SSCI 101 – Workshop in Spatial Analysis

Course: SSCI 101 – Workshop in Spatial Analysis

Section: 35687R (Lecture)

Lecture: Tuesday 4-6:20pm

Location: AHF (Allan Hancock Foundation) B57A

Website: www.blackboard.usc.edu

Instructor: Dr. Jennifer Swift

Office: AHF Building B57G

Tel: 213-440-5841

Email: jswift@usc.edu

Website: http://spatial.usc.edu

Skype: ssb27q

Office Hours: Tuesday and Thursday 11:30am-12:30pm and by appointment. I am happy to meet in person or asynchronously via email. I am also available via Skype or Adobe Connect most days provided we schedule the meeting in advance. Please take advantage of office hours – it is a great resource.

1. Introduction

The convergence of various global trends, including the sustained growth of the Earth's human population, increasing urbanization and globalization, the widening gap between rich and poor, and the likely impacts of climate change, among others, make location more important than ever. Different places or locations afford us different opportunities and challenges and many locations are increasingly as much a reflection of human creativity and imagination as they are natural places. People have an unprecedented opportunity to transform places into something different than they are now and many of these interventions will have important consequences for human health and well-being.

"**SSCI 101 – Workshop in Spatial Analysis**" provides an analytical overview of the various ways in which mobile apps can be used to help improve our understanding of the meaning and significance of place. There are many reasons why this knowledge may be helpful and individual workshops will be tailored to explore the role of location and place in one or more

different applications, including business, design, diplomacy, environmental science, health, journalism, planning and public policy, and the humanities.

Students need no prior experience with mobile application development, as this course is meant to be introductory. Throughout the course, students will use the latest spatial analysis tools and accompanying geospatial data on mobile devices to collect, design, and deliver valuable information and assessments to address some problem and/or achieve some future goal.

The geographic information and technology for location-based services leverage web, wireless and geospatial technologies, and drive popular applications such as in-car navigation, mapping of nearby points of interest on cell phones, automatic notification of weather hazards as they impact travel along a highway route, location-based advertising, geosocial networking, and the tracking of inventory along supply chains. Most of these applications leverage the user's or the object's physical location to locate and access additional relevant information, and although the geospatial technology is perhaps the least understood of the three components, the geospatial content and services comprise most of the value.

"**SSCI 101 – Workshop in Spatial Analysis**" will explore the various ways in which geospatial content and services can be captured and used to advance our understanding of the places we traverse in our everyday lives.

2. Course Organization

This is a 10-week two-credit course comprised of lecture meetings once per week. The lecture sessions will discuss various aspects of spatial analysis, which include: spatial reasoning, cartography, data analysis and process, as well as hardware and software systems to investigate these processes. In general, lecture meetings will be divided into two parts: 1) an in-depth discussion of weekly topics; and 2) in-class time to work on course Projects.

Please note that all course materials and correspondence will be posted on the course Blackboard website. As a registered student you will find this course available for you to access at 10am Pacific Time on the first day of classes.

3. Grading Scheme

Social Media Interactions	5%
Project #1: Exemplary Geospatial Application	10%
Project #2: Space Shuttle Endeavor Application	15%
Project #3: Geospatial Web Application	20%
Project #4: ArcGIS App for Smartphone	10%
Seminar Participation (Responses to Readings & Class Discussion)	10%
Peer Review: Projects #2 & #3	10%
Final Reflections: The Value of Spatial Literacy	20%

4. Social Media – Twitter

The social media site Twitter has been gaining tremendous currency in the academic world as an instrument for sharing information, commenting on issues related to higher education, as well as addressing challenges in a given field, such as geospatial technologies. As such, it has achieved acclaim for its use as a pedagogical tool to extend the work of the classroom. We are going to use Twitter in this course to complement assignments and activities, in addition to augmenting the analytical work of the class. Beyond its relevance to the coursework, though, you are encouraged to explore the site as to its possibilities for professional networking for yourselves. Make sure to follow me (@SSI_Prof), other members of the class, in addition to following leaders in your field.

Although we will sometimes use Twitter in the classroom, the bulk of your Twitter activity will take place outside of class. You will be required to tweet a minimum of 3 times per week (at least three tweets each week for weeks 1-10 of this course). There are a few simple guidelines for tweeting: 1) they must be relevant to the class (i.e., a response to a reading, a link to a related article, a map or image, a question, etc.); 2) they must be substantive; and 3) they must be respectful. In addition to reading your tweets on a regular basis, I will be using an online archiving tool to keep track of Twitter activity.

