Assessment Plan – NEUR 265

Assessment Title

Coding Homework

Due Date

Coding Homework #1: 02/09/2024, 11:59 PM
Coding Homework #2: 02/16/2024, 11:59 PM
Coding Homework #3: 03/01/2024, 11:59 PM
Coding Homework #4: 03/08/2024, 11:59 PM
Coding Homework #5: 03/22/2024, 11:59 PM
Coding Homework #6: 03/29/2024, 11:59 PM
Coding Homework #7: 04/05/2024, 11:59 PM
Coding Homework #8: 04/12/2024, 11:59 PM
Coding Homework #9: 04/19/2024, 11:59 PM

Value

15 point each (135 points total)

Introduction

Learning to effectively code will require practice outside of the classroom. Weekly practice will allow you to **write effective code**, **create graphical output,** and **organize your data and code.** Coding homework will build off of concepts and work that we do in-class during the week.

Directions

Coding homework will be assigned in Google Colaboratory (colab.research.google.com) each week. I will share the homework sheet with you in Colab (via your Lafayette-linked Google account). Homework assignments will look much like the assignments we do in-class. You will be prompted to create snippets of code within the Colab notebook. You will sometimes use outside datasets to finish your homework – these datasets will be provided to you via Google Drive.

Once you have finished your homework, you will upload it as a Jupyter notebook in the main branch of your GitHub repository. You will do this by choosing “File”, and “Save a Copy in GitHub”.

Your notebooks will be scored on accuracy (does your code work?), organization and formatting (is your code as simple as possible?), and graphical output (are your graphs displaying the correct information? Are axes labeled?)

Scoring

Criteria	Weight	Unacceptable	Satisfactory	Exemplary
Accuracy	50%	(0 – 74.9%) Code does not run – produces errors consistently.	(75– 89.9%) Most code runs, but some produces errors.	(90 - 100%) All code runs perfectly.
Organization	15%	(0 – 74.9%) Code is extremely convoluted. Syntax that we have not covered in class is used.	(75-89.9%) Code is mostly clean, but sometimes convoluted.	(90 - 100%) All code is written as simply as possible, using only syntax covered in class.
Graphical Output	35%	(0 – 74.9%) Graphs display wrong output, axes aren't labeled, graphs are formatted incorrectly.	(75-89.9%) Graphs are mostly formatted correctly, but might contain slight errors/formatting problems.	(90 - 100%) Graphs display correct content, axes are labeled correctly, formatting is correct.

Assessment Plan – NEUR 265

Assessment Title

Final Poster Presentation

Due Date

Posters due 04/26/2024 at 11:59 PM
Posters will be presented during the final week of class

Value

50 points

Introduction

At the end of the semester, you will present a final project to the class. This project will be in the form of a scientific poster, with Introduction, Methods, Results, and Discussion sections. For this project, you will perform an original analysis of an open dataset from the Allen Brain Institute, and present the output (your visualizations) in the Results section of the poster. The Methods section of the poster will contain information about the analyses that you performed, including snippets of code. The Introduction section will contain a paragraph about which analysis you chose and why, and the Discussion section will contain a paragraph outlining your interpretation of your results, and why you think they might be important. This project will enable you to **draw conclusions** about brain-behavior relationships, **write** clean and efficient code, and **create** clean and intelligible graphs.

Directions

For the final project, I would like you to create a scientific poster that details the methods and results for two original analyses that you complete. These analyses must come from an open source dataset from the Allen Brain Institute. You may choose to analyze two datasets for your poster. You will be provided with a scientific poster template in our shared Google Drive folder later in the semester. Put your background/code/graphs/discussion/future directions in this template.

Here are the rules:

1) For each analysis, you should pick two dependent variables from one of the datasets. You should then compare these variables between at least two groups from that dataset. An example of two groups in the PatchSeq dataset would be Pvalb neurons vs. Sst neurons. An example of two groups in the Alzheimer's Pathology dataset would be APOE4 allele carriers vs. non-APOE4 allele carriers. There are a variety of groups to choose from in each dataset – if you have a question about what constitutes a group, please see me.

2) For each analysis, you should create the following:

a) Some way of visualizing the distribution of each dependent variable – a histogram, for example

b) Some way of visualizing the distribution of each grouping variable – a bar graph, or pie chart, for example

c) A scatter plot showing the relationship between the two dependent variables, with dots color-coded by group

d) Two boxplots – one for each dependent variable – showing how each dependent variable distribution differs between groups

3) You should put each graph in a section of the poster called “Results”. Each graph should have a short figure legend beneath it. The figure legend should contain a description of the graph, results of skewness tests for “a”, a description of how many observations of each group are in your dataset for “b”, a description of the correlation between your variables, and how that correlation might differ by group for “c”, and results (statistic and p-value) from either a t-test (if your data are normally distributed), or a Wilcoxon’s rank-sum test (if your data are not normally distributed) for “d”.

