Assignment Title: Data Visualization

Project Title: Fake News Detection

1. Reading Summary:

This week, I learned how to visualize data using Matplotlib and Seaborn libraries.
I understood how to create bar charts, scatter plots, histograms, boxplots, and heatmaps.
These visualizations help in understanding patterns, relationships, and data distribution more effectively.

2. Task Performed:

- Imported cleaned Fake News dataset (Fake.csv).
- Calculated text length for each news article.
- Created visualizations using Matplotlib and Seaborn.
- Analyzed patterns in fake news based on subject and text length.

3.Plots and Insights:

- **Bar Chart – Fake News by Subject**
  Shows the most frequent subjects in fake news, such as politics and world news.
- **Boxplot – Text Length by Subject**
  Highlights how text length varies by category — political news tends to be longer.
- **Heatmap – Correlation Matrix**
  Displays relationships between numerical features, helping identify patterns or dependencies.
- **Pair Plot – Feature Relationships**
  Visualizes pairwise relationships between key features to detect clusters and trends.

- **Bar Plot – Top 20 Most Common Words**
  Shows the most used words in fake news headlines/text, indicating common themes or biases.

4. Learning Outcome:

From this task, I learned :

- How to use **Matplotlib** and **Seaborn** for visualization.
- How to choose the right chart for data storytelling.
- How visualization helps to detect patterns and anomalies in datasets.

5. Challenges Faced:

- Faced difficulty in selecting the most relevant plots for fake news detection analysis.
- Large dataset size caused slow processing and visualization rendering in Google Colab.
- Encountered a **NameError** for plt when Matplotlib was not imported initially.
- Required multiple adjustments to **figure size, axis labels, and color themes** to improve readability and presentation quality.

6. GitHub Repository Link:

GitHub repository link here:
https://github.com/AlmasMalik66/DataScience-AI-Assignment