COP 5859 – Semantic Web Programming

(Focus: Smart Mobile Phone Apps)

Course Syllabus: Build an infrastructure to develop practical Apps with open source tools. Semantic web building blocks (standards, languages, and framework). Specific focus this semester: **Smart Mobile Phone Apps**

Textbook: Building Cross-Platform Mobile and Web Apps for Engineers and Scientists, by Pawan Lingras, 2015. ISBN: 978-1-305-10596-6. Recommended (for the smart app part): Linked Data: Structured Data on the Web, by D. Wood, M. Zaidman, and L. Ruth, Manning, 2014, 9781617290398

Pre/Co- Requisite: Graduate or Senior student status in CE, CS, or ITOM. Programming with a scripting language, such as Python or JavaScript. By topic: Internet Computing. These are easy to learn languages.

Course Description: There are two parts to this course: Platform independent mobile phone app development; and addition of semantic annotations to improve user experience and productivity. The text book uses an app-centric development methodology using HTML5, JavaScript, jQuery, jQuery Mobile, NoSQL/SQL databases, Node.js, and JSON. The result are apps that run across all mobile platforms (Android, iOS, Microsoft, and others).

Tim-Berners Lee, the father of WWW, started the linked data movement to create a web of data by attaching meaning to the hypertext data and linking related websites. This converts information silos on web pages to a global database. This has far reaching implications for our well-being and economic prosperity. Link to his TED talk on its usage for Haitian Earthquake relief efforts: http://bit.ly/1NyAWGz .

Many companies, such as Google, Facebook, IBM, and Microsoft have found commercial success with this approach. Mobile phone Apps can now read, follow and combine linked data much more effectively. Now machines can become active and useful partners in our daily lives.

In this course, students will use JavaScript and Python to link HTML pages, embed metadata and access it on the web to convert human-readable text to machine processable data. This significantly improves search results and speeds mashed up web services. It also provides tools for managing personal concerns (privacy, security, health, etc.).

Students may take on app development or a research report for their project part. The app can be on any of the Linked Data topics for developing/updating an app using JavaScript and Python. For undergrad students, the focus may be fully on a mobile app with less emphasis on the machine processable part. Graduate students may team up with undergrad students to provide linked data support to access focused and relevant data on the web. Healthcare Apps developed in fall '16 are available here: https://github.com/FAUMobileWeb . Graduate students are welcome to use these and improve the pages to embed machine processing and intelligence. Teams can be groups of 1 or 2 students (graduate/undergraduate).

The research report could focus on a topic such as quality of service metrics, machine reasoning, markup for truth, Web transparency, and advanced integration and/or visualization. This will be an individual effort.

Grading: Five assignments: 40%; Mid-term exam: 20%; and Project (App Development or Research Report) 40%. Class community service (**bonus**): 10%. Project ideas to combine research and development are welcome!

Topics to Cover:

1. Refresher on HTML5 and JavaScript. Introduction to Python.
2. JavaScript to make web apps interactive and functional
3. Role of JQuery, JQuery Mobile, and Express for mobile responsive apps.
4. Graphics with HTML5 canvas
5. Server and Node.js for sharing and storing information on the cloud
6. MongoDB, a NoSQL database for cloud storage of data
7. Maps, Locations, and Multimedia databases
8. Linked Open Data (LOD) Cloud: principles and standards
9. HTML with embedded RDFa: Enhanced Search Engines. SPARQL for querying Linked Data
10. Schema.org Vocabulary: Initiative from Google, Microsoft, and Yahoo, to maximize sharing on the web.
11. Big Data & Data Fusion Apps: From Google, Yahoo, IBM, BBC, and the US Federal Government.