Smart Analytics for a Vegetable Seller

A Proposal report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled **"Smart Analytics for a Vegetable Seller"**. I extend my appreciation to **Mr. Muthuraj A**, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the principles of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate

Name: Anuj Krishna S

Date: March 03, 2025

1 Executive Summary and Title

The project **Smart Analytics for a Vegetable Seller** focuses on a small roadside vegetable shop owned by Mr. Muthuraj A, located at Ashok Nagar, Chennai. The business is B2C and deals in the segment of fresh vegetable retail.

The major business issues that Mr. Muthuraj is facing include stagnant sales, making it difficult to increase revenue and savings. Additionally, the seller struggles with vegetable wastage, requiring effective strategies to minimize the losses and improve overall profitability.

To address these challenges, the first step is to collect accurate data, as the seller currently lacks proper records. By staying with him, I am gathering data on customer purchases, vegetable procurement from the market, previous stock levels, and excess inventory. This data is then analyzed to identify sales trends, optimize stock management, and reduce wastage, ultimately helping to improve revenue and profitability. The expected outcome helps the seller with improved inventory control, minimized wastage, and data-driven strategies to boost sales, ultimately leading to increased revenue and profitability.

2 Organization Background

The organization I am working with is a small vegetable shop owned by Mr. Muthuraj A, a platform vegetable seller operating in 7th Avenue, Ashok Nagar, Chennai. A native of Chennai, he has been in this business since 1986, initially running a much larger store at the same location. However, due to rental constraints, he had to downsize his shop over the years. Despite these challenges, he continues to serve the local community with fresh vegetables. Mr. Muthuraj resides at Saligramam locality of Chennai and follows a rigorous daily routine to ensure the quality of his products. Every morning at 3 AM, he travels to the Koyambedu wholesale market, one of the largest vegetable markets in Chennai, to procure fresh stock. He then sets up his shop in Ashok Nagar and sells vegetables to residents, relying on regular customers for his livelihood. His long-standing presence and commitment to quality have earned him a loyal customer base in the area.

3 Problem Statement

3.1 Mr. Muthuraj is facing stagnant sales, limiting his business growth. He seeks data-driven strategies to increase revenue, attract more customers, and improve profitability.

3.2 He is experiencing high daily stock wastage, leading to financial losses. Reducing this wastage is essential to improve profitability and operational efficiency. Implementing better inventory management and sales strategies can help minimize losses and maximize earnings.

4 Background of the Problem

The challenges faced by Mr. Muthuraj are, the stagnant sales and high stock wastage. These issues directly impact his revenue and profitability, making it difficult for him to expand his business. Despite his experience, the changing market conditions and operational inefficiencies have made growth difficult.

The major cause of these problems is the lack of data-driven decision-making. Without proper sales tracking, demand forecasting, and inventory management, excess stock often leads to wastage, while a lack of promotional strategies results in limited customer reach. Additionally, rising competition from other sellers at a more affordable price has reduced footfall in his shop.

Internally, inefficient stock management contributes to waste, as vegetables perish before they can be sold. Without proper demand estimation, over-purchasing leads to excess stock that cannot be stored for long. Limited marketing efforts and reliance on a fixed customer base also restrict sales growth.

Externally, the fluctuating vegetable price changes the customer preferences. Competition from more vegetable street hawkers further impact his business. Additionally, weather conditions lead to price fluctuations, making it harder to maintain steady profits.

5 Problem Solving Approach

To address the challenges faced by Mr. Muthuraj, I am using the Design Thinking approach, which consists of four key phases: Empathize, Analyse, Solve, and Test. This structured

methodology enables a deep understanding of the problem, data-driven analysis, and strategic solutions.

5.1 Empathize and Analyze

In the empathize phase, I have put myself in the seller's shoes to understand his daily challenges, including stagnant sales and stock wastage. Observing his routine and interacting with customers has provided first hand insight into the problem. The next step is data collection and analysis**.**

Data Collection

Since Mr. Muthuraj does not maintain daily sales records, I am manually collecting two months' worth of data on key metrics, including stock purchased, stock sold, and leftover stock. Tracking these numbers consistently will help identify patterns in sales and wastage. In order to gain deeper insights, I am also gathering customer data regarding vegetable preferences, purchasing frequency, and product quality. Additionally, I am conducting market research by visiting competitors to compare their product quality, pricing, and business strategies. Furthermore, I will assess the business feasibility of Mr. Muthuraj's current location by analysing foot traffic and local demand.

Data Processing and Analysis

Once data collection is complete, I will document all findings in an excel file for structured analysis. The next step involves data cleaning and processing to refine the collected data, removing inconsistencies and ensuring accuracy. Using MS Excel and Google Colab, I will conduct descriptive statistical checks to identify correlations between key metrics such as stock purchases, sales volume, and wastage levels. I will also perform exploratory data analysis (EDA) to simplify the broader problem into actionable insights. Additionally, I will use time series analysis to uncover patterns in daily sales performance.

5.2 Solve Phase: Implementing Data-Driven Solutions

Based on insights from the analysis, I will develop strategies to increase sales and revenue by focusing on customer preferences, competitive pricing, and effective inventory management.

To minimize stock wastage, I will optimize procurement strategies, ensuring supply aligns with demand trends.

