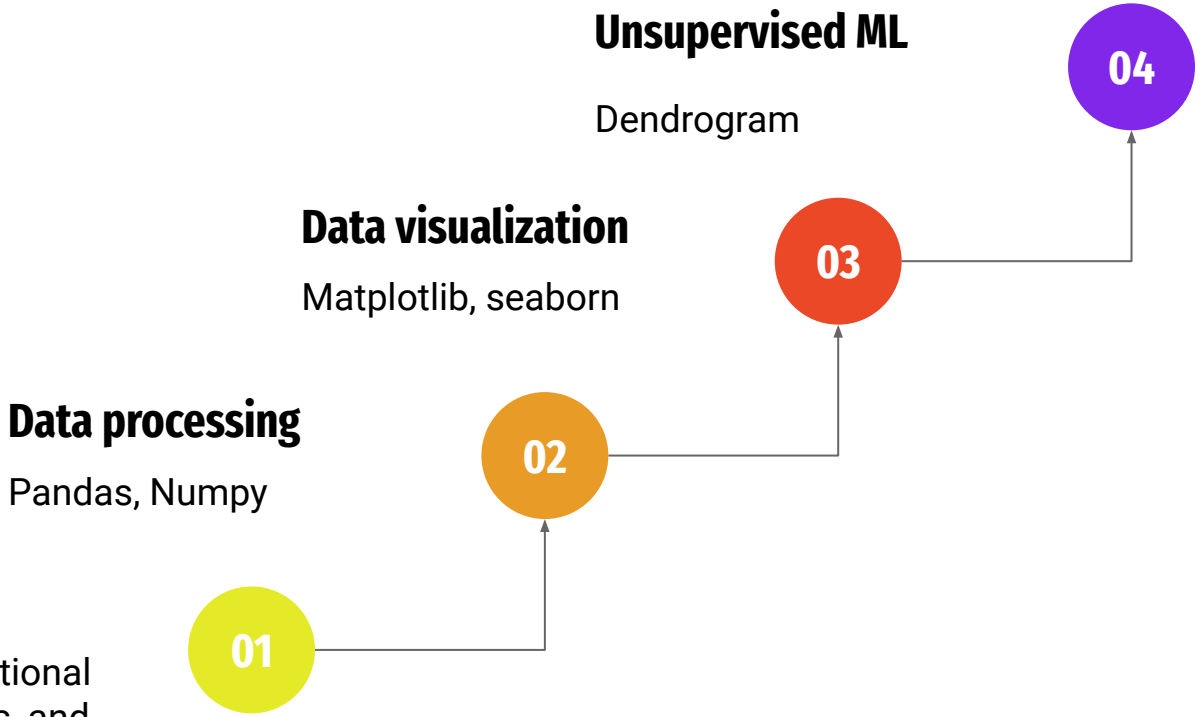
NETS Python Workshop Day 2

February 26th, 2023

Recap on what we have done so far...



Data Structures

What is it?

A way of organizing and storing data in a particular format.

Some common data types:

- **Numbers**
- **Strings**
- **Booleans**

Brief overview of the data structures we talked about:

- **Lists**: A collection of elements that can be of different types
- **Arrays:** A collection of elements of the same type
- **Tuples:** Similar to a lists, but elements can not be changed once created
- **Dictionaries:** a collection of key-value pairs.

Data Processing

What is it?

Involve converting raw data into meaningful information, in turns making it more manageable and understandable

Python Libraries

- **Numpy**
- **Pandas**
- **More…**

Typically includes the following steps:

- **Data collection:** from databases, or experiments
- **Data cleaning:** remove any inconsistent data, and dealing with errors in the data
- **Data transformation:** prepare the data for analysis through data scaling, create new features, etc
- **Data analysis**
- **Data interpretation**

