Unified Data Analysis Dashboard

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1. Objective:

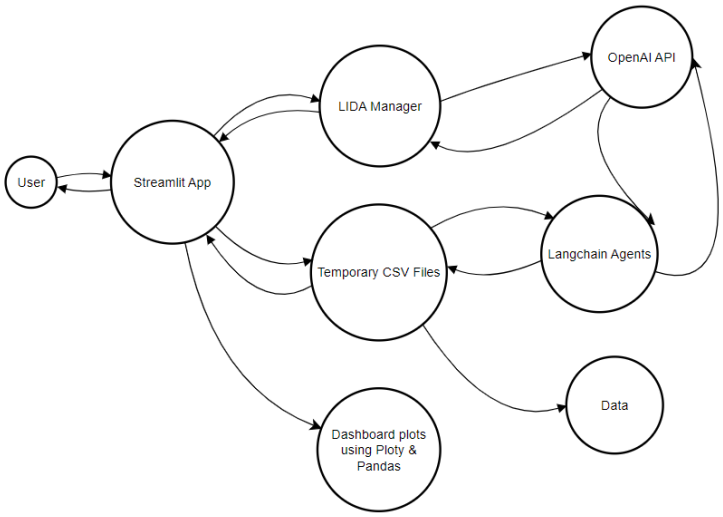
To develop an application that can perform dynamic statistical analysis of CSV files and create dashboard , Use LLMs & the Prompt to answer questions based on the uploaded CSV, to LLM model and generate plots based on the results.

2. Introduction :

Streamlit-based Unified Data Analytics (UDA) is a web application with an easy-to-use interface that facilitates quick and thorough data analysis. Pandas is used by UDA to handle CSV files encoded with UTF-8.When the "Summarize" option is used, UDA uses ChatGPT Turbo and LIDA to generate goals and contextual summaries. The Seaborn library is used to generate visualizations, which are then supplied in base64 format and transformed into pictures. LIDA and ChatGPT Turbo handle user-defined queries for graph generation, generating pertinent visualizations.
Users can ask precise questions about the CSV data by utilizing the "Ask CSV" feature, which uses Langchain a framework to connect language models with external data sources is used to communicate with ChatGPT 3.5 Turbo as an agent. The "Dashboard" option performs internal data analysis—detecting categorical columns, numeric columns, and time stamps—using Plotly for interactive visualizations and Pandas for data segmentation and overview.

3. System Design

Architecture of UDA :



