data spaces and data integration
  - Semantic Web
    - Architecture
    - Models, standards and languages
      - RDF and OWL
    - Web of data and metadata
    - Querying and SPARQL
    - Rules, reasoning and SWRL
  - Ontologies
    - Knowledge representation
    - Ontology spectrum
      - Controlled vocabularies
      - Taxonomies
      - Thesaurus
  - Semantic Web Services
- **Data Science**
  - "Digging" the Web
    - Information extraction

- Mining
- Searching
- Matching
- Entity resolution
- Deep Web
  - Fourth Paradigm
  - Web Observatory
- **Web Social Science**
  - Folksonomies and emergent social structures
  - Crowdsourcing
  - Content, Behavioral and Graph analysis
    - Link and tag analysis
    - Link prediction
    - Sentiment analysis
- **Network Science**
  - Complex Networks
    - Scale-Free Property
    - Small-world Netowork
    - Graph topology and Metrics

Evaluation Criteria

The course has two main projects:
- 1ª project
  - presentations starting – 11/03/2015
  - deadline article – 15/04/2015
- 2ª project
  - presentations starting – 01/06/2015
  - deadline article – 01/06/2015

The projects specification will be delivered in specific documents during the course.

Average :

final = (project$_1$ + project$_2$) / 2

Concepts mapping:
- A → final >= 8,5
- B → 8,5 > final >= 7
- C → 7 > final >= 5
- D → final < 5

Final exam – only for undergraduate students:
- Date: 13/07/2015
- In this case the final grade will be calculated as follows:
  - final$_{exam}$ = (final + grade$_{exam}$) / 2

Bibliography

Books

Berners-Lee, T., Hall, W., Hendler, J. A., O'Hara, K., Shadbolt, N., & Weitzner, D. J. (2006). A Framework for Web Science. Hanover, MA, USA: Now Publishers Inc.

Barabási, A. (2012) Network Science. Online: http://barabasilab.neu.edu/networksciencebook/

Staab, S., & Studer, R. (2009). Handbook on Ontologies (2nd ed.). Springer Publishing Company, Incorporated. Doi: 10.1007/978-3-540-92673-3.

Breitman, K. (2005). Web Semântica: a Internet do Futuro. Editora LTC.

Readings

Hendler, J., Shadbolt, N., Hall, W., Berners-Lee, T., & Weitzner, D. (2008). Web science: an interdisciplinary approach to understanding the web. Commun. ACM, 51(7), 60–69. doi:10.1145/1364782.1364798

Shneiderman, B. (2007). Web science: a provocative invitation to computer science. Commun. ACM, 50(6), 25–27. doi:10.1145/1247001.1247022

Gruber, T. R. (1993). A translation approach to portable ontology specifications. Knowledge Acquisition, 5(2), 199-220. Academic Press Ltd.

Berners-Lee, T., Hendler, J., & Lassila, O. (2001). The Semantic Web. Scientific American, 284(5), 28-37.

Smith, B., & Welty, C. (2001). FOIS introduction: Ontology---towards a new synthesis. Proceedings of the international conference on Formal Ontology in Information Systems - Volume 2001 (pp. 3-9). New York, NY, USA: ACM. doi: http://doi.acm.org/10.1145/505168.505201.

Guarino, N. (1997). Understanding, building and using ontologies. Int. J. Hum.-Comput. Stud., 46(2-3), 293-310. Duluth, MN, USA: Academic Press, Inc. doi: http://dx.doi.org/10.1006/ijhc.1996.0091.

Uschold, M., & Gruninger, M. (1996). Ontologies: Principles, Methods and Applications. Knowledge Engineering Review, 11(2), 93-136.

Cullot, N., Parent, C., Spaccapietra, S., & Vangenot, C. (2003). Ontologies: A contribution to the DL/DB debate. Proc. of the 1st International Workshop on the Semantic Web and Databases, 29th International Conf. on Very Large Data Bases (pp. 109-129).

Noy, N. F., & McGuinness, D. L. (n.d.). Ontology Development 101: A Guide to Creating Your First Ontology. Retrieved from http://protege.stanford.edu/publications/ontology_development/ontology101.html.