Course Description
Topics in computational social sciences focuses on applications of big-data methods (machine learning techniques, natural language processing and network analysis), guided by psychological theories, for identifying various social and cognitive properties evident in human related big data. In this course, we will survey state-of-the-art techniques, and applications of such techniques, for investigating various aspects of human cognition. The intended audience for this course is psychology and computer science PhD students, and more broadly graduate students in social sciences, who are interested in using machine-learning techniques for analysis of data. Also, this course may be of interest to PhD students in communications and the business school.

Learning Objectives
This course is designed to survey current state of research in computational social sciences. In order to achieve this objective, each week several papers/books will be read and presented by students. Also, there will be a final project and written report.

Prerequisite(s): Instructor permission
Recommended Preparation: Psych 625 or a similar course

Course Notes
Students are not allowed to use laptops or smartphones during class, unless used for class presentations. Homework assignments will be posted on Blackboard. Students are also highly encouraged to use the course forum on Blackboard.

Technological Proficiency and Hardware/Software Required
The project for the class involves programming. Students are recommended to have taken a programming course before enrolling in this course.

Description and Assessment of Assignments
a. Paper presentation. Each student will present a set of papers related to one of the topics discussed in class.
b. Reaction paragraphs. Students are asked to write a short note, one or two paragraphs in length, about their reaction to the reading assignments of the week. These can be a quick summary of the material, comments about the subject area, or a critique of a particular theory or experiment. I will read these paragraphs before each class, and will use them to guide the discussion in class.
c. Class Project. This class is project oriented. The goal of the project is for students to get experience in applying big-data methods for analyzing behavioral data. This will include a project proposal presentation, three project update presentations, final project presentation, and a report. For project proposals, students will present a problem and a data collection method and/or dataset for which they want to analyze using the methods discussed in class. Each presentation should be about 10-15mins. The goal of the project update presentations
is to inform the class about the state of the project and brainstorm with other students on how to solve the remaining issues. Each update presentation should be around 10 minutes. For the final project presentation, each student/group will give a 15-20min presentation on their project. Students are expected to spend at least 80 hours working on their final project. The project report will be 10-15 pages.

d. Review Paragraphs: Students will provide reviews for other students’ projects. The reviews for the project proposal and project updates can each be about a paragraph in length and should address the strength and weaknesses of the discussed projects and other potential sources of related work. Each student is asked to read the final report of two other groups and provide comprehensive reviews of the final projects as well. These reviews will be sent to the authors, and the authors will have a chance to respond to the reviews.

### Grading Breakdown

<table>
<thead>
<tr>
<th>Assignment</th>
<th>% of Grade</th>
</tr>
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<tbody>
<tr>
<td>Project Proposal</td>
<td>10</td>
</tr>
<tr>
<td>Project Update 1</td>
<td>5</td>
</tr>
<tr>
<td>Project Update 2</td>
<td>5</td>
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<tr>
<td>Project Update 3</td>
<td>5</td>
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<tr>
<td>Project Presentation</td>
<td>10</td>
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<tr>
<td>Final Project Report</td>
<td>15</td>
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<tr>
<td>Reviews</td>
<td>10</td>
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<tr>
<td>Participation</td>
<td>15</td>
</tr>
<tr>
<td>Paper Presentations</td>
<td>15</td>
</tr>
<tr>
<td>Reaction Paragraphs</td>
<td>10</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
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### Assignment Submission Policy

The reaction paragraphs need to be submitted through Blackboard before 9:00am of the day the corresponding readings are due. The final project report and the reviews need to be submitted through Blackboard on the day of the final.

### Course Schedule:

The following schedule is tentative and may change during the semester (* indicates optional readings).

- **Week 1: Introduction to Computational Social Sciences**

- **Week 2: Discussions related to Data**
  - Borgman, C. L. (2015). *Big data, little data, no data: scholarship in the networked world*. MIT Press. Required chapters: 1, 2, 5, 6, 7 & 8
UK.
- Watch in class: Friends You Haven’t Met Yet

**Week 3: Text Analysis in Social Sciences – Word Count 1**

**Week 4: Text Analysis in Social Sciences – Word Count 2, Project Proposals**

**Week 5: No Class**

**Week 6: Text Analysis in Social Sciences – Modern Approaches 1, Project Proposals**


• Week 7: Text Analysis in Social Sciences – Modern Approaches 2, Project Update 1


• Week 8: Applications of Network Analysis in Social Sciences, Project Update 1


• Week 9: Audio/Video Analysis and their applications – Manual Analysis

• Week 10: Audio/Video Analysis and their applications – Automated Analysis
• Week 11: Project Update 2

• Week 12: Multi Voxel Pattern Analysis (MVPA)

• Week 13: Discussion of Deep Learning

• Week 14 & 15: Final Project Presentations
Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity or to the Department of Public Safety. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men provides 24/7 confidential support, and the sexual assault resource center webpage describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.