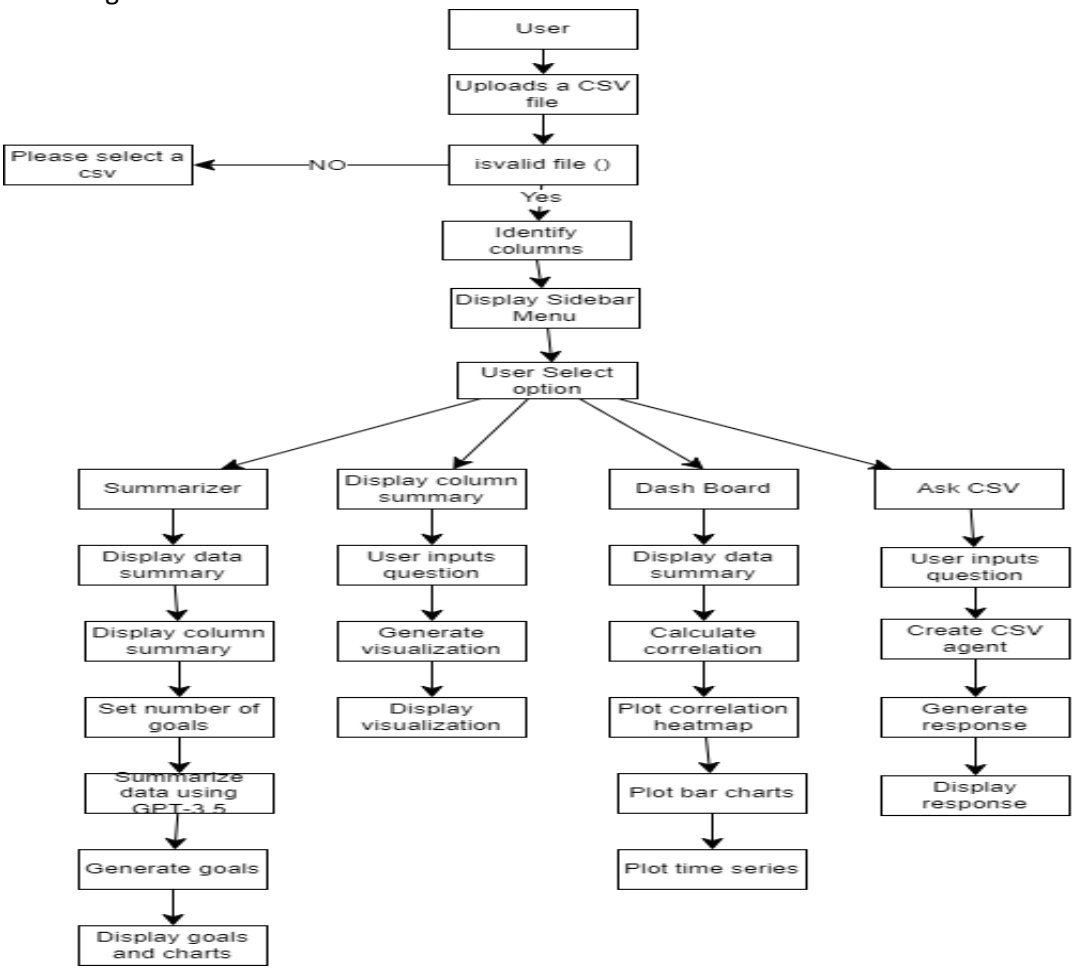
The architecture of Unified Data Analytics (UDA) consists of a Streamlit-based web application that facilitates user interaction and data processing. It integrates with various components such as LIDA Manager for summarization and goal-setting, and the OpenAI API

for advanced language model capabilities. The system manages CSV files, performs data analysis and visualization using libraries like Plotly and Seaborn, and allows users to query and generate insights through a comprehensive dashboard and interactive visualizations.

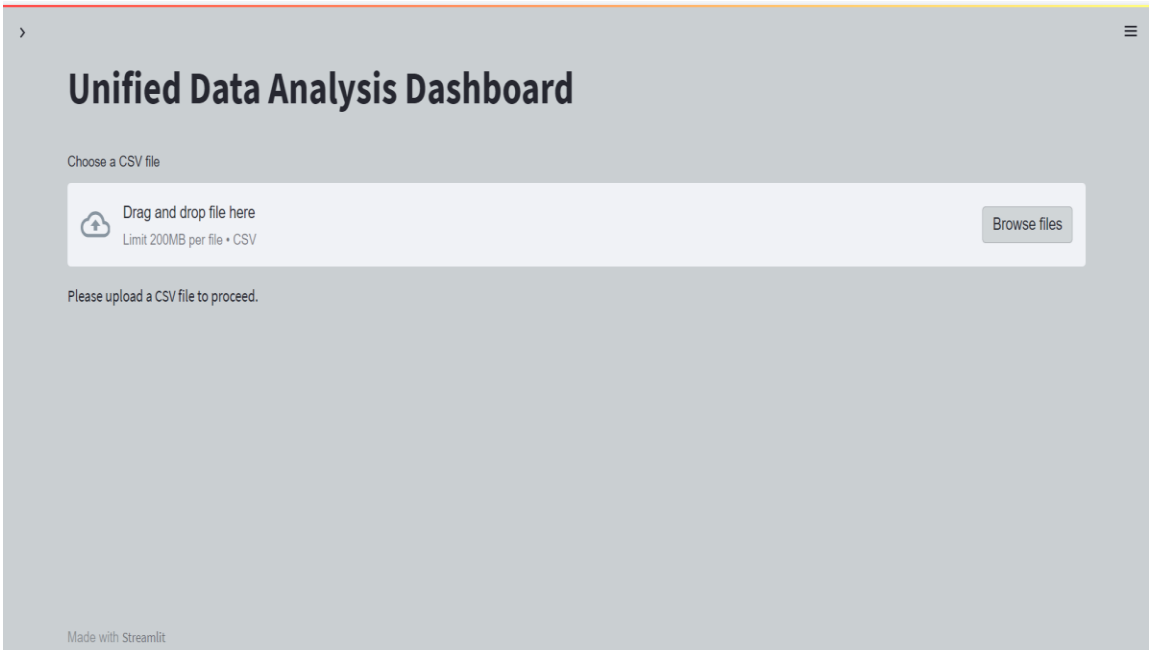
4. TECHNOLOGIES USED
    - **Streamlit**: Used for building web interface.
    - **Pandas**: Utilized for data manipulation and CSV file handling.
    - **Plotly**: Provides interactive visualizations used in dashboards.
    - **Seaborn**: Visualization library, here it is used with Plot Generation and LIDA .
    - **GPT 3.5 Turbo :** LLM Backend of LIDA and AI Agent used in Ask CSV
    - **LIDA Manager**: Assists in summarizing data and generating visualizations using GPT-3.5 Turbo.
    - **Langchain**: Connecting CSV with LLM and Creating OpenAI Agent in Ask CSV .
5. IMPLEMENTATION

