Data Analysis Dashboard - Project Documentation

1. Project Description:

This **Data Analysis Dashboard** is a **GUI-based Python application** built using **Tkinter** for analyzing CSV datasets. It provides an interactive interface to explore, visualize, and analyze data with the following features:

- **Load & Preview CSV Data**
- **Basic Data Overview** (Rows, Columns, Data Types)
- **Numerical Analysis** (Mean, Median, Histograms, Box Plots)
- **Categorical Analysis** (Value Counts, Bar Charts)
- **Correlation Analysis** (Heatmaps, Top Correlations)
- **Interactive Visualizations** (Matplotlib & Seaborn Charts)

2. Requirements:

A. Software Requirements

To run this project, you need:

- Python 3.6+ (Download: https://www.python.org/downloads/)
- Required Python Libraries (Install via pip):

Cmd command : pip install pandas matplotlib seaborn numpy

- Tkinter (Usually comes pre-installed with Python)

B. Hardware Requirements

- Minimum:
    - 2GB RAM
    - 100MB Disk Space
    - Any modern CPU (Intel/AMD)
- Recommended:
    - 4GB+ RAM (for large datasets)
    - 500MB Disk Space (if saving plots)

3. How to Use the Dashboard:

A. Running the Application

1. Save the code as data_analysis.py.
2. Open a terminal/command prompt and navigate to the project folder.
3. Run the script:

Script : python data_analysis.py

B. Step-by-Step Usage

1. Load a CSV File:
    - Click "Load CSV" in the top-right corner.
    - Browse and select your dataset (e.g., sales_data.csv).
2. Navigate the Dashboard:
    - Home: Basic info about the loaded file.
    - Data Overview: Shows rows, columns, and sample data.
    - Numerical Analysis: Stats & charts for numeric columns.
    - Categorical Analysis: Counts & bar charts for text columns.
    - Correlation Analysis: Heatmap of column relationships.
    - Visualizations: All plots in one scrollable view.
3. Interact with Visualizations:
    - Hover over charts for details.
    - Scroll through tabs for different analyses.
    - Close plots to return to the dashboard.
4. Exit:
    - Close the window or press Ctrl+C in the terminal.

4. Troubleshooting

Issue	**Solution**
ModuleNotFoundError	Run **pip install pandas matplotlib seaborn numpy**
CSV not loading	Ensure the file is in correct CSV format
Charts not displaying	Check if **matplotlib** is installed correctly
App crashes on large files	Use a smaller dataset or upgrade RAM

6. Future Enhancements:

- Export visualizations as PNG/PDF
- Support for Excel files (.xlsx)
- Statistical tests (t-tests, ANOVA)
- Machine learning integration (basic predictions)