Final Project

DUE:

- **Week 8 (Draft)**
- **Week 10 (Final)**

The Final Project can be chosen by the students. It will consist of a conceptual project with a dataset chosen from your experience that you pick to apply concepts of deep learning or from a list of proposed projects from the class instructor. You will do the data analysis, provide arguments why this is a candidate for deep learning, choose a method, and develop a solution using a neural network architecture.

Provide the following:

- Describe the problem clearly in terms of use case (no technology).
  For example:
  - Recommended style:
    - House pricing prediction in an area given the zip code using a neural network.
    - The challenge is the current methods don't provide accurate results. Evaluate whether a DNN can provide a better estimate.
  - Not recommended: (Remember, the problem comes first, not the technology.)
    - Deep learning application to estimated house prices
    - Challenge: To learn about neural networks
- Describe data, statistics:
  - Original form
  - Modifications
  - Your visualizations, charts, descriptions
- DNN architecture, hyperparameters, design choices
  - Provide design choices.

References:

You may choose the project from:

- Class-provided resources.
- From the Final Project folder in GitHub: https://github.com/emmanueliarussi/DU-DeepLearning
- From: https://www.geospaces.org/capstone/capstone/capstone_index.html/

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Term projects will be developed individually or in groups of two to three people, and the presentation will consist of

- Class presentation (7–10 minutes plus 3 minutes for questions).
- A documented notebook containing the complete project.
- A 10- to 12-page report including dataset description, data preparation and analysis, results, and discussion).
- In each decision, justify your choices!

Please prepare a single Python notebook with the answers. However, feel free to use more than a single Python file to solve the tasks. If necessary, some results may be precomputed and stored in separate files.

Notebooks must clearly explain the answers to each question, supported by evidence derived from the data and visualized using the tools presented in class.

Describe the characteristics of the data you were given as well as your reasoning process leading to each answer. Use the following structure template for the answer notebook:

- Project title, task name
- Description and data characterization
- Answer to Question 1
- Answer to Question 2

Final Project reports are due immediately after your presentation and should be a 12- to 15-page description that includes (among others) the following topics:

- Research question: What problem are you solving? What is the usefulness of the project?
- What dataset and metadata were collected, and why?
- Required data munging and wrangling procedures
- Statistical and visual data exploration
- Data analysis and modeling
- Model evaluation and visualization
- Discussion, conclusion, further work
- A slideshow adequate for a 10- to 15-minute comprehensive presentation in class; please find the Term Project Presentation Rubric in the class Toolbox.