 Algorithms, Public Policy, and Ethics  
 POLI 170 – Fall 2020  
 Tuesday, Thursday 11:00am – 12:20pm  
 Location: https://ucsd.zoom.us/j/98158397497

**Professor:** Kirk Bansak  
Contact: kbansak@ucsd.edu  
Office Hours: Wednesday, 10:00am – 12:00pm (sign-up details below)  
Location: https://ucsd.zoom.us/j/8599340921 (different from lecture)

**TA:** Dora Hu  
Contact: xyhu@ucsd.edu  
Office Hours: Monday, 10:00am – 12:00pm  
Location: https://ucsd.zoom.us/j/7178050921

1 Overview

With machine learning becoming more pervasive and data availability improving over time, decision-makers in various realms of public policy are increasingly utilizing predictive algorithms to help inform or optimize their decisions. For instance, in the area of criminal justice, algorithms are often used to make predictions like a criminal defendant’s likelihood of failing to appear at court or reoffending in the future. These predictions are then used as risk assessments to inform various decisions, such as whether to grant a defendant pretrial release. The goal of incorporating these types of tools and data into public policy has been to address shortcomings in existing decision-making processes. However, the ability of algorithms to produce fair decisions and improve policy has been the subject of intense debate in recent years. Policymakers, academic researchers, and the popular media alike have scrutinized the increasing deployment of such tools.

As members of society—and potentially future policymakers, data scientists, lawyers, etc.—we have a stake in how public policy is being shaped and executed. What are the benefits, limitations, dangers, and ethics of the use of algorithms in public policy? How can we formulate balanced perspectives on these issues so that we can carefully evaluate different use cases? How can the deployment of such tools be improved in the future?

1.1 Objectives

This course will cover a broad range of topics on the use of predictive and related algorithms in public policy. This will include specific case studies, background material on how data are used in these tools, their possible benefits relative to status quo procedures as well as their limitations, and the potential harms and ethics surrounding their use (e.g. issues of algorithmic bias). As the goals of this course, students will:
1) Be introduced to a broad range of topics related to the use of algorithms in public policy.

2) Learn about specific case studies in which algorithms have been deployed in real-world public policy processes.

3) Develop key conceptual perspectives to think critically about, and weigh the pros and cons of, algorithms in specific public policy use cases. For example, perspectives on:
   - Prediction and predictive efficacy
   - Algorithmic bias
   - Applied notions of fairness
   - Human-algorithm interaction

4) Be introduced to various concepts and understandings that are useful for thinking about data, prediction, analytics, and ethics in society more generally.

5) Develop programming abilities in R.

1.2 Prerequisites

There are two prerequisites for the course. The first is upper-division standing. The second prerequisite is POLI5/POLI5D/ECON5 (Data Analytics for the Social Sciences), in particular as that course introduced the statistical software R. We will make use of R during class and in homework. See section regarding the use of R on the syllabus below.

In order to motivate and illustrate key concepts and themes throughout the course, there will also be some mathematical content, and many of the readings contain quantitative analyses and results. However, the course does not require a mathematical background other than basic arithmetic and algebra, as well as an elementary understanding of probability.

1.3 Evaluation

Students will be evaluated across the following areas.

- **Data Analysis Assignments: 50% of your grade.**
  
  Data Analysis Assignment 1: 10%
  
  Data Analysis Assignment 2: 20%
  
  Data Analysis Assignment 3: 20%
There will be three data analysis assignments that you will complete using R and R Markdown (see section regarding the use of R on the syllabus below). The first assignment will serve mainly as a refresher on using R and an introduction to R Markdown for anyone who has not used it before. The second and third assignments will be longer and more substantial.

You are allowed to work on data analysis assignments together in small groups of no more than three if desired, but you must write up your code and answers on your own! Submitting any code or answers that are copied from another student is unacceptable and in violation of academic integrity. If you work together, you must indicate on your assignments who your co-workers were.