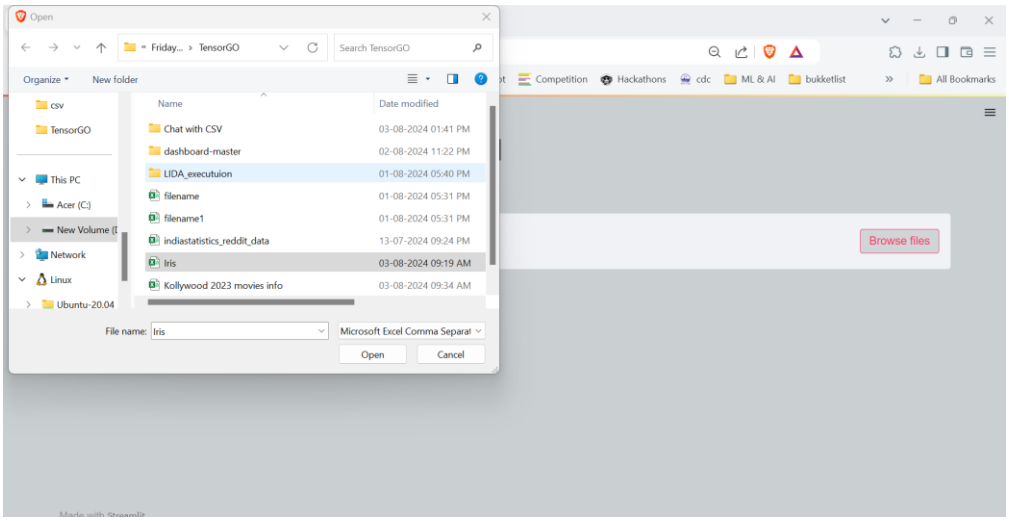
The Unified Data Analytics (UDA) application uses several key technologies. Streamlit creates a simple and interactive web interface. Pandas processes CSV files for analysis and visualization. Plotly and Seaborn generate various charts and plots to show data insights. LIDA Manager and GPT-3.5 Turbo are used for summarizing data and setting goals, while Langchain helps with interactive querying

