

Project Overview

PPOL564 | Data Science 1 | Foundations

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Overview

The following provides an overview of the data science project that you will be responsible for completing by the end of the semester. The project is an opportunity to apply the skills and tools that you've learned throughout the course on an area of substantive interest to you.

The project is composed of three distinct parts: a proposal, a presentation, and a report. The proposal should outline the general plan for the project and will serve as an opportunity for the professor to provide guidance on the project's feasibility. The presentation is an opportunity to present your work in mid-stream to receive verbal feedback from the professor, TA, and classmates. These comments will help you as you move forward with the final report. The report is the written analysis of the project in its entirety. The report will be due on December 16 @ 9pm EST (PPOL564's designated finals slot).

While completing your project, you will be responsible for creating and maintaining a public repository on [Github](#), tracking all progress made on your project using the version control implementations discussed at the start of the semester. All work product should be reflected on the repository. The proposal, presentation materials, and the report should be generated using [RMarkdown](#) or [Jupyter Notebook](#) and should follow all reproducibility practices discussed in class.

Project Proposal

Due	Proportion of Grade	Length
November 3	5%	500 words

The project proposal asks that you sketch out a general 2 page (single-spaced; 12pt font) project proposal. The proposal should offer the following information:

1. A high-level statement of the problem you intend to address or the analysis you aim to generate;
2. The data source(s) you intend to use;
 - The data you choose to utilize should take some effort to compose (it shouldn't be entirely "off-the-shelf data", i.e. data easily downloaded online).
 - If using API's or other easily downloadable data sources (such as World Bank data) to collect your data, try joining other data to the downloaded data, change the unit of analysis, etc.
 - In general, one should have some wrangling component to get their data in order.
3. Your plan to obtain that data;
4. The methods (learned in class) that you aim to employ; and
 - The project must contain:
 - a data wrangling component
 - (multiple) data visualizations
 - a machine (statistical) learning component
5. A definition for what "success" means with respect to your project.
 - In your words, what would a successful project look like? How will you know that you solved the problem or accomplished your goal?
 - Four weeks isn't a long time to complete a project like this. Thinking serious about what a "finished" or "successful" project might look like. This will help you set realistic goals/expectations.

Please be detailed but *succinct* as possible when writing. *Any material that exceeds 500 words will not be considered when grading/reading.* There is no advantage/incentive to exceeding the page limit. Be sure to properly cite any referenced materials and/or packages (it is okay if your work cited runs onto a third page).

Project Presentation

Due	Proportion of Grade	Length
December 1	10%	7 minutes in length

Part 1: Video Presentation

Please prepare and record a 7 minute presentation that walks us through the progress you've made on your project to date. The presentation is an opportunity to summarize your project and talk through your (preliminary) results. Moreover, it'll provide an opportunity for both your peers and the Professor/TA to provide constructive feedback, which you can then incorporate into your final paper.

When preparing your recording, please prepare slides *using R Markdown or Jupyter Notebook*. **Students should not “live code” or show output from their computer.** This is meant to be a polished presentation as if you were giving it in-person.

The slides should generally adhere to the following format. You should plan on having up to 5-10 slides in total. The layout of the presentation should take on the following form.

1. (1-3 slides) Problem statement and Background
2. (1-3 slides) Methods you explored or considered using.
3. (1-3 slides) The methods/tools you used, and the rationale for their use.
4. (2-4 slides) Results (however preliminary).
 - Show main visuals, analyses/tables, and/or any products built (interactive graphics, websites, etc.)
5. (1-2 slides) Lessons learned thus far and/or plans to mitigate challenges.

Students must submit both their slides *and* the `.rmd/.ipynb` file used to render the slides along with their video recording as a `.zip` file to CANVAS by the end of the scheduled class time. There will be no in-person and/or virtual class meeting this day.

Note that it is vital that all students submit their video on time so that others will have sufficient time to provide feedback.

Part 2: Feedback

Each student will be randomly assigned the names of 5 peers in their class. The names will be circulated on **December 1**. Each student will be required to watch the recordings of their assigned classmates and provide substantive feedback by **Sunday December 5 11:59PM**. All comments/Feedback should be written on a shared **Google Document**, which will be circulated on **December 1** via the class Slack channel. The recorded presentations will be stored in a share folder on CANVAS. All enrolled students will have access to this folder.

Project Report

Due	Proportion of Grade	Length
December 16	30%	3000 words

The report is a complete description of the project's analysis and results. The report should be 3000 words in length and cover the below bullet points. As with the proposals, no written material will be considered beyond 3000 words when reviewing the report (a work cited can span beyond 3000 words). Below I've outlined points that one should aim to discuss in each section. Note that paper should read as a cohesive report, so do not respond to these bullet points verbatim.

- **Introduction**

- What is the aim of the project?
 - * Summarize the problem
 - * State your goals
- What do you do in this report?
 - * offer a roadmap of the project

- **Problem Statement and Background**

- Give a clear and complete statement of the problem and/or aim of your analysis.
- Include a brief summary of any related work that has tried to tackle a project similar to yours (i.e. a *light* literature review)

- **Data**

- Where does the data come from?
- What is the unit of observation?
- What are the variables of interest?
- What steps did you take to wrangle the data?

- **Analysis**

- Describe the methods/tools you explored in your project.
- Outline in detail our entire analysis.
 - * Justify the tools/methods that you used.
 - * Assume the reader is smart but doesn't know Python and/or Machine Learning well. That is, be crystal clear about what you're doing and why.

- **Results**

- Give a detailed summary of your results.
- Present your results clearly and concisely.
- Please use visualizations and tables whenever possible.

- **Discussion**

- Speak on the “success” of your project (as defined in your proposal).
 - * Did you achieve what you set out to do? If not why?
- What tools/methods did you consider but *not* use in the final analysis?
- How would you expand the analysis if given more time?

The reports must be submitted as a hardcopy (i.e. the `.rmd` notebook must be rendered as a `.pdf` or `.html`) to CANVAS by 9PM on December 16th. ***The code for all the tables and visuals in the rendered document must be included in your Github repository.*** The professor or TA should be able to clone the repository and run your code without issue. ***Note that given the page constraints, no Python3 code should be visible in the rendered document.***