- **Policy Memo: 30% of your grade.**
  
  Group Component: 20%
  
  Individual Component: 10%

In groups of 3-4, you will write a policy memo in which you propose, discuss, and evaluate the hypothetical deployment of an algorithmic tool to improve some process or function at UCSD. It will be up to your group to identify an area of campus life, university decision-making, or any other official UCSD business that could theoretically be improved via the assistance of a data-driven algorithm. Using the various themes and concepts learned throughout the course, you will explain how such a tool could be integrated into (or replace) an existing process, and you will evaluate the possible benefits, risks, and viability of its deployment. Based on this evaluation, you will make a final recommendation as to whether deployment would ultimately be desirable. In addition to the group memo that your group will write together, there will also be an individual written component that each student will complete separately and independently. More information on the precise format and guidelines for this assignment will be provided later.

- **Group Formation:** Each group must e-mail the instructors (kbansak@ucsd.edu and xyhu@ucsd.edu) a list of group members or request to be assigned to a group by **Tuesday, November 3rd**.

- **Proposal Approval:** Prior to writing the policy memo, each group must get the instructors’ approval of the proposed UCSD algorithm use case that will be highlighted in the memo. Groups are encouraged to get approval as early as possible, and the deadline for doing so is **Thursday, November 19th**.

- **Assignment Due Date:** The group memo and individual component are both due on **Friday, December 4th**.

- **Final Exam: 20% of your grade.**
  
  You will complete a cumulative final exam, administered online and on the date delineated under UCSD’s Fall Quarter exam schedule.
2 Logistics

2.1 Class Meetings

All class meetings will be conducted online at our scheduled class time (Tuesday, Thursday 11:00am – 12:20pm Pacific Time) via the video-conferencing platform Zoom. It is recommended that everyone tries to connect to Zoom in advance of our first class meeting to ensure the software is working properly. Please note that only authenticated users will be able to join our Zoom meeting room, which means you will need to ensure you have signed into your UC San Diego Zoom account. Our Zoom link for class meetings is the following:

https://ucsd.zoom.us/j/98158397497

In addition, all class meetings will be recorded and posted on our canvas.ucsd.edu page. However, students are highly encouraged to attend class at the scheduled meeting time in order to have the opportunity to participate and ask questions in real time. Note that in-class participation is not required and will not factor into grading. Individuals who do not want to have their surroundings visible are encouraged to use Zoom’s virtual background feature, if feasible, or to participate without video. Please also be mindful of others who may not wish to be visible or recorded in the background.

2.2 Office Hours

I will hold office hours from 10:00am to 12:00pm on Wednesdays on Zoom. Please note that the Zoom room for office hours is different from the room used for lecture! Office hours will be held here:

https://ucsd.zoom.us/j/8599340921

Please make sure to sign up for office hours in advance using the following Calendly link:

https://calendly.com/kbansak/officehours

If you would like to meet but have class or another important commitment during my office hours, I am happy to make accommodations. Please e-mail me to arrange an alternative time.

2.3 Teaching Assistant

Dora Hu (xyhu@ucsd.edu) will be the teaching assistant for this course. Dora will be holding office hours on Mondays from 10:00am to 12:00pm on Zoom here:

https://ucsd.zoom.us/j/7178050921

2.4 Course Website

We will use our canvas.ucsd.edu page to distribute readings, submit assignments, and access Zoom recordings.
2.5 Readings
There is no textbook for this course. All readings will be uploaded to the Canvas page or will be available online via the links listed on the syllabus. Pay attention to page numbers when noted on the syllabus, which indicate the portions of a reading that are required. If there are no page numbers listed, then the document should be read in its entirety. However, anything *highlighted in yellow* in the readings uploaded onto the Canvas page is *not required!*

2.6 R
Any homework requiring the use of R should be completed and submitted using R Markdown, a markup language for producing well-formatted HTML documents with embedded R code and outputs. R Markdown requires installation of the rmarkdown and knitr packages. We strongly recommend using RStudio, an IDE for R, which is set up well for the creation of R Markdown documents.

