

APCV 361 Data Analysis and Visualization

Final Project Description

1 Objectives

The whole project is worth 15 points for your comprehensive grade. The objective of this final project is to employ data analysis and visualization to address research questions regarding public health in U.S. states and counties. This project requires you to identify a problem or research questions, and design and develop computational models to understand and employ data used in your project. You are expected to present your project results using a Jupyter notebook document.

Note that this project is designed as a team project for you to practice collective learning. GitHub is required to be used for your project management and sharing in class. But you are allowed to conduct your own research and/or programming on the project work if your schedule cannot work out with that of others in class. Note that copying some online text/code or textbook examples will **NOT** satisfy the requirement of the final project.

2 Scoping Your Project

It is up to your group to define and scope the project. Your data analysis and visualization could focus on community data analysis using the community data in the U.S. context. You could explore community data that describe a single state's counties such as the 15 counties in Arizona. Or you could compare public health in multiple states such as Arizona, California, and Texas. Below I list three potential general research questions you could address:

1. What are the disparities in health outcomes and access to healthcare across different racial and ethnic groups, income levels, and geographic areas?
2. What are the trends in behaviors such as smoking and physical activity that impact health outcomes?
3. What could be the relationship between access to healthcare services, insurance coverage, and health outcomes?

When you define your project, make sure it only focuses on an appropriate piece of the broad topic. For example, you are not allowed to analyze solar panel data in China even though the data would be interesting too. And you need to clearly state what is the goal of your project by specifying more specific research questions. Be sure that this is understandable to someone who doesn't know much about your field of study. If needed, define terms. To test your explanation, you may give your document to a friend who is not in your major. If he/she doesn't understand, try again!

3 Project Proposal Submission, Due March 26, 2023

For your proposal package submitted to dropbox on time, you could earn up to 5 points out of the total 15 points for the whole project. In this submission, you need to submit two parts:

1. Project Proposal (5 points)
2. Peer Review (Submission required to get points)

If you work in a team, your team only need to submit one project proposal by a chosen team member. The other team members need to write a note in the folder that shows who is responsible to submit the team project proposal. Every team member needs to submit the peer review form, which has a form at the D2L web site. Even if you are working solo, you will also need to submit

the peer review document to indicate your contribution to the project development. You need to fill in the peer review form indicating who are your team members and how much each member contributed to the development of the project proposal. I will grade your proposal based on the required elements in the proposal, the subject knowledge demonstrated in your proposal, and the quality of writing. The project proposal submission is due on March 26, 2023.

Your project proposal (2-3 pages) should include:

1. A title, which reflects nature of your project
2. Introduction and Project Objectives, including:
 - (a) Definition of the problem/research question/opportunity to exploit. This part is to address what is the project and what is the motivation of the project. You should provide context for your study and reveal what you are trying to resolve or address, and/or what experience you want to have in your project. Even though I provided two general research questions, you need to adjust them into your project context. Note that your problem statement needs to be clearly stated and should be able to be addressed by data you collect and analyze in your project.
 - (b) Background/Significance of the Project: Be succinct. Clearly support why this project and how your project brings up benefits or values. Make sure the content you provide is accurate, relevant, and provides appropriate background for your project.
3. Project Design or Development: Design and describe the methodology or algorithmic steps you will use to address the research questions or problems tackled in the project. The methodology could include methods of community data gathering, model design and/or implementation, etc. This section of the proposal should explain the details of the “how” questions on approaching your project to accomplish the project goal. That is, the planning

on the project design or development should be able to produce fruitful results. For example, for a particular research question, make sure your project design or development has planning to collect data and work with data to address the question.

4. Project Timeline: Give an overview of when you are going to do specific steps (milestones) of your project. This does not need to be a day to day list but give an overview weekly. (I would encourage you to come up some weekly project outcomes that may contribute to your overall project eventually.) You should plan how to develop your final project notebook incrementally.
5. Project References: Listing references including the author, title of article, journal title, volume, pages, and date. References are not included in (are in addition to) the 2-3 page max.

You need submit your proposal to D2L assignment folder. The same late turn-in assignment policy specified in the syllabus is applicable to the project proposal.

4 Final Project Submission, Due May 8, 2023

You could earn up to 10 points out of the total 15 marks for the final project package. Your final project submission includes three parts:

1. Project Log Report (2 points)
2. Final Project Notebook (8 points, and each team is required to submit one report.)
3. Peer Review Form (Submission required to get points)

Your final project report includes your accumulated project log reports, which are individual reflections and worth 2 points, and the final project notebook (Jupyter Notebook document),

which is worth 10 points and should be team work if you work in a team. Additionally, you should also submit the peer review document that indicates how much each team member, including yourself, contributed to the project development. Every student needs submit both the peer review document and the accumulated log document, to the D2L assignment folder by the due date, May 8 2023. For your final report (the Jupyter Notebook document), your team only needs to submit one report. (One team member can submit the team report for the whole team. The other team members can indicate who is responsible to submit the report as a note in their D2L assignment folders.) Note that you can package multiple files including the required one and other supplementary documents if you have in a zip file and upload the zip file to the D2L assignment folder.)

4.1 Project Log Report

To document and reflect your project development during the term, you are required to keep a systematic record of your thoughts, experiences, and research progress. The notes you capture in your log report will be a great resource for you to discuss your project with your instructor and peers.

Your log report should be done weekly. Your weekly reports could include an update on the progress of your work, any questions and concerns that have arisen, ideas and observations, and any self-reflection about how your project is evolving as your work goes forward. The complete project log report including your weekly entries will be required to be submitted as part of your final report.

I have more details about what to document and reflect presented in a Google Doc titled “Project Log Report” in the project module at the course Content page at D2L course site.

4.2 Final Project Notebook

You will use a notebook document to communicate ideas and messages about the final project. The document may be presented creatively. However, you should make sure that your presentation includes below:

1. Title: Show your project title, and your name.
2. Summary: Describe what the project is about and what you did. (E.g. research questions or problem statements.) Clearly and coherently state motivations for the work and its importance.
3. Methodology/algorithm: Describe your methodology/algorithm to resolve the problems or methods in your computation (e.g. what is the data you used in your project, what is the computational model you built, how you examined your data, and what is your project result, etc.) You should give enough details including code and markdown cells in your document in order to describe what is unique about your project. For example, you may want to describe how you built and evaluated the computational models based on your project data.
4. Results, Discussion, and/or conclusions: Show illustrative results of the works and make conclusions of your project. Also clearly describe the importance of the results.
5. Future Directions (optional): If it is appropriate, state what you plan to do next on your project. Do your conclusions lead you to new questions/problems? Are you considering alternative computation for your original questions or problem solving?
6. Acknowledgements (optional): This is the place where you can acknowledge those who supported and contributed to your project.

7. References: List all sources that you cite in the project.

Note that you also need to pay attention to the presentation of your notebook document, which should be attractive in terms of design, layout and neatness. Please try your best to avoid any grammatical/spelling mistakes.

5 Notes

You need submit your final project documents including proposal and notebook documents to D2L assignment folders. You are also welcome to publish your project proposal and report at online discussion for celebrating your accomplishment and sharing your work with your peers.

I will provide you the rubrics attached with the proposal and final report assignment folder where you will submit your proposal and final project report files. Please make sure you read the rubrics as well as the specification while developing your proposal and final project documents.