CSCI 599
Geospatial Data Integration
Spring 2013

Instructors: Craig Knoblock (knoblock@isi.edu)

Meeting Time: Tuesday and Thursday 5:00-6:20

Location: TBD

Office Hours:
Professor Knoblock
- Tuesday & Thursday 6:20-6:50pm
- Or by appointment (ISI 922 or by phone: 310-448-8786)

Teaching Assistant:
- TBD

TA Office Hours:
- TBD (location TBD)

Course Web Page: USC Blackboard (blackboard.usc.edu)

There is an ever-increasing amount of geospatial data available, including satellite imagery, aerial imagery, maps, vector layers, elevation data, photos, etc.. There is also a huge amount of information that can be linked to location and integrated with the geospatial layers. This course will focus on the problem of how to integrate the diverse sources of geospatial data. The course will cover a wide variety of topics within this area, including building geospatial mashups, geospatial source discovery, geospatial mediation, geospatial semantic web, mobile geospatial apps, geocoding, extracting and aligning data from maps, linking documents to locations, data mining of geospatial data, and real-time geospatial data.

The class will be run as a lecture course with lots student participation, student presentations, and hands-on experience. The class will cover the latest research papers, software, tools, and results on the various topics. Each student will develop and build a geospatial data integration project based on the research and tools covered in the class.

Prerequisites: None

Recommended Courses:
CSCI561 -- Introduction to AI
CSCI585 – Database Systems
CSCI587—Geospatial Data Management

Grading:
- Course project -- 40%
- Quizzes – 30%
- Class Presentations and Participation – 30%
- No Final Exam!

Books: There is no required textbook. We will read technical papers on each topic.

Course Syllabus and Schedule

- **January 15 & 17**
  - Topic: Introduction & GIS Basics
  - Readings:

- **January 22 & 24**
  - Topic: Geographic Information Systems
  - Readings:
    - Suggested Readings:
      - Using geographic information system analyses to monitor large-scale distribution of nicotine replacement therapy in New York City, Karen Davis Czarneckia, Chris Goransonb, Jennifer A. Ellisa, Laura E. Vichinsky, Micaela H. Coadya, and Sarah B. Perla, Preventive Medicine, Volume 50, Issues 5-6, May-June 2010, Pages 288-296. [Paper](#)
• **January 29 & 31**
  o **Topic: Building Geospatial Mashups**
  o **Readings:**
    - Making Mashups with Marmite: Towards End-User Programming for the Web
      [Paper](#)
    - Intel Mashmaker
      [Paper](#)
      [Paper](#)
      [Paper](#)
  o **Suggested Readings:**
      [Paper](#)
      [Paper](#)
• **February 5 & 7**
  o **Topic: Geospatial Semantic Web**
  o **Readings:**
    - The Semantic Web in Breath by Aaron Swartz
      [Paper](#)
    - The Semantic Web: An Introduction
      [Paper](#)
    - The Geospatial Semantic Web by Frederico Fonseca
      [Paper](#) (Follow the “Open URL”, Read pages 367-376 in NetLibrary)
    - Toward the Semantic Geospatial Web by Max J. Egenhofer
      [Paper](#)
October 30, 2012

- Suggested Readings:
  - Exploring the Geospatial Semantic Web with DBpedia Mobile [Paper]

February 12 & 14
- Topic: Mapping Addresses to Locations (Geocoding)
- Readings:

February 19 & 21
- Topic: Linking Text Documents to Location
- Readings:
  - A Flexible Addressing System for Approximate Geocoding, Davis et al. [Paper]

Paper

  
  Paper

  
  Paper

  o **Suggested Readings:**
    
      
      Paper

      
      Paper

      
      Paper

  
  o **February 26 & 28**
    
    o Topic: Building Geospatial Apps for Mobile Phones
    
    o **Readings:**
      
        
        Paper

  o **Suggested Readings:**
    
    - **TBD**

March 5 & 7

o Topic: Geospatial Reasoning

o **Readings:**

Paper

Paper

Paper
- Suggested Readings:
  - Information Fusion for Feature Extraction and the Development of Geospatial Information. Michael A. O’Brien and John M. Irvine
  - Merging of Heterogeneous Data for Emergency Mapping: Data Integration or Data Fusion. Florin Savopol and Costas Armenakis

- March 12 & 14
  - Topic: Registering and Aligning Geospatial Layers
  - Readings:
  - Suggested Readings:
    - Design of a conceptual framework and approaches for geo-object data conflation. Li, Linna, Ph.D., UNIVERSITY OF CALIFORNIA, SANTA BARBARA, Chapter 2: Geo-Object Data Conflation: Review and Overview Thesis

- **March 19 & 21**
  - Spring Break!

- **March 26 & 28**
  - Topic: Extracting Layers from Maps
    - **Readings:**
  - **Suggested Readings:**

- **April 2 & 4**
  - Topic: Building 3D Models from LIDAR
    - **Readings:**

- Suggested Readings:

- April 9 & 11
  - Topic: Geospatial Source Discovery
    - A Data Integration Approach to Dynamically Fusing Geospatial Sources. Thakkar, S. Ph.D. Thesis, Department of Computer Science, University of Southern California. Chapter 3, pages 42-80

- April 16 & 18
  - Topic: Integrating social, mobile, and real-time data

- April 23 & 25
  - Project Presentations
• April 30 & May 2
  o Project Presentations

Statement for Students with Disabilities
Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: http://www.usc.edu/dept/publications/SCAMPUS/gov/. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: http://www.usc.edu/student-affairs/SJACS/.

Emergency Preparedness/Course Continuity in a Crisis
In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.