Flow Diagram



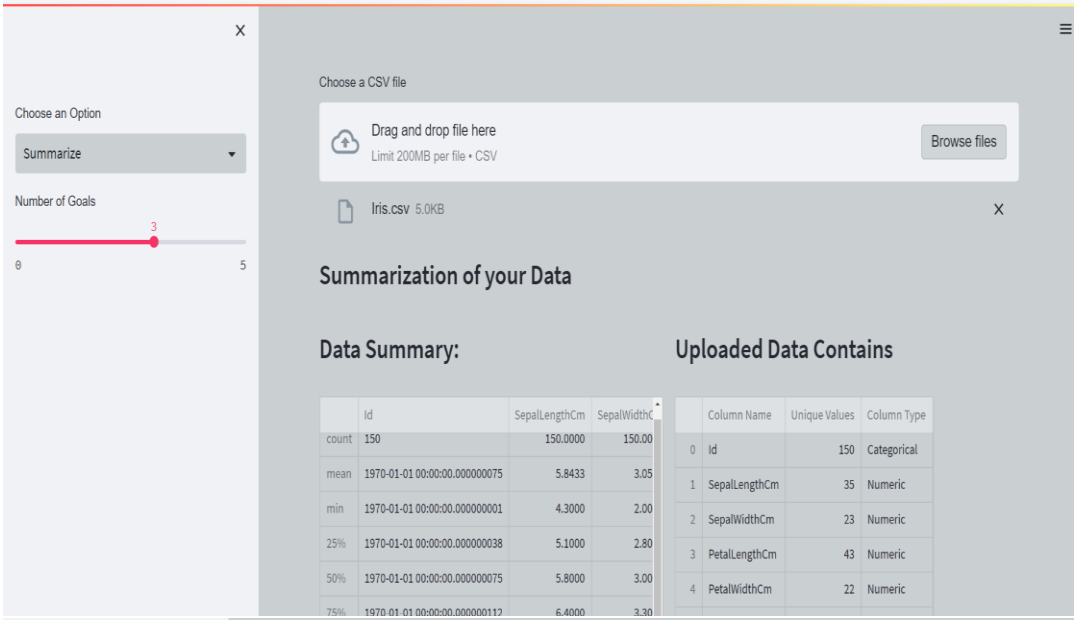
The flow of UDA starts with uploading a CSV file, validating it, and proceeds through various features such as summarization, question-based graph generation, data dashboard, and querying with CSV agents. Each option leads to specific data analysis and visualization tasks .

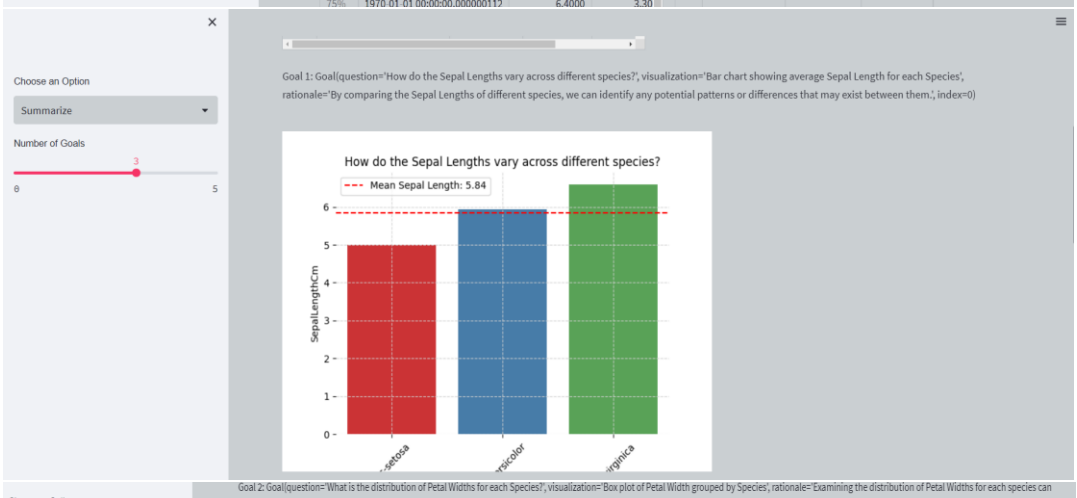
6. FEATURES
    1. Summarize
       The Summarize menu provides an overview of the data with basic statistics and a column summary, and allows users to set goals for data summarization and visualization. It uses LIDA Manager and Seaborn to generate charts based on these goals.
    2. Question based Graph
       The Question Based Graph option displays a column summary and lets users input queries about the data, creating visualizations based on these questions with LIDA and GPT-3.5 Turbo.
    3. Data Dashboard
       The Data Dashboard shows statistical summaries, plots correlation heatmaps for numeric data, creates bar charts for categorical data, generates time series plots, and decomposes time series data into its components.
    4. Ask CSV
       The Ask CSV feature lets users input questions about the CSV file, using GPT-3.5 Turbo to generate and display responses.
7. DEMONSTRATION
    1. 

