1. Project 1 (OIB SIP)

Project Idea : Exploratory Data Analysis (EDA) on Retail Sales Data

Project Name : 🛒 Walmart Demand and Forecasting Solution

🎯 Problem Statement

The retail store is facing challenges in managing inventory efficiently to balance demand with supply across multiple outlets in the country.

🧠 Project Objective

The objective of this project is to **analyze historical sales data** and **build a predictive model** that can forecast sales for the next few months or years.
This will help Walmart make **data-driven inventory decisions** and reduce overstocking or understocking situations.

📊 Dataset Description

The dataset contains weekly sales information for multiple Walmart stores along with related economic and environmental factors.

Column Name	Description
Store	Store number
Date	Date of sales
Weekly_Sales	Sales for the week
Holiday_Flag	Binary flag indicating if the week contains a holiday (1) or not (0)
Temperature	Average temperature during the week
Fuel_Price	Fuel price during the week
CPI	Consumer Price Index
Unemployment	Unemployment rate

🧰 Tech Stack

- **Programming Language:** Python
- **Libraries Used:** Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn
- **Tools:** Jupyter Notebook, GitHub
- **Dataset Format:** CSV file (Walmart.csv)

⚙️ Approach / Methodology

1. **Data Cleaning & Preprocessing**
    - Handled missing values and outliers.
    - Converted date columns to datetime format.
2. **Exploratory Data Analysis (EDA)**
    - Visualized sales trends, seasonal effects, and correlations.
    - Identified how holidays, temperature, and fuel prices affect sales.
3. **Feature Engineering**
    - Created new time-based and economic features for better prediction.
4. **Model Building**
    - Used regression models (like Linear Regression, Random Forest) to forecast future sales.
5. **Model Evaluation**
    - Evaluated using MAE, RMSE, and R^2 metrics.

📈 Results / Insights

- Sales spike significantly around holiday weeks.
- Economic factors like fuel prices and CPI have moderate impact on weekly sales.
- Predictive model achieved **high accuracy** for future sales forecasting.

💡 Conclusion

This solution provides valuable insights into Walmart's sales patterns and helps the company optimize inventory planning and resource allocation.

📂 Project Structure
