

Business Analysis and Sales Forecasting Project

Overview

This project provides analysis of sales data from an online retail business. It includes data cleaning, exploratory data analysis (EDA), customer behavior insights, product performance evaluation, and predictive modeling using time-series analysis.

The objective of this project is to identify key business insights and forecast future sales to support decision-making and strategy development.

Features

1. Data Cleaning

- Removed duplicates and missing values.
- Filtered out invalid records (e.g., non-positive quantities).
- Converted date columns to proper datetime format.

2. Exploratory Data Analysis (EDA)

- Calculated total revenue and identified top products by quantity.
- Analyzed sales trends over time and across countries.
- Visualized data using bar plots, line graphs, and heatmaps.

3. Customer Analysis

- Identified top customers based on revenue.
- Performed RFM (Recency, Frequency, Monetary) analysis to segment customers.

4. Product Performance

- Highlighted best-performing and underperforming products.
- Identified countries with the lowest sales.

5. Predictive Modeling

- Used the ARIMA model for time-series forecasting.
 - Predicted sales for the next 12 months with visualized trends.
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Technologies Used

Programming Language: Python

Libraries:

- **Data Manipulation:** pandas, numpy
 - **Visualization:** matplotlib, seaborn
 - **Time-Series Analysis:** statsmodels
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Setup and Usage

Prerequisites

Ensure you have Python installed and the following libraries:

```
pip install pandas numpy matplotlib seaborn statsmodels
```

Steps to Run

1. Clone the repository:

```
git clone <repository-url>
```

2. Navigate to the project directory and run the script:

```
python business_analysis_project.py
```

3. Ensure the dataset (Online Retail.xlsx) is in the same directory as the script.
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Project Structure

- `business_analysis_project.py`: Main Python script for the analysis.
 - `Online Retail.xlsx`: Dataset file.
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Results and Insights

- **Total Revenue:** Summary of overall sales performance.
- **Top Products and Customers:** Insights into high-performing segments.
- **Sales Trends:** Identification of seasonal patterns and monthly trends.
- **Forecasting:** Predictive insights for the next 12 months.