1. Introduction

Sales forecasting is an essential step for retail firms to plan inventory, management resources, and make strategic decisions. This project aims to develop an AI-driven sales forecast dashboard using historical sales data. The end result is an interactive dashboard to effectively display sales analysis, trends, seasonality, and future forecasts.

2. The Aim of the Project

The primary aim of this project will be to:

- Analyze historical retail sales data
- Determine Trends & Season Patterns
- Analyze or predict sales using a time series model
- Draw insights from a clear Power BI visualization presentation
- It enables enterprises to make proactive decisions, unlike when they have to resort to guesswork.

3. Tools & Technologies

- A number of tools were employed for the task at hand:
- Google Colab (Python) to analyze data and build models
- Pandas & Matplotlib for Data Cleaning and Visualization
- Facebook Prophet for time series forecasting
- Power BI Desktop for Interactive Dashboard.

4. Dataset Overview

The data set corresponds to historic sales at a retail environment. Some of the most important columns in the data set include:

- ds - Date
- y = Actual sales values

After applying a forecasting model, a number of columns were added:

- yhat - Predicted Sales
- yhat_lower - Lower prediction limit
- yhat_upper – Upper prediction interval

These values enable estimation of expected sales performance and ranges where uncertainty exists.

5. Project Workflow

- Data Cleaning and Preparation
- Character Set Overview
- Loaded the dataset into Google Colab
- Mapped date columns with correct datetime format
- The inconsistencies were removed, and the data was made ready to be analyzed.

Feature Engineering

- Data regarding aggregated sales on a monthly basis
- Modelled seasonal components and trends using Prophet
- Identified the times of high and low sales

Dashboard Development

- Export forecast results into a CSV file
- Imported data into Power BI
- Designed visualizations of sales data for comparison purposes on a monthly basis

6. Key Findings

- The sales demonstrate strong seasonality on both a monthly and annual basis
- More sales are seen towards the end of a year
- Lower sales are seen in initial months, particularly February
- There is a general upward trend of increased sales with the passage of time.

7. Business Insights and Recommendations

- Companies should offer more of any particular item during peak periods of demand.
- For instance, the advertisement campaigns could be organized during the periods of low sales.
- Forecasted data may also contribute to enhanced budgeting and demand forecasting
- Data-driven forecasting is more reliable than traditional methods, making it a significant

8. Conclusion:

This project showcases how one can leverage the capabilities of business intelligence along with machine learning in order to tackle business issues and problems. The AI-driven sales prediction dashboard offers valuable business insights into sales activity and aids businesses in planning for the future.