4) Your poster should contain a “Background” section. This section should contain a couple of paragraphs outlining the dependent variables/groups you chose to use – for example, what are Pvalb and Sst? Why are they important? Why would we be interested in comparing them? What is APOE? What are the different APOE alleles, and how common are they? What is the relationship between APOE and Alzheimer’s disease?

You should have some sort of rationale as to why you chose your dependent variables/groups – in other words, why did you pick those specific comparisons? What do we know about how your dependent variables might differ? What has already been found about the relationships between those dependent variables in the groups that you chose? Why might comparing these variables in these groups be important?

You should include at least 3 references (scientific, peer-reviewed articles) in this section. This section should also contain your hypotheses for each analysis. You can find references through resources like Google Scholar (scholar.google.com), or PubMed (pubmed.gov). Use in-text citation only for your sources, in the following format: Last name, first name, Title, Volume: Page numbers, Year of publication.

5) Your poster should contain a “Methods” section. This section should contain the python code, copied and pasted exactly as you ran it, that you used to perform your analyses.

6) Your poster should contain a “Conclusions” section. This section should contain an interpretation of your results – did your analyses support your original hypotheses? What new information was gained from doing these analyses?

7) Your poster should contain a “Future Directions” section. This section should contain a paragraph with a couple of ideas about important experiments that should be done to further elucidate the relationships between the groups that you chose.

Your poster should be saved as a .pdf and e-mailed (or shared via Google Drive) to me no later than Friday, April 26th. It is *extremely* important that you send your poster to me by this date – otherwise, we will not have time to print the poster, and you will lose points as a consequence.

Scoring

Criteria	Weight	Unacceptable	Satisfactory	Exemplary
Content	35%	(0 – 74.9%) The required content (as outlined in the assessment plan) is not present. Code is missing. Introduction section is incomplete. No references. Graphs are missing.	(75– 89.9%) The required content is generally present. Some parts may be missing (references, graphs, background information, etc.)	(90 - 100%) The required content is clearly present and summarized well. All required information, as outlined in the assessment plan, is present on the poster.
Organization	35%	(0 – 74.9%) The poster is not formatted correctly. Ideas are difficult to follow. Too much text/not enough graphs. Graphs and text are difficult to read. Graphs are incorrect.	(75-89.9%) The poster is generally formatted correctly, but some parts may be sloppy.	(90 - 100%) The poster is formatted perfectly. The flow from Introduction to Discussion is immaculate. Ideas are easy to follow. Graphs are well done and easy to interpret. Legends are formatted correctly. Interplay between text and graphics is visually pleasing.
Oral Presentation	30%	(0 – 74.9%) Figures and concepts on poster are not explained correctly. Student cannot answer questions about analyses/graphs. Presentation is rushed/takes too long. Student stumbles over words and/or reads from notecards.	(75-89.9%) Explanation of content is mostly good. Student is unsure about some parts of poster.	(90 - 100%) Student engages with audience, explains everything on poster perfectly and with confidence. Student can answer questions thoughtfully and completely.

Assessment Plan – NEUR 265

Assessment Title

Article Discussion & Reflection Essays

Due Date

Article Discussion: 01/26/2024 by 11:59 p.m.
Reflection Essay: 03/08/2024 by 11:59 p.m.

Value

20 points total (10 points each)

Introduction

Anybody can become good at coding. The idea that people are innately "good" or "bad" at math, science, and coding is false. How good you become at coding is largely dependent on how much effort you put into learning how to do it, and how well you learn from failure. Failure is normal when analyzing data and learning how to code – your code will almost certainly fail at some point during this course. This assignment will help you develop the confidence to be successful at coding.

Directions

During the first week of class, you will read the Slate article "The Secret Technique for Learning How to Code", and write a short (1-page) essay detailing the following:

- Your past coding experience, and your attitude toward coding (Do you like it? Are you apprehensive about it?)
- Your impression of the article, and how/if the article has changed your attitude toward coding or how you think about your own coding abilities
- Why you are taking this course, and what you hope to get out of it

For the reflective essay:

You will write a short (1-page) paper detailing the following:

- How has your attitude toward coding changed from the first week of the semester? What has contributed to this change?
- Which aspect/assignment have you liked the most during the course? Which have you liked the least? What are your reasons for both?
- Reflect on the skills you thought were necessary for coding at the beginning of the course. Do you still think those same skills are the most important for coding? Why or why not?

Scoring

Criteria	Weight	Unacceptable	Satisfactory	Exemplary
Content	70%	(0 – 74.9%) Content (as outlined in the assessment plan) is not present.	(75-89.9%) Paper is well summarized, content is generally present.	(90 - 100%) Paper is excellently summarized.
Clarity and Organization	30%	(0 – 74.9%) Summary lacks clear transitions. Too much (or too little) space is dedicated to one topic.	(75-89.9%) Transitions are present, and generally make sense. Outline of paper is clear.	(90 - 100%) Transitions are excellent. The summary flows well from beginning to end. Everything is presented in a logical order.