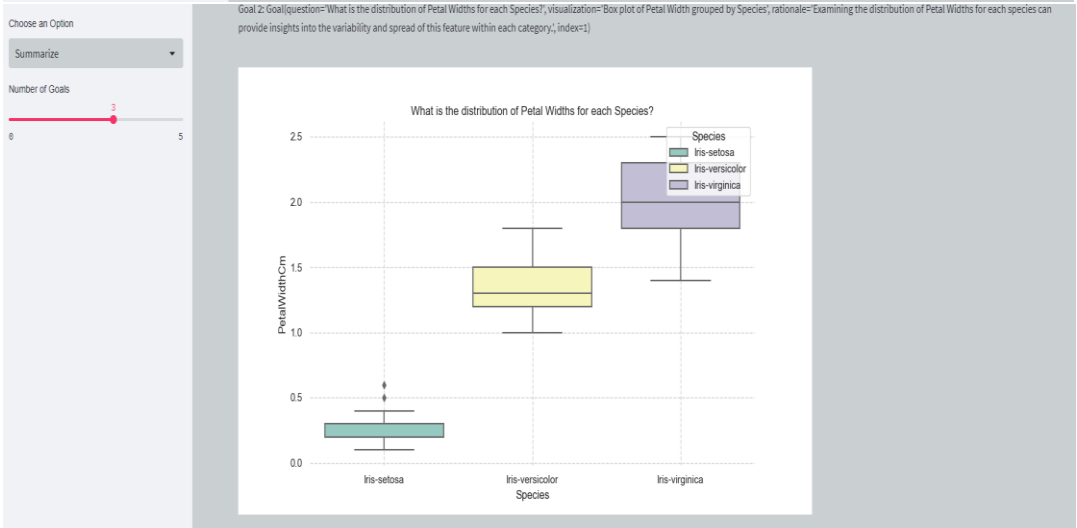
    2. Uploading prominent iris data


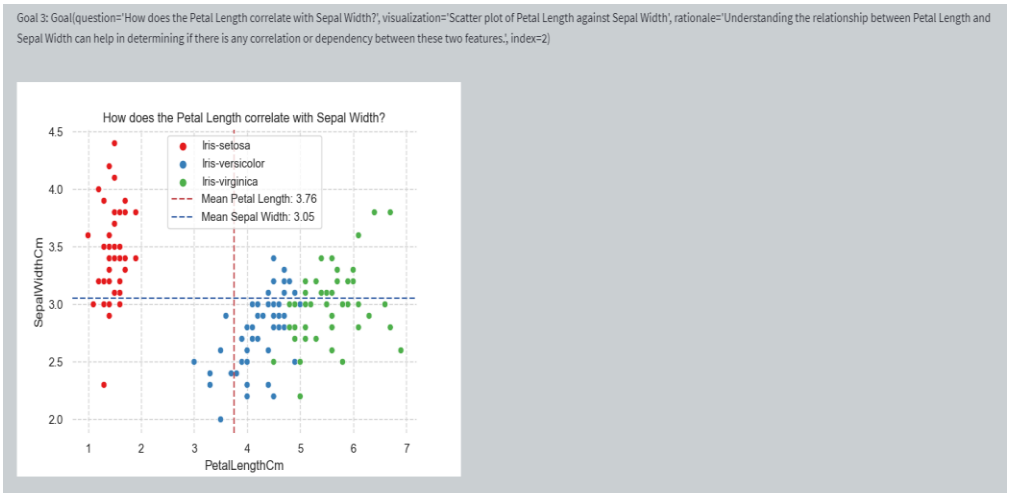
3. Once you Upload , click on the side bar and input Goals .