You must use the hashtag **#SSCI101** to ensure that your tweets are incorporated into the class discussion. Any tweets that do not contain this hashtag will not be counted because the website will not record their activity.

I will hold a Twitter workshop on the first class meeting to answer questions that you may have on creating and/or using this platform.

Twitter activity for the course will be graded on a pass/fail basis. If you tweet the requisite number of times (a minimum of three tweets per week – or 3X10 = 30 total tweets), you will receive an A for this assignment. If not, then you will receive a 0 (zero).

5. Course Outline

Week 1, Jan 14: Introduction to Class

Discuss class goals, projects, technology, and plans for the remainder of the semester.

Distribute Project #1 which asks students to identify an application to advance human well-being that might benefit from spatial analysis.

Week 1 Homework: view Episode 4 (Chapters 1-4) videos on the Geospatial Revolution prepared by Pennsylvania State University and Tweet relevant comments. The video series includes: 1) Monitoring a Changing Climate; 2) Preventing Hunger; 3) Tracking Disease; and 4) Mapping Power to the People. A link to the video series can be found at: http://geospatialrevolution.psu.edu/episode4/complete

Week 2, Jan 21: The Spatial Lens

Discuss the three aforementioned videos and the ways in which spatial analysis might be used to advance human well-being.

Discuss and work on Project #1

Week 2 Homework: view the six modules that make up the "Turning Data into Information Using ArcGIS 10" training seminar. These cover the Basics of Data and Information (Module 1), Cartography, Map Production, and Geo-visualization (Module 2), Query and Measurement (Module 3), Transformations and Descriptive Summaries (Module 4), Optimization and Hypothesis Testing (Module 5) and Uncertainty (Module 6) (see http://training.esri.com/ for additional details).

Week 3, Jan 28: Geospatial Data (Project #1 due)

Discuss the six aforementioned modules and the nature of geographic data, the creation and visualization of information, representing spatial objects and attributes, GIS-based visualization; the various ways querying is supported in a GIS and the roles played by buffering, point-in-polygon and polygon overlay, spatial interpolation and density estimation, centers and dispersion, histograms, pie charts, and scatterplots; and the roles of optimization, hypothesis testing, and uncertainty in geospatial analysis and decision-making.

Distribute Project #2 for which the class will be divided into small teams and asked to explore how various kinds of geospatial data and analysis tools could have been deployed to help choose a route for transporting the Space Shuttle Endeavor from Los Angeles International Airport to its new home at the California Science Center.

Week 3 Homework: watch training videos for "Using ArcGIS for Smartphones and Tablets" and "Working with Imagery" training seminars (see http://training.esri.com/ for additional details).

Week 4, Feb 4: Spatial Analysis and Image Data

Discuss the aforementioned training seminars and how GIS tools can help you describe and model the spatial distribution of phenomena on the one hand and GIS can be used to work with all kinds of local imagery as well as image services on the web to produce mosaicked datasets and other kinds of derived image products on the other hand. The spatial analysis tools are relatively straightforward to use and in many ways, they simply extend what the eyes and mind do intuitively to assess spatial patterns, trends and relationships.

Discuss and work on Project #2

Week 4 Homework: view the "Using ArcGIS.com Templates to Create Web Applications" training seminar (see http://training.ersi.com/ for additional details).

Week 5, Feb 11: Geospatial Web Applications (Project #2 due)

Discuss the aforementioned training seminar and the various ways the online map viewer and application templates in ArcGIS.com can help you to create and share GIS-enabled web maps.

Distribute Project #3 for which the class will be divided once again into small teams and asked to create some data of their own and to then use these data along with publicly available geospatial datasets to customize a web application built from one of the web application templates provided in ArcGIS Online. This particular project will constitute their final projects and they will work on it at various times throughout the remainder of semester.

Week 5 Homework: view the "Using ArcGIS for Smartphones and Tablets" training seminar plus one or other of the following three training seminars ("Mobile GIS: Using ArcGIS for iOS Applications"; "Introduction to the ArcGIS API for the Windows Phone"; "Introduction to the ArcGIS Runtime SDK for WPF") and read the research article on the accuracy of iPhone locations (a comparison of assisted GPS, WiFi, and cellular positioning) written by Paul Zandbergen (Transactions in GIS, 13(s1), 5-26, 2009) (see http://training.ersi.com/ for additional details).

Week 6, Feb 18: VGI and Crowdsourcing

Discuss the opportunities and challenges of building and sustaining crowdsourced geospatial databases and various roles played by citizens, including their roles as sensors and as cartographers mapping our world, in making collective geographic information a reality.