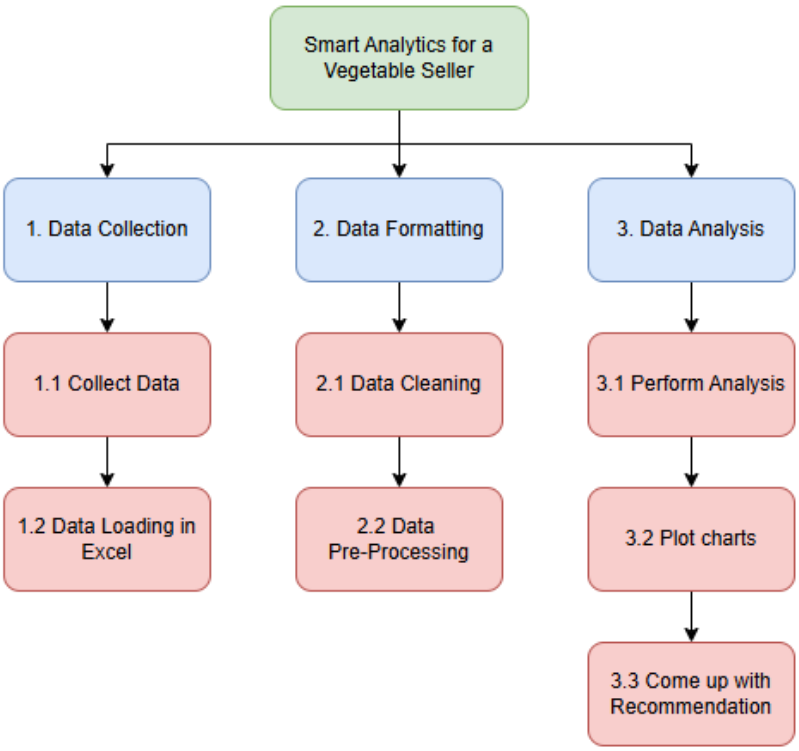
5.3 **Test Phase: Live Implementation of Solutions**

After developing potential solutions, I will test them under live conditions with Mr. Muthuraj, monitor their impact, and make necessary adjustments for better results.

This structured approach will enable Mr. Muthuraj to make informed decisions, optimize operations, and achieve sustainable business growth**.**

6 Expected Timeline

6.1 Work Breakdown Structure:



6.2 Gantt chart

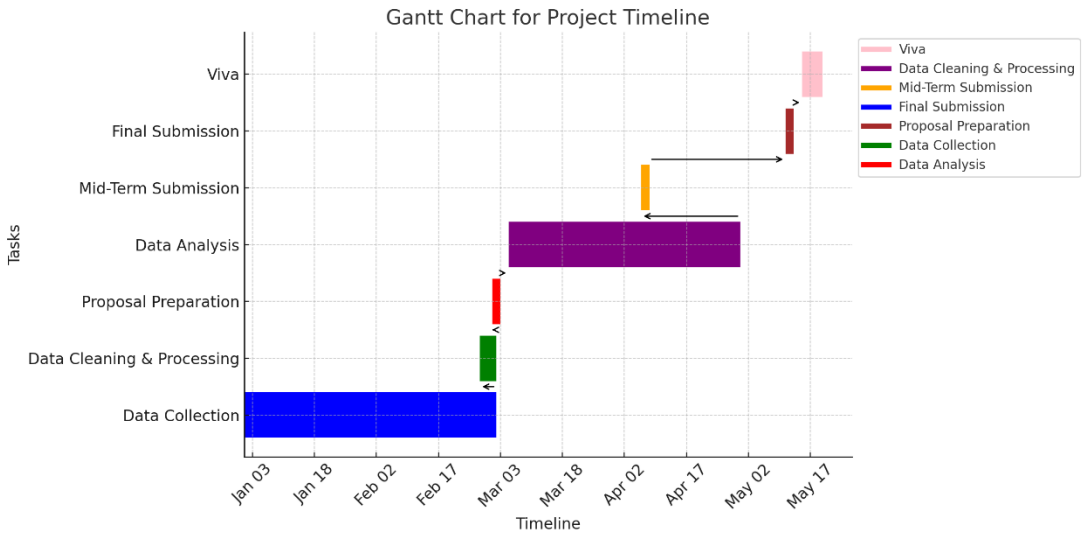


Figure 1 Expected timeline for completion of project.

7 Expected Outcome

- The project aims to enhance business performance through data-driven insights by identifying clear sales trends and patterns using time-series analysis. It will provide recommendations on best-selling products, peak sales hours, and customer preferences while developing effective strategies to increase footfall and improve customer retention, ultimately driving growth and profitability.
- The project focuses on optimizing stock procurement to minimize excess inventory and reduce wastage through data-backed solutions. By leveraging proper analysis for demand, it ensures stock aligns with customer needs, preventing over-purchasing and improving inventory efficiency, ultimately leading to better resource utilization and increased profitability.
- The project conducts a comparison of product quality, pricing, and sales strategies with competitors to identify areas for improvement. A feasibility analysis of the current shop location will assess its business potential, while strategic positioning recommendations will help enhance market competitiveness and drive long-term business growth.