Data Visualization

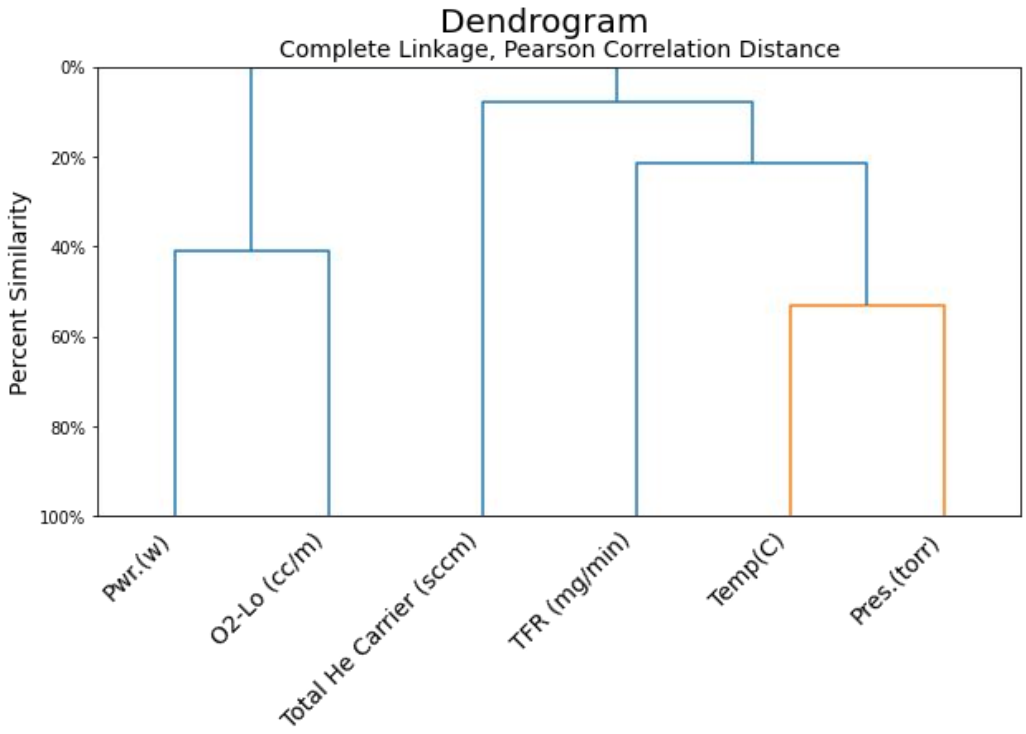
Python Libraries

- **Matplotlib**
- **Seaborn**
- **More…**

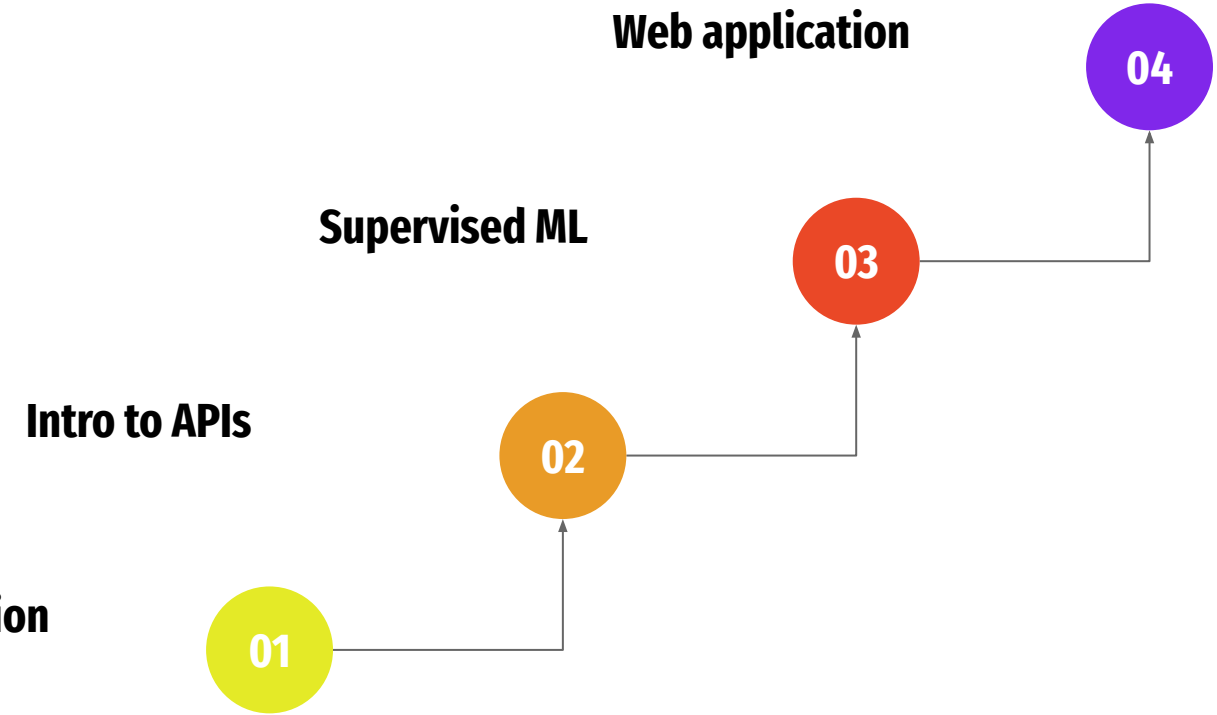
Unsupervised ML - Dendrogram

What is a dendrogram?

A type of diagram to visualize the hierarchical relationship between different variables in a dataset