Field activity: balloon mapping project on USC campus.

Discuss and continue work on Project #3

Distribute Project #4 in which students successfully implement and demonstrate the use of ArcGIS Online on their smartphones or tablets.

Week 6 Homework: view four short Where 2.0, 2011 videos on VGI and crowd sourcing ("Living Maps: Making Collective Geographic Information a Reality" by Jack Dangermond, "Holistic and Virtuous Map Community Platform" by Michael Halbherr, "Crowdsourcing and the Democratization of Data" by Lukas Biewald, and "Real-time Updating, Crowdsourcing" by Matt Galligan) and read the research article on the annotation process in OpenStreetMap written by Peter Mooney and Padraig Corcoran (Transactions in GIS, 16, 561–579, 2012).

Week 7, Feb 25: GIS for Smartphones & Tablets (Project #3 due)

Discuss the aforementioned training seminar and how the ArcGIS App for Smartphones can help mobile users to access GIS maps and explore data hosted on ArcGIS Online, discover information in interactive, visually rich maps, and collect and update data using the app on their device. Discuss the various smartphone and tablet choices and what they might mean for various geospatial analysis and visualization tasks.

Week 7 Homework: view four short videos about the links between social media and spatial data: "Facebook Places" (Justin Shaffer; URL), "Mapping Social Media" (Fluttr; http://www.youtube.com/watch?v=9wXrEAPkMYo&feature+player_embedded#at=19); "Who, What, Where, When: Creating New Maps from GeoTweets" (John Barratt; URL); and "What can we Learn from Human Sensors?" (Where CampDC; http://www.youtube.com/watch?v=52HKtcz-NJw&feature=related).

Week 8, Mar 11: Social Media & Spatial Data

Discuss what we can learn from human sensors; in particular, their use of social media and the kinds of problems that might ensue if we promote this kind of scientific inquiry by exploring some of the opportunities for exploiting spatial data from geosocial networking to obtain valuable (i.e. intelligent) information about specific events such as the 1984 Los Angeles

Summer Olympics, the 1992 Los Angeles riots, the 1994 Northridge earthquake, and the annual Oscar Academy Awards.

Field activity: data collection and analysis with Dr. Yao-Yi Chiang

Work on Project #4

Week 8 Homework: review the contents of the floating sheep website (see http://www.floatingsheep.org/ for additional details) and at least one other website (i.e. something like http:/flowingdata.com/ for example) that contains citizen cartography.

- ***Spring Recess: Mar 17-22***

Week 9, Mar 25: Citizen Cartography

Discuss the various ways citizens have collected or compiled geospatial data and used these data to build a series of visually attractive and informative map products.

Work on Project #4

Week 10, Apr 1: Final Presentations (Project #4 due)

6. Important Dates

1/10	Last day to register and settle without a late fee
1/13	Spring Semester classes begin
1/20:	Martin Luther King's Birthday, university holiday
1/31:	Last day to register and add classes
1/31:	Last day to change enrollment option to Pass/No Pass or Audit
1/31:	Last day to drop a class without a mark of "W", except for Monday-only classes, and receive a 100% refund and receive a 100% refund
2/17:	President's Day, university holiday
3/17-3/22:	Spring recess
4/1	Final Presentations

7. 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 can be found at http://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. 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/.

8. Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. More information about academic accommodations based on a disability can be found at http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered as early in the semester as possible. DSP is located in STU 301 and is open from 8:30 a.m. to 5:00 p.m., Monday to Friday. The phone number for DSP is 213-740-0776.

9. Required Materials

All readings and videos will be provided as a URL or posted to the class Blackboard site. Students will also need a GPS-enabled smart phone or tablet (either iOS or Android operating systems) that can connect to ArcGIS Online throughout the semester. Students will also need to check their e-mail and the class Blackboard site regularly. Blackboard posts and e-mails will be used to follow up on in-class discussions, to provide software updates, and to help organize the various class tasks and related activities. You are encouraged to use the class Backboard site to contribute to the class discussion as well.

10. Software Proficiency

To fully participate in lab activities, students are expected to develop sufficient skills for working in the software and accompanying geospatial data assigned to the course, and it will be important that students keep up with the exercises and skills as the semester advances. While technical skills will be developed and practiced during lab sessions, students are encouraged to continue their learning and practice with the software and outside of the lab sessions as much as possible.

Note that the software proficiency expectations point to the minimum skills required for you to perform each of the assigned project tasks. The lab assistants, however, are equipped to provide help with more sophisticated geospatial software and data resources, and students are free to take advantage of this expertise if they are interested in learning about more advanced features or programs.