# Project Report: Bakery Sales Prediction

## Project Overview

This project focuses on developing a machine learning model to predict bakery item sales for the next day. The goal is to assist bakeries in managing inventory efficiently and minimizing waste by leveraging sales predictions.

## Objectives

- Analyze historical sales data to identify trends and patterns.  
- Build a machine learning model to accurately predict next-day sales.  
- Provide actionable insights to optimize bakery operations.

## Methodology

1. Data Collection: Historical sales data was collected, cleaned, and preprocessed to ensure consistency and accuracy.  
2. Data Analysis: Using visualization tools like Matplotlib and Seaborn, trends and seasonality in sales data were identified.  
3. Model Development: The scikit-learn library was used to implement and evaluate different machine learning models, including linear regression and random forest.  
4. Model Evaluation: Metrics like Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE) were used to evaluate model performance.

## Tools and Technologies

- Programming Language: Python  
- Libraries: Pandas, NumPy, Matplotlib, Seaborn, scikit-learn

## Results

- The model achieved an MAE of X and an RMSE of Y, demonstrating its effectiveness in predicting sales.  
- Visualization of predicted vs. actual sales data highlighted the model's accuracy in capturing trends.

## Conclusion

The sales prediction model provides reliable forecasts that can help bakeries optimize inventory and reduce costs. Future work includes integrating real-time data for enhanced predictions and expanding the model's scope to include seasonal promotions and holidays.

## Note on Chatbot Integration

Although a chatbot feature was linked to this project, it was implemented using a paid website service and is not included in the technical scope of this report.