Today's Agenda

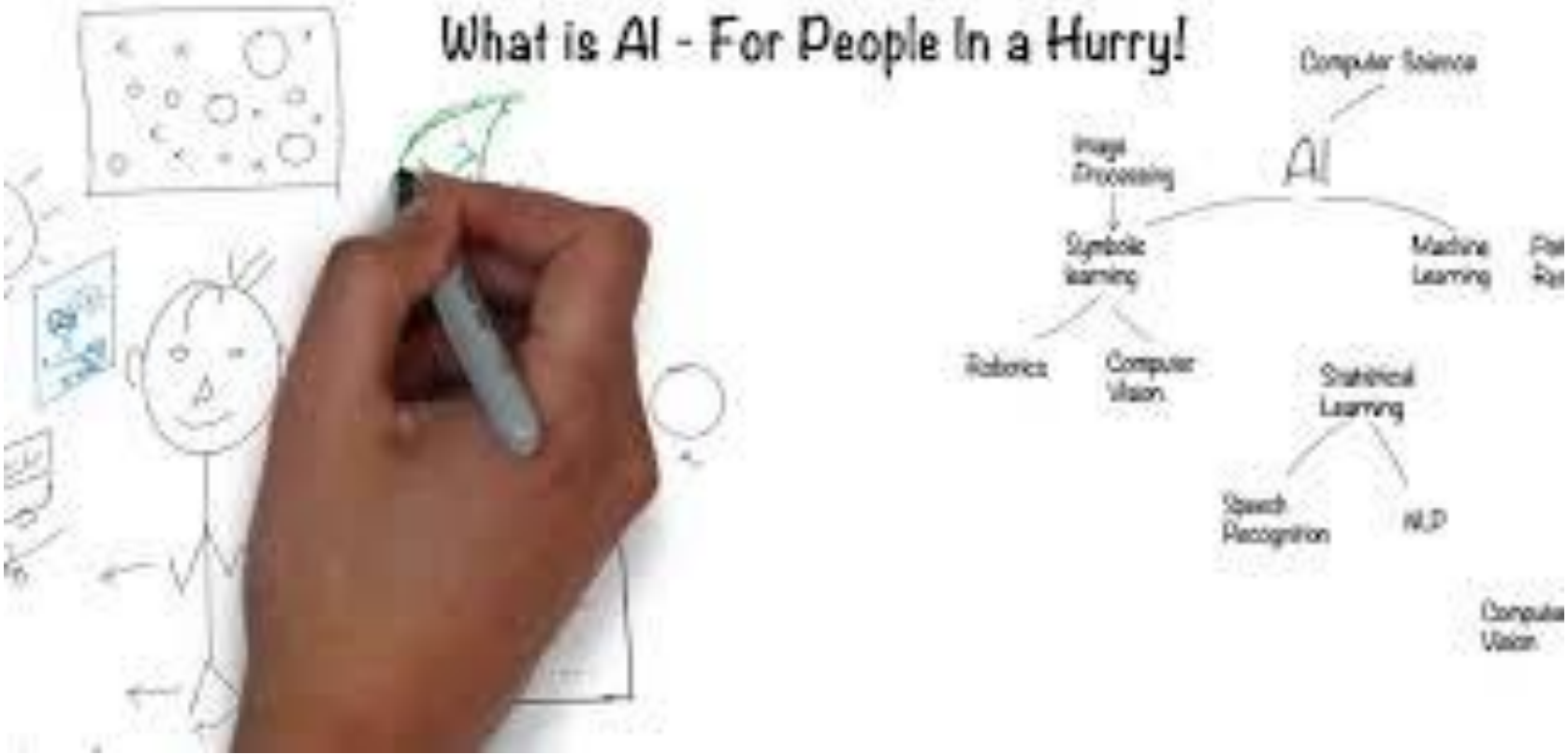


Up next

What is Machine Learning?

In short, Machine Learning is...

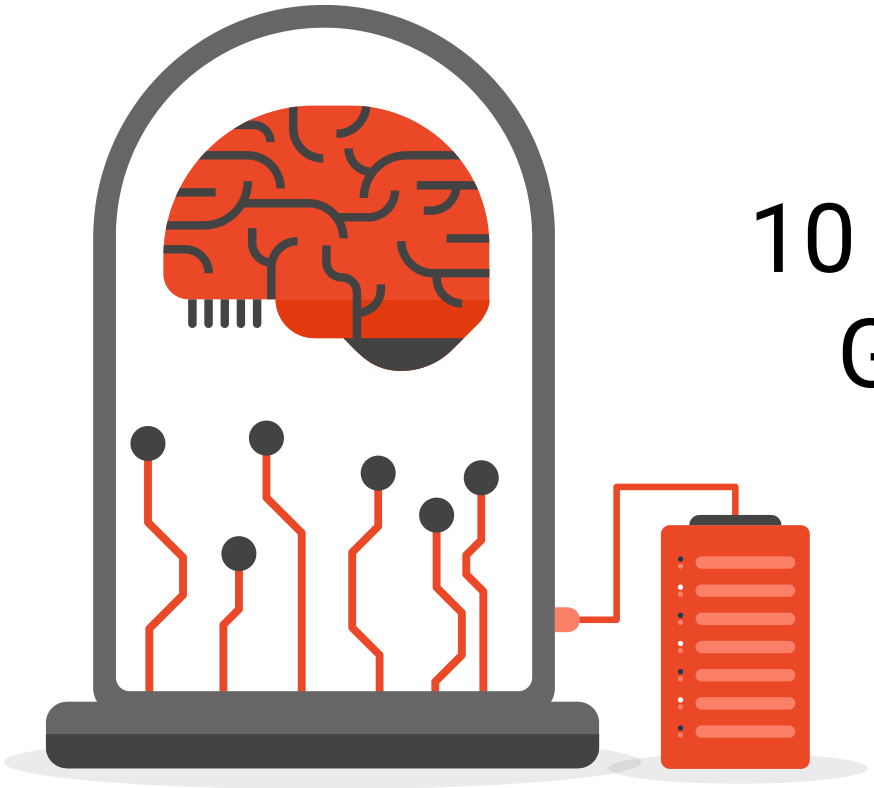
- a subfield within Artificial Intelligence
- **a method of teaching computers to recognize patterns and make predictions based on existing data**
- the method of teaching is called **an algorithm or a model**
- Successful AI/ML applications are seen across engineering and research fields


What is AI - For People In a Hurry!
Computer Science
AI
Image Processing
Symbolic learning
Machine Learning
Robotics
Computer Vision
Statistical Learning
Speech Recognition
NLP

