

Progress Report 4

Intelligent Business Analytics System

- for Maximizing Revenue and Efficiency

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Time Log

Date	Task Description	Hours
Apr 2	<ul style="list-style-type: none">● Developed logic for grouped order handling in Market Basket Analysis and product recommendation features.● Removed the LSTM model from revenue forecasting due to accuracy issues and focused on Prophet-based predictions.● Improved frontend UI with enhanced styling, layout consistency, and clearer data visualization.● Applied final frontend adjustments to ensure smooth integration and user experience.	5
Apr 3	<ul style="list-style-type: none">● Normalized and aligned order data columns to support transaction grouping.● Updated the backend to group orders effectively for Market Basket Analysis, enabling more accurate item association and recommendations.	3
Apr 5	<ul style="list-style-type: none">● Improved the Customer Sentiment Chart with a clearer output format for better user understanding.● Removed the anomaly detection feature from the backend to simplify the system and reduce complexity.	4
Apr 6	<ul style="list-style-type: none">● Implemented automatic categorization of menu items based on input data.● Fixed output logic for Market Basket Analysis and Customer Sentiment Chart to improve accuracy and display format.	3

Progress Summary

Since Progress Report 4, significant enhancements have been made to both backend and frontend components of the Intelligent Business Analytics System:

- **Sentiment Analysis Improvements**
 - Redesigned sentiment output to show:
 - Best item by % positive reviews
 - Worst item by % negative reviews
 - Sorted summary of all items by positivity rate
 - Improved FastAPI endpoint to calculate, aggregate, and return sentiment summaries grouped by item
 - Updated frontend SentimentChart.js to clearly display data in table format
- **Market Basket Analysis Refinement**
 - Modified backend logic to group transactions by order_id for more meaningful association rule mining
 - Improved Apriori results handling and filtering
 - Updated frontend to display top 3 rules by **support**, **confidence**, and **lift** with definitions to help end-user understanding
- **Menu Category Pie Charts**
 - Integrated **Hugging Face Transformers** to auto-categorize menu items as **Main**, **Drink**, or **Dessert**
 - Built a new API to generate category counts
 - Developed new MenuCategoryChart.js React component to display category-based item distributions using pie charts
- **Bug Fixes and UI Enhancements**
 - Removed deprecated LSTM from revenue forecasting
 - Normalized Excel columns and improved upload compatibility
 - Resolved 500 and 422 errors from market-basket/ and sentiment-results/ endpoints
 - Redesigned frontend UI styling and layout to enhance clarity and polish

Issues Encountered and Solutions

- **FastAPI 500 Errors** due to missing or malformed review data in sentiment analysis
 - Fixed by validating review text and ensuring only non-null string reviews are processed
- **Frontend not showing Market Basket results**
 - Resolved by adjusting JSON structure to match frontend expectations
- **GPT API Limitations**
 - Initially integrated OpenAI GPT for menu classification but later removed due to quota error; replaced with free Hugging Face model
- **Multiple Menu Name Formats**
 - Improved data preprocessing to support various formats and ensure consistent categorization