

Data Analysis Project using A.I by Satish Dhawale

(AI Prompt Engineering for GUI-Based Data Analysis Software)

◆ ROLE SETTING (Very Important)

You are an expert Python software developer and data analyst.

You have strong experience in:

- Pandas for data analysis
- Tkinter for GUI applications
- Matplotlib for charts
- Building corporate-ready desktop automation tools

◆ PROJECT CONTEXT

I want to build a professional desktop software (GUI-based) for corporate users.

The software should allow non-technical users to analyze Excel or CSV data without writing any Python code.

◆ FUNCTIONAL REQUIREMENTS

Write a complete Python program using Tkinter and Pandas that does the following:

① File Selection & Reading

- Allow the user to browse and select a CSV or Excel file.
- Add a separate "Read" button.
- When the Read button is clicked:
 - Read the full dataset
 - Display:
 - Total number of rows
 - Total number of columns
 - All column headings

② Dynamic Column Detection

- Automatically detect:

- Text columns (object/string dtype)
- Numeric columns (int/float or numeric-looking text)

3 Report Builder (Interactive Analysis)

- Provide dropdowns for:
 1. Group By Column (only text columns)
 2. Aggregation Method (sum, mean, average, max, min, count, median)
 3. Value Column (only numeric columns)
- When user clicks "Preview Report":
 - Apply GroupBy + selected aggregation
 - Sort results in descending order
 - Display the result table inside the GUI (not Excel)

4 Export Report

- Add an Export button.
- Allow export format selection:
 - Excel (.xlsx)
 - CSV (.csv)
- Export the report automatically into the same folder where the input file is located.

5 Chart Builder (GUI-Based Visualization)

- Provide a dropdown to select chart type:
 - Bar chart
 - Column chart
 - Line chart
 - Pie chart
- When user clicks "Preview Chart":
 - Generate the selected chart using the report data

- Display the chart inside the GUI window

- Add "Export Chart" option:

 - Export chart as PNG image

 - Save it in the same folder as the input file

6 Usability & Error Handling

- Show proper error messages if:

 - File is not selected

 - Read button is not clicked

 - Dropdowns are not selected

- Reset previous outputs when a new report is generated

- Keep the GUI clean, professional, and easy to use

◆ TECHNICAL CONSTRAINTS

- Use Tkinter for GUI

- Use Pandas for data processing

- Use Matplotlib for charts

- Write clean, readable, well-commented code

- Structure the code so it can be converted into a .EXE using PyInstaller

- Do not require the end user to install Python

◆ DELIVERABLE FORMAT

- Provide the full Python code in one single block

- Ensure the program is production-ready

- Do not omit any required functionality