File Manipulation

Open Notebook

File_manipulation.ipynb

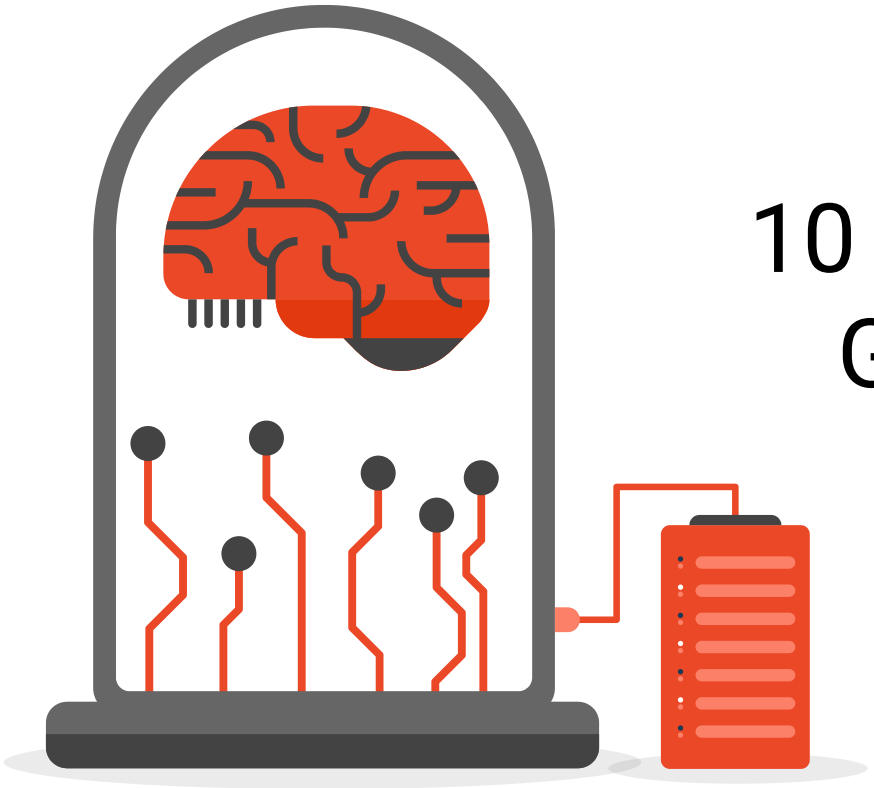


10 minutes break
Grab a bagel!

Intro to APIs

Open Notebook

Intro_to_Materials_API.ipynb



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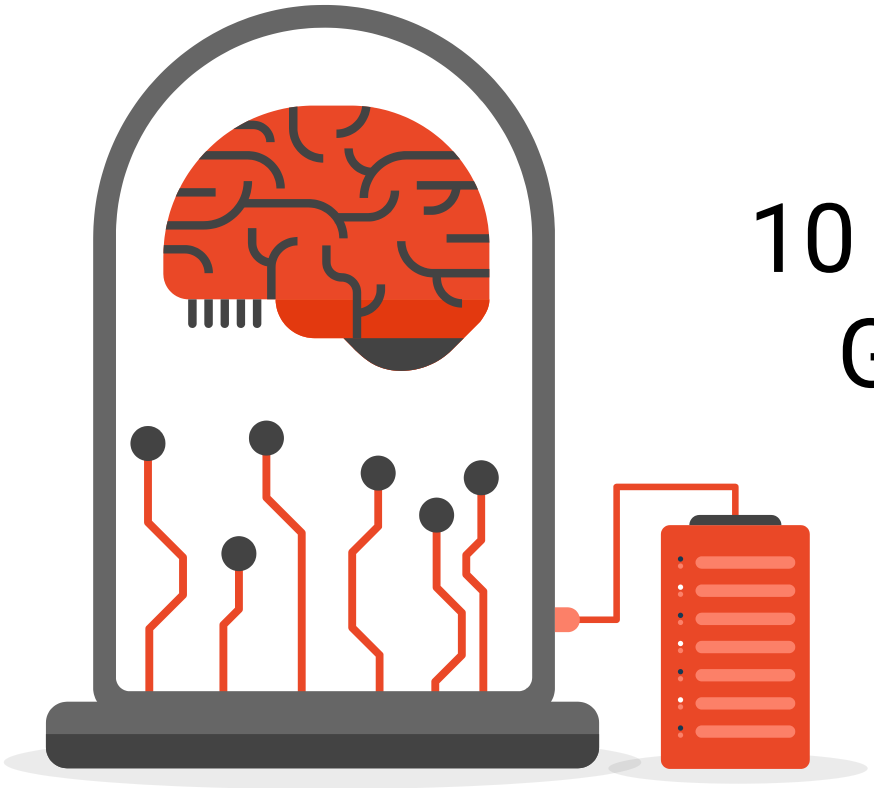
Supervised Machine Learning