To download/install R:
https://cran.r-project.org/

To download/install and learn more about RStudio:
http://www.rstudio.com

For more on R Markdown:
http://rmarkdown.rstudio.com

2.7 Assignment Schedule Summary

<table>
<thead>
<tr>
<th>Due Date</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Each Class Meeting</td>
<td>Assigned Readings</td>
</tr>
<tr>
<td>Thursday, October 15</td>
<td>Data Analysis Assignment 1</td>
</tr>
<tr>
<td>Thursday, October 29</td>
<td>Data Analysis Assignment 2</td>
</tr>
<tr>
<td>Tuesday, November 3</td>
<td>Group Formation for Policy Memo</td>
</tr>
<tr>
<td>Tuesday, November 17</td>
<td>Data Analysis Assignment 3</td>
</tr>
<tr>
<td>Thursday, November 19</td>
<td>Approval of Policy Memo Proposal</td>
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<tr>
<td>Friday, December 4</td>
<td>Policy Memo (Group &amp; Individual Components)</td>
</tr>
<tr>
<td>Wednesday, December 16</td>
<td>Final Exam</td>
</tr>
</tbody>
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2.8 Expectations

<table>
<thead>
<tr>
<th>What you can expect of me</th>
<th>What I expect of you</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lecture</strong></td>
<td>I will hold lectures online during our normally scheduled class time, and I will post the lecture recordings on Canvas.</td>
</tr>
<tr>
<td></td>
<td>I encourage everyone to join the lectures synchronously if possible to have the opportunity to participate and ask questions in real time. However, this is not required.</td>
</tr>
<tr>
<td><strong>Emails</strong></td>
<td>I try to respond to emails as soon as I can, and at least within 24 hours. Don’t hesitate to send me a reminder if I haven’t responded within that window.</td>
</tr>
<tr>
<td></td>
<td>Before writing to me with a question, check the syllabus to see if it’s addressed there first. Please don’t leave questions until the last minute.</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>I’ll always be available during the office hours stated above.</td>
</tr>
<tr>
<td></td>
<td>Please use my office hours if you would like to discuss something. If you have class during my office hours, please e-mail me to arrange an alternative time.</td>
</tr>
<tr>
<td><strong>Reading</strong></td>
<td>The content in some of the readings I have assigned can be challenging or dense, so it’s OK if you don’t immediately understand everything. We will use class and office hours to clarify.</td>
</tr>
<tr>
<td></td>
<td>Please do all the readings. With academic articles, read outside-in: the introduction and conclusion first, then the middle.</td>
</tr>
<tr>
<td><strong>Late Submission</strong></td>
<td>I am willing to make reasonable accommodations and understand that difficult situations can arise. However, I will not make exceptions for one person that are not available to everyone else.</td>
</tr>
<tr>
<td></td>
<td>Complete all assignments on time, and reach out to me if you are encountering troubles.</td>
</tr>
</tbody>
</table>
3 Course Outline

3.1 Introduction

- Thursday, October 1, 2020
  Topic: Course Introduction
  Nothing to read before class.

- Tuesday, October 6, 2020
  Topic: Algorithms and Public Policy: The Big Picture
  Read before class:

- Thursday, October 8, 2020
  Topic: A Refresher on R
  Read/Do before class:
  - Make sure R and RStudio are installed on your computer (see section in the syllabus on R above).
  - Review your R materials from POLI5/POLI5D/ECON5.
  - Optional, for your reference: Additional refresher tutorial videos can be found at the links below.
    https://www.youtube.com/playlist?list=PLOU2XLYxmsIK9qQfztXeybpHvru-TrqAP
    https://www.youtube.com/playlist?list=PLjgj6kdf_snYBkIsWQYcYtUZiDpam7ygg

Case Study 1

- Tuesday, October 13, 2020
  Topic: Allocation of Health Care Services
  Read before class:
3.2 Better Understanding Data and Prediction

- Thursday, October 15, 2020

**Data Analysis Assignment 1 Due**

**Topic:** Data, Data Sets, and Measurement

**Read before class:**

- Tuesday, October 20, 2020

**Topic:** Demystifying Prediction

**Read before class:**

- Thursday, October 22, 2020

**Topic:** Implementing Prediction

**Read before class:**
- Dan Kopf, “This is How Computers ‘Predict the Future,’” *Quartz*, September 5, 2018. Available at: https://qz.com/1261817/predictive-algorithms-are-not-all-that-complicated/
Tuesday, October 27, 2020

**Topic:** Evaluating Predictive Performance and Uncertainty

**Read before class:**


**Case Study 2**

Thursday, October 29, 2020

**Data Analysis Assignment 2 Due**

**Topic:** Algorithms in Criminal Justice

**Read before class:**

Election Day

- Tuesday, November 3, 2020

*Group Formation for Policy Memo Due*

No Class! Go Vote!

