Furniture Store Sales Time Series Forecasting

Presenter: Team 3

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Project Idea

Problem: Furniture stores face difficulties in predicting future sales, leading to overstocking or stockouts.

Solution:
Automated SARIMA-based ML model to predict monthly sales with 95% confidence intervals.

Value: Improved inventory management and marketing strategies based on data-driven forecasting.

Project Wireframe

Visuals:

Data Pipeline Flowchart: Raw CSV → Cleaning → Model Training → Forecast Dashboard.
Dashboard Mockup:
Time series plot with actual vs. predicted sales.
Dropdown filters for product categories/regions.

User Journey:

Upload historical data → Generate forecasts → Export inventory recommendations.

End Users + Features

End Users:
Store Managers
Marketing Analysts

Features:
Monthly sales forecasts
Decomposition for trend/seasonality analysis
Performance metrics (RMSE, MAE, R^2)

Impact:
Store managers can restock on time
Analysts can plan campaigns based on sales peaks

Data Structure

Dataset: CSV with 9,994 rows × 18 columns (e.g., `Sales`, `Profit`, `Order Date`).

Preprocessing:
Handled duplicates, log-transformed skewed sales data.
Engineered features: `Profit Margin`, `Order Month/Year`.

Techniques:
ADF test for stationarity.
ACF/PACF for SARIMA hyperparameters (`p,d,q`).

Programming Languages + Frameworks

Core Stack:
Python: `pandas`, `numpy`, `statsmodels` (SARIMAX).

Visualization: `matplotlib`, `seaborn`.

Testing: `sklearn` (MSE, MAE).

Supporting Tools: Jupyter Notebook, GitHub.

Live Application + Test

Current State: Notebook-based prototype

Testing:

- Train-test split (80-20)
- Performance metrics used: RMSE, MAE, R^2
- Model evaluated on unseen test set

Next Step: Deployment

Interactive Dashboard (Streamlit)

Overview: Dynamic display of the sales forecast through the Streamlit interface.

Key Features:

- **Forecasted Sales Over Time**: A graph showing forecasted sales against actual data.
- **Forecast Table**: Display of monthly forecasts in a table format.

Deliverables (Reports, etc.)

- Jupyter notebook with full code and visualizations
- Forecast charts for the next 6 months
- Documentation of modeling process
- Power BI Dashboard (optional add-on)
- GitHub repository (with code and README)

Project Team + Roles

Ahmed Tarek Attia:(**Team Leader**) Responsible for Preprocessing and Feature Engineering, Exploratory Data Analysis (EDA), Series Analysis, Model Evaluation

Aya Elsayed Mohamed: Responsible for Exploratory Data Analysis (EDA) Series Analysis, Model Evaluation ,Dashboard design

Elsayed Hesham Elsayed: Responsible for data collection, preprocessing)

Mahmoud Hamdy: Responsible for Report writing, documentation)

رواد مصر الرقمية

وزارة الاتصالات وتكنولوجيا المعلومات

Thank You

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Feel free to ask any questions