**AI\_Powered\_EDA\_Sales\_Data\_Insights (Co-pilot -Driven):**

\*\*An AI-powered sales analysis project built during vibe coding week using Github Copilot,Natural language prompts, and VS Code.

This project was developed using Github Copilot inside VS code with natural language prompts to accelerate data analysis, Visualization, and forecasting.

Github Copilot interpreted these prompts into python code instantly, saving time and helping prototype business insights rapidly.

This project is a sales trend analysis and forecasting tool built using python, jupyter notebooks, and Github Copilot inside VS Code.\*\*

GitHub Copilot-Driven AI EDA + Dashboard-Ready Workflow (Excel/CSV Sales Data)

**This project demonstrates how GitHub Copilot can accelerate exploratory data analysis (EDA) on real-world sales datasets in Excel/CSV or any other formats. The workflow is optimized for building future-ready, AI-powered analytics solutions.**

**Tools & Stack**

**Tool/Library Purpose**

**GitHub Copilot AI-driven code generation and auto-completion**

**Python Core language for data manipulation**

**Pandas Data loading, transformation, and EDA**

**NumPy Numeric calculations**

**Matplotlib / Seaborn / Plotly Data visualization**

**Excel/CSV Source files for raw sales data**

**Workflow Overview:**

**1. Data Loading & Cleaning:**

* **Used Copilot to load .csv/.xlsx using pandas.read\_csv() and read\_excel()**
* **Converted date columns and handled missing/null values**
* **Standardized column names and formats**

**2. EDA with Copilot-Generated Code:**

* **Descriptive statistics using .describe(), .value counts()**
* **Visual exploration**
* **Correlation matrix and heatmap**
* **Monthly sales trend line plots**
* **Revenue by product and region (bar/pie charts**

**3. Advanced Analysis**

* **Time series decomposition (trend, seasonality, residual)**
* **Customer and product segmentation**
* **Rolling averages and growth KPIs**
* **Suggestions for forecasting (Copilot prompts only)**

**4. Dashboard Preparation (Future Scope)**

* **All visuals and KPIs are structured to plug into tools like Streamlit or Power BI**
* **Filters such as Region, Category, and Date Range planned**
* **Modularized code allows fast transition to dashboard format**

**GitHub Copilot Prompt Guide(For Data Analysis):**

1. **Data Loading & Inspection**
2. **Data Cleaning & Transformation**
3. **Exploratory Data Analysis (EDA)**
4. **Business Insight Extraction**
5. **Forecasting & Trend Analysis**
6. **Streamlit Readiness (Optional Future Inegration to create data apps)**

**Prompt Examples for GitHub Copilot**



Below are the natural language instructions used with GitHub Copilot during this project:

🔍 Data Analysis Prompts:

* "Load sales\_data.csv using pandas"
* "Display basic statistics for the dataset"
* "Check for missing values and drop nulls"

**📊 Visualization Prompts:**

* "Create line plot for monthly sales using matplotlib"
* "Plot bar chart for category-wise sales"
* "Show correlation heatmap using seaborn"

**📈 Forecasting Prompts:**

* "Use linear regression to forecast next 6 months of sales"
* "Train-test split the dataset"
* "Plot actual vs predicted values"

**Automation Prompts:**

* "Export plots to PNG"
* "Convert notebook into Python script"
* "List all required libraries in requirements.txt"

These prompts were typed as comments or docstring inside VS code, allowing Copilot to generate efficient and accurate code blocks instantly.

**AI Integration (Future-Ready Design):**

This project is designed to support future integration with OpenAI GPT-based assistants. While GPT API is not currently connected, the architecture supports:

Building a prompt engine for summarizing filtered data insights

Adding natural language chat to explain KPIs and trends

Using openai.ChatCompletion to generate contextual responses based on filters

You can later activate GPT integration with a secure API key once business needs and access are finalized.

--- Why This Approach Matters

**Speeds up analysis with GitHub Copilot suggestions**

**Promotes reproducible workflows for sales KPIs and trends**

**Streamlit-ready architecture for dashboarding**

**Scalable for larger datasets and AI-driven decision support**

