

University of Trento --- M.Sc. Data Science

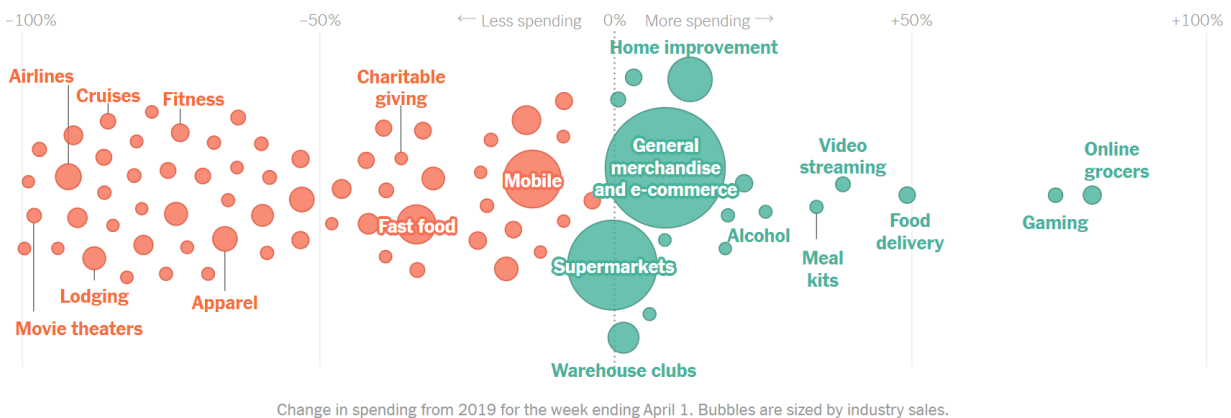
Data Visualization Lab Exam

4 September 2023

Using either a Jupyter and/or a R Notebook, generate either the HTML or PDF files to submit.

Answer the questions (in a Markdown cell / as plain text) and solve the exercises listed hereafter:

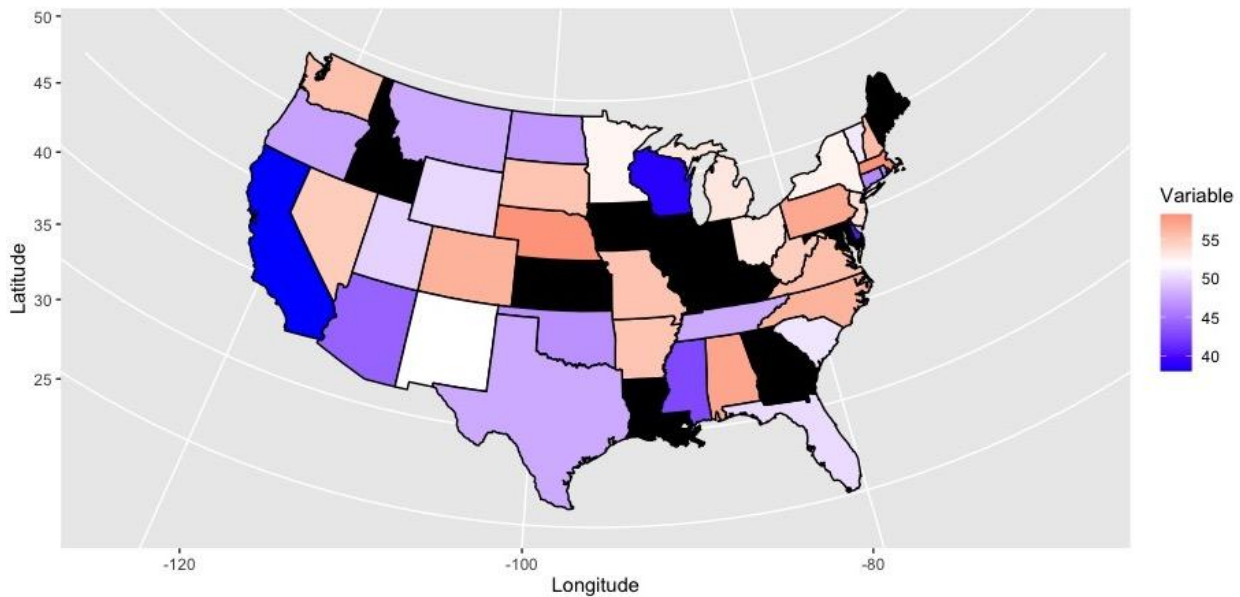
1. [0-5 points] Describe in detail the meaning of the visual encoding elements and their attributes in the following infographic reporting the change of spending in the US in 2020 as compared to 2019.



2. [0-5 points] Discuss in detail the differences among the 3 diverse types of visual experience: exploratory, exhibitory and explanatory. Highlight those differences through graphical examples, other than those shown in the course slides.

3. [0-5 points] "UMAP induces a space transformation while t-SNE does not". Explain in detail the previous sentence and show some explanatory plots.
4. [0-7 points] The datafile [employment_italy.csv](#) collects information about work employment in the italian regions across several years. Prepare an infographic with two panels describing some patterns inferred by (a subset of) the dataset, including at least one geographic map.
5. [0-7 points] Consider the [ionosphere.csv](#) dataset, where 351 radar readings (on the rows) are described by the 32 different frequency values (columns 1-32) and classified as "good" or "bad" (g or b in the last column). Try different 2D dimensionality reduction algorithms with optimized parameters to separate the two sets of good/bad samples and discuss the differences between the obtained projections.

6. [0-7 points] Using the dataset [mydata.csv](#), try to replicate the following plot.



Send by email to giuseppe.jurman@unitn.it the **HTML or PDF files produced by the notebooks: please name it as *name_surname.{html,pdf}* or *name_surname_1.{html,pdf}*** (if you have more than one HTML or PDF file).

Optionally, you can also submit the corresponding notebook(s) (Python,R). In this case, please supply also all the files needed to correctly compile the notebooks (images, .json, etc)

Notes:

- Exam is passed when at least 18 points are earned.
- If more than 30 points are achieved, the corresponding mark will be "30 cum laude"
- Use of the internet is allowed, but the candidate is expected to work individually.
- Check your mailbox in the next few hours, I may contact you for missing files or replacing corrupted files.