### 3.3 Algorithmic Bias and Ethics

- **Thursday, November 5, 2020**

  **Topic:** Ethics, Algorithms, and the Law

  **Read before class:**

  

- **Tuesday, November 10, 2020**

  **Topic:** Applied Definitions of Fairness

  **Read before class:**


- **Thursday, November 12, 2020**

  **Topic:** Choosing Fairness Priorities and Impossibility Results

  **Read before class:**

  
• Tuesday, November 17, 2020

**Data Analysis Assignment 3 Due**

**Topic:** Sources of Bias

**Read before class:**

• Thursday, November 19, 2020

**Approval of Policy Memo Proposal Due**

**Topic:** Dealing with Bias: Human and Algorithmic

**Read before class:**

**Case Study 3**

• Tuesday, November 24, 2020

**Topic:** Improving Refugee Integration via Algorithmic Assignment

**Read before class:**
Thanksgiving

- Thursday, November 26, 2020
  No Class! Thanksgiving Holiday!

3.4 From Prediction to Decision-Making

- Tuesday, December 1, 2020

  Topic: Prediction, Decision-Making, and Human-Algorithm Interaction

  Read before class:

- Thursday, December 3, 2020

  Topic: Limits of Prediction-Based Action

  Read before class:

- Friday, December 4, 2020

  *Policy Memo (Group and Individual Components) Due*

- Tuesday, December 8, 2020

  Topic: Getting to Deployment & Other Issues for Algorithms in Practice

  Read before class:
3.5 Conclusion

- Thursday, December 10, 2020
  Topic: Conclusions and Review
  Nothing to read before class.

- Wednesday, December 16, 2020
  Final Exam
4 Policies

4.1 Academic Integrity
Students agree that by taking this course, all required assignments may be subject to submission to Turnitin.com for textual similarity review and the detection of plagiarism. All submitted assignments may be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

4.2 Students with Disabilities
Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (https://osd.ucsd.edu/). Students are required to discuss accommodation arrangements with instructors and OSD liaisons in the department well in advance of any exams or assignments. The OSD Liaison for the Department of Political Science is Joanna Peralta; please connect with her as soon as possible via the Virtual Advising Center: https://stark.ucsd.edu/students/vac/

4.3 UC San Diego Principles of Community
The University of California, San Diego is dedicated to learning, teaching, and serving society through education, research, and public service. Our international reputation for excellence is due in large part to the cooperative and entrepreneurial nature of the UC San Diego community. UC San Diego faculty, staff, and students are encouraged to be creative and are rewarded for individual as well as collaborative achievements.

To foster the best possible working and learning environment, UC San Diego strives to maintain a climate of fairness, cooperation, and professionalism. These principles of community are vital to the success of the University and the well being of its constituents. UC San Diego faculty, staff, and students are expected to practice these basic principles as individuals and in groups.

For the complete UC San Diego Principles of Community, see: https://ucsd.edu/about/principles.html
5 Resources

Library Help and Research Tools:  https://library.ucsd.edu/ask-us/triton-ed.html

Writing Hub:  https://commons.ucsd.edu/students/writing/index.html

Supplemental Instruction:  https://commons.ucsd.edu/academic-support/supplemental-instruction/si-students.html

Tutoring:  https://commons.ucsd.edu/academic-support/content-tutoring/index.html

Mental Health Services:  https://caps.ucsd.edu

Community Centers:  Learn about the different ways UC San Diego explores, supports, and celebrates the many cultures in our diverse community.  https://students.ucsd.edu/student-life/diversity/index.html

Accessibility:  https://disabilities.ucsd.edu/

Basic Needs:  Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in this course, is encouraged to contact: foodpantry@ucsd.edu and basicneeds@ucsd.edu. For more information, see https://basicneeds.ucsd.edu/