4.



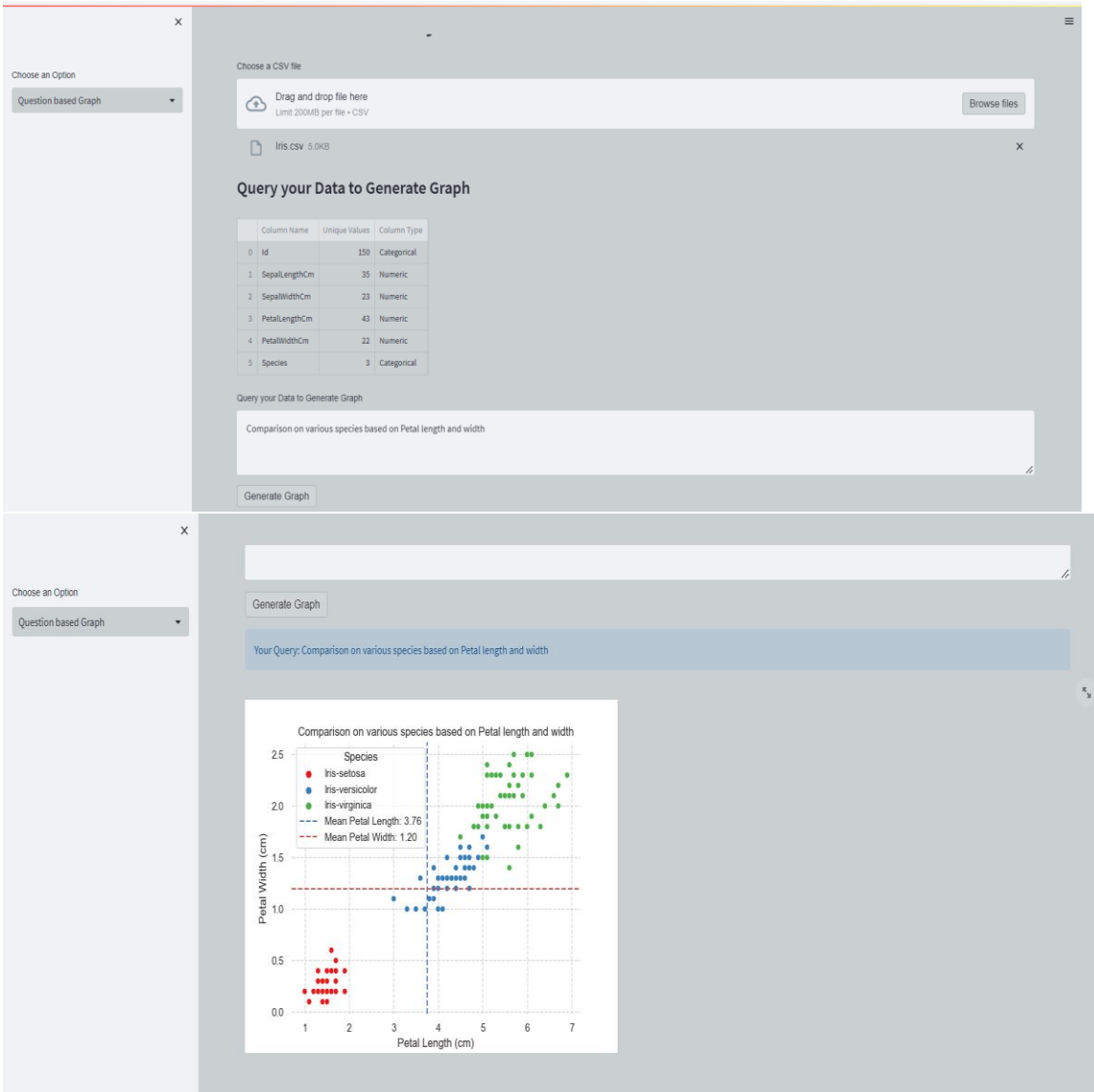




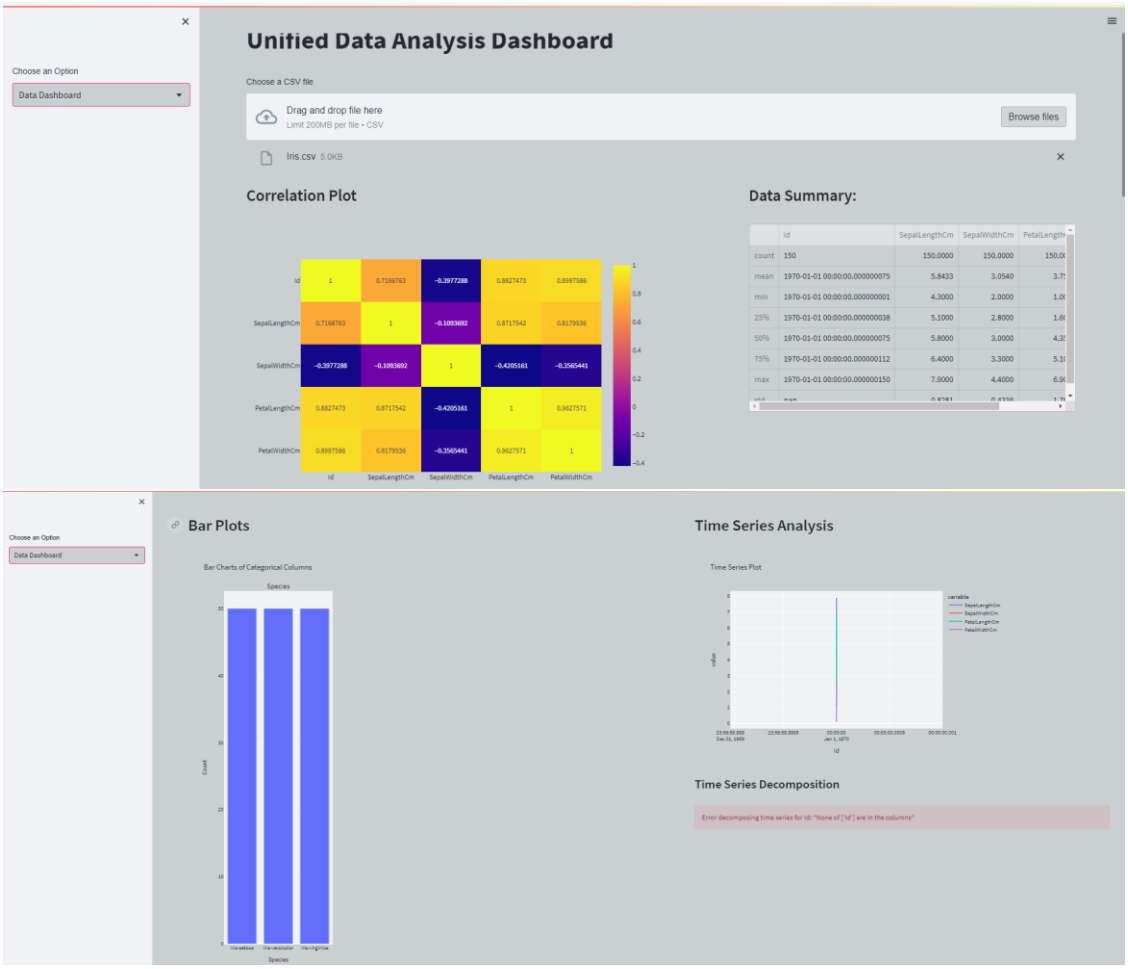


All these 3 Goals and Graphs were generated.

5. Option 2 Question based Graph : Enter a plot to be generated



6. Option 3 : Data Dashboard



Since the Data Doesn't have a Time series data ,It does not make a meaning full chart

7. "Ask CSV

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