LEVERAGING DATA FOR EFFECTIVE PRICE FORECASTING AND CREDIT MANAGEMENT FOR VEGETABLE DISTRIBUTOR

A PROPOSAL REPORT FOR THE BDM CAPSTONE PROJECT

ADITYA JAISWAL
22F3002960
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INDIAN INSTITUTE OF TECHNOLOGY, MADRAS, CHENNAI
TAMIL NADU, INDIA, 600036

(BS) DEGREE IN DATA SCIENCE AND APPLICATIONS

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Declaration Statement

I am working on a Project titled " Leveraging Data For Effective Price Forecasting And Credit Management For Vegetable Distributor ". I extend my appreciation to **Kanhaiyalal D Jaiswal (Wholeseller Merchant of Onion, Potato)**, 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: (**Digital Signature**)

Name: Aditya Jaiswal

Date: 5/07/24

Executive Summary

Kanhaiyalal D Jaiswal (Wholeseller Merchant of Onion, Potato) is a leading vegetable vendor specializing in the wholesale and retail distribution of high-quality potatoes and onions which is owned and operated by Mr Rajkumar Jaiswal. Established in 2010, the organization has built a reputation for excellent customer service and sustainable practices, serving both B2B and B2C markets. The business prides itself on high-quality produce, customer retention, and a strong inflow of new customers driven by customer loyalty and satisfaction.

Despite these strengths, the shop faces significant challenges due to price volatility from seasonal variations and inadequate tracking of credit transactions and balances. Price fluctuations impact procurement costs and pricing strategies, while the lack of a robust system for credit management leads to cash flow issues, financial discrepancies, and increased risk of bad debts.

To address these challenges, a comprehensive, data-driven approach will be implemented. This involves using historical pricing data and seasonal patterns to forecast price changes and integrating an credit tracking system. Analysis tools like Microsoft Excel and Python will facilitate advanced data analysis and predictive modeling. These solutions will enhance price and credit management, optimize inventory control, reduce operational costs, improve customer satisfaction, and provide a competitive edge, ensuring long-term profitability and sustainability.

Organisation Background

Kanhaiyalal D Jaiswal (Wholeseller Merchant of Onion, Potato) is a dynamic and customer-focused vegetable supplier located near Ambhaji Dham Mandir , M.G Road , Mulund - West, Mumbai, Maharshtra owned and operated by Mr Rajkumar Jaiswal.

It specializes in the wholesale and retail distribution of high-quality potatoes and onions. Established in **2010**, the shop has grown to become a trusted name in the vegetable supply industry, catering to both B2B and B2C market.

The shop employs a total of 7 staff members which includes 1 cashier, 3 workers, and 3 delivery personnel.

BUSINESS SEGMENTS :

· **Wholesale (B2B):**

- Target Market: Restaurants, hotels, supermarkets, food processing companies, and other large-scale consumers
- Services: Bulk supply, flexible delivery schedules, competitive pricing, and customized order handling
- Logistics: Efficient supply chain management ensuring timely and fresh deliveries

Retail (B2C):

- Target Market: Individual consumers, small grocery stores, and farmers' markets
- Services: Convenient in-store shopping options, home delivery, and seasonal promotions
- Customer Engagement:Customer feedback systems, and community outreach initiatives

Problem Statement

The shop has major issues due to frequent price changes due to different seasons which affect how much it costs to buy vegetables ; price fluctuations have an effect on cost decisions which ultimately affect how customers relate to them as well as profit margins. This is coupled with lack of an effective system to monitor credit transactions or keep up-to-date records about outstanding debts from buyers hence leading into poor cash flows.

1. **Price Changes due to Seasonal Variation** : The challenge with having potato and onion prices fluctuating greatly due to their pricing being affected by the unpredictable weather and seasonal changes. These fluctuations increase difficulty of procuring the commodities since more money is required while the wholesale as well as retail pricing strategy is concerned. Financial instability and other challenges related to maintenance occur due to lack of reliable forecast models on such price deviations.
2. **Inadequate Tracking of Credit Transactions and Balances** : In this case,the vendor relies hugely on credit stipulating terms to its B2B clients. Unfortunately, there no standardized means of tracking these transactions or managing the outstanding balances effectively with difficulties in keeping proper financial records intact, monitoring accounts receivable together with ensuring that there are collections being made on time.

Background of the Problems

Expanding the problems

1. **Price Changes due to Seasonal Variation**: Unforeseeable variation of costs may hurt the relationships with B2B and B2C clients used to stable prices. Raising sourcing prices without corresponding growth of purchasing values will shrink profit margins whereas pushing prices too high may raise them too much high hence reducing purchases and leading to client dissatisfaction. and rainfall, pose furthercomplexities, leading to sudden increases in their prices overnight.
2. **Inadequate Tracking of Credit Transactions and Balances**: Not keeping track of credit transactions well can lead to cash flow problems. If debts are not paid on time, the business may struggle to revive the inventory or keep its operations running. Also, failure to manage credits properly results in financial errors which increase chances of bad debts and create strained customer relationships because of poor credit terms..

These problem statements highlight key areas where Kanhaiyalal D Jaiswal (Wholeseller Merