BSBINS401 - Analyse and Present Research Information

Session 3: Getting Started with Kaggle and Data Visualization

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Learning Objectives

- 1. Understand how to create and navigate your Kaggle account and profile.
- 2. Explore Kaggle datasets for research and analysis.
- 3. Complete Kaggle Learn: Intro to Data Visualization, Lesson 1: Hello, Seaborn.
- 4. Apply fundamental data visualization principles in Python.
- 5. Review key NumPy concepts from "Python for Data Analysis" (Chapter 4).

Key Topics for Session 3

- Kaggle Account Creation & Profile Setup
- Touring the Kaggle Platform (Competitions, Datasets, Notebooks)
- Principles of Data Visualization:
 - Clarity, Comparisons, and Context
- Kaggle Learn: Intro to Data Visualization, Lesson 1 (Hello, Seaborn)
- NumPy Essentials and the Role of Arrays in Data Analysis

1. Kaggle Setup: Creating an Account (If you haven't already)

- Visit https://www.kaggle.com/account/signup
- Provide your preferred email and create a password (or link to Google/GitHub).
- Verify your account via email confirmation.
- Configure your Kaggle profile (optional but encouraged):
 - Add a profile picture and bio.
 - Indicate any areas of interest (e.g. machine learning, data visualization).

2. Navigating Kaggle

Kaggle Competitions

- Participate in real-world data science challenges.
- Learn from other participants' public code notebooks.

Kaggle Datasets

- Kaggle Datasets: Repository of diverse public datasets.
- Explore dataset previews, metadata, and discussions.

Kaggle Notebooks

- In-browser environment for Python and R.
- Collaborative notebooks are shareable and reproducible.

3. Principles of Data Visualization

- Clarity: Ensure your plots tell a clear story—add labels, titles, legends.
- Comparison: Visuals should facilitate easy comparison across categories or over time.
- **Context**: Provide necessary background or supporting information so that viewers can interpret your graph.
- Color and Aesthetics: Use coherent color schemes; avoid visual clutter.

<iframe width="100%" height="580" src="https://www.youtube.com/embed/42RojZSB0Yg? si=4-tS5Lsnlh6bO1Xi" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture; web-share" referrerpolicy="strict-origin-when-cross-origin" allowfullscreen></iframe>

4. Kaggle Learn: Intro to Data Visualization

- Go to Kaggle Learn and select "Lesson 1: Hello, Seaborn."
- Follow the step-by-step notebook instructions.
- Practice:
 - Customize the example plots.
 - Try different Seaborn functions (e.g., barplot, scatterplot).
- Discuss:
 - Which charts best fit your data or prospective research questions?

5. Review of NumPy Basics ("Python for Data Analysis," Chapter 4)

What is NumPy?

• A Python package for scientific computing, focusing on arrays and fast operations.

Arrays

Homogeneous collection of items (same data type) in a continuous block of memory.

Key Functions

• [np.array()], [np.arange()], [np.ones()], [np.zeros()], shape manipulations, indexing, and slicing.

Why it Matters

• Nearly every data manipulation or ML pipeline in Python starts with NumPy arrays or uses libraries that rely on them.

Code Snippet: NumPy Demo

```
import numpy as np
# Create a 1D array
arr_1d = np.array([1, 2, 3, 4, 5])
# Create a 2D array (matrix)
arr_2d = np_array([[1, 2, 3],
                      [4, 5, 6]]
print("1D Array:", arr_1d)
print ("2D Array Shape:", arr_2d.shape)
# Perform arithmetic
arr_sum = arr_1d + 10
print ( "Add 10 to each element in 1D Array:", arr_sum)
```

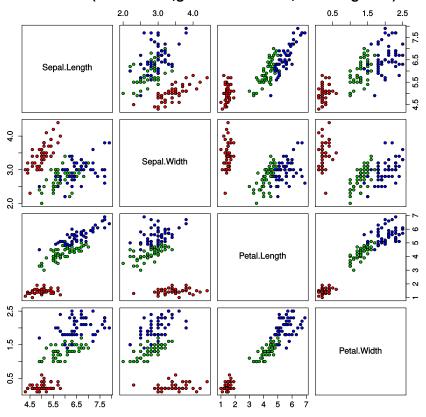
Sample Seaborn Visualization

```
import seaborn as sns
import matplotlib.pyplot as plt

# Load built-in example dataset
data = sns.load_dataset("iris")

# Create a pairplot
sns.pairplot(data, hue="species")
plt.suptitle("Pairplot of Iris Dataset", y=1.02)
plt.show()
```

Iris Data (red=setosa,green=versicolor,blue=virginica)



In-Class Activities

1. Hands-On Kaggle Platform Exploration

- Explore Datasets and Competitions.
- Create a new Notebook on Kaggle.
- Experiment with simple Python commands.

2. Find a dataset on Kaggle, Can you locate the original source of the data?

- What columns are in the dataset?
- What kinds of datatypes are in the dataset?
- Try to find the original source of the data.

Discussion Prompt

- 1. What types of datasets on Kaggle spark your interest and why?
- 2. How do you see data visualization principles influencing the way you present your research questions?
- 3. Any barriers or issues encountered while signing up/in to Kaggle or running notebooks?

Discuss these questions with the person next to you.

In-Class Activities

3. Practice: Kaggle Learn Module

- Open the "Hello, Seaborn" tutorial and read through the lesson.
- Using the tutorial write a quick snippet of Seaborn code to visualize a sample dataset found previously.
- Complete the Exercise: "Hello, Seaborn"

Lab Resources

- 1. Kaggle Interface Exploration
 - Create a simple Python notebook; run basic commands.
- 2. Kaggle Learn Module Lesson 1
 - Follow the "Hello, Seaborn" steps to practice data visualization.
- 3. NumPy Basics Reference
 - Reinforce array manipulation skills for future data exploration.

Next Steps

- Continue working through Kaggle Learn: Data Visualization lessons.
- Review Chapter 4 of "Python for Data Analysis" to strengthen NumPy and array manipulation skills.
- **Brainstorm**: Think about future datasets and research questions you might explore for assessments.

Questions?

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