Open Notebook

Supervised_ML.ipynb



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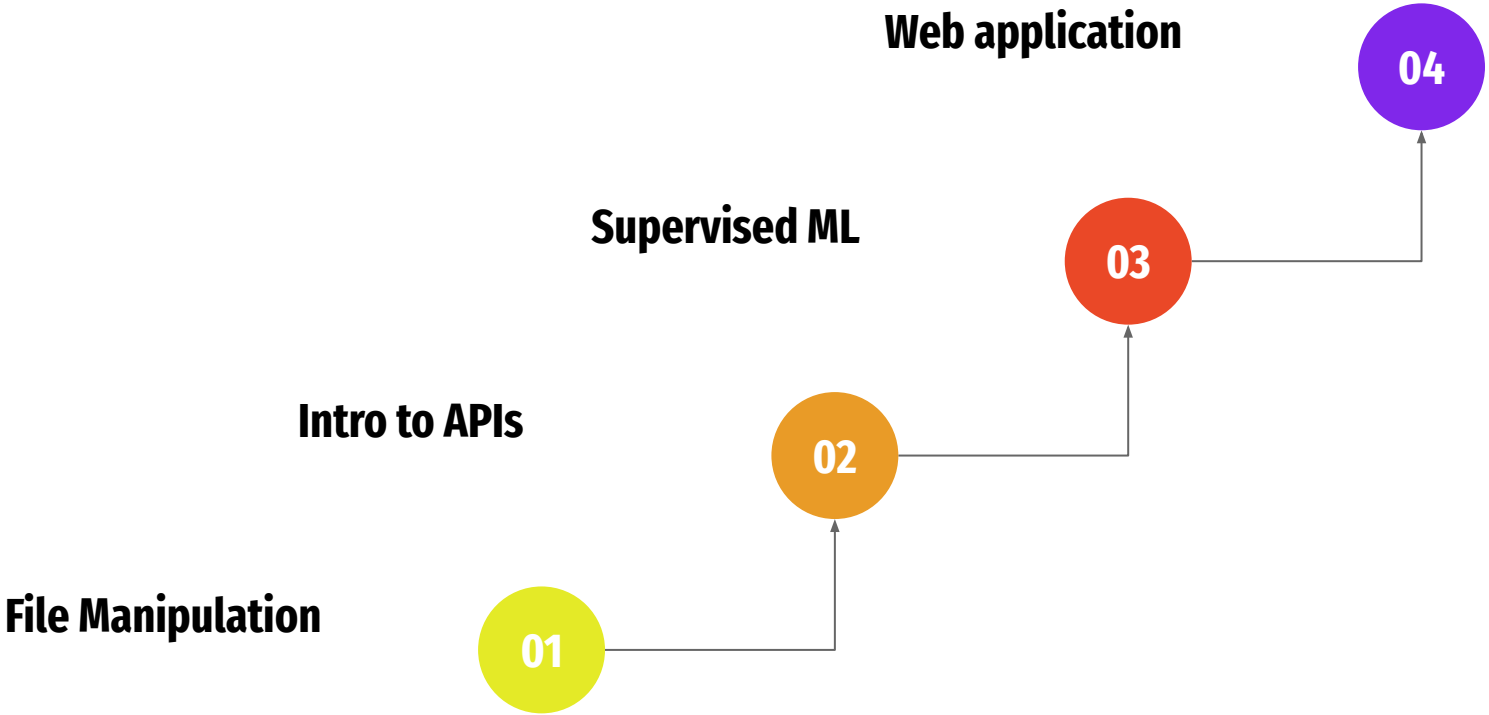
Web Application

Open Notebook

web_application.ipynb

What we've learn today



Other Resources for YOU

- General Python: https://github.com/phillipai/100-days-of-code-python
- Material Sciences: https://github.com/materialsvirtuallab/nano281
- Physics: https://deeplearningforphysicsresearchbook.github.io/deep-learning-physics/
- Overview of ML for Material Science: https://towardsdatascience.com/machine-learning-in-materials-science-8c6c0db5ce7a
- Competitions: https://www.kaggle.com/competitions

Food and Goodbye.

Thank you everyone for coming!

Sign out here for Assassin points and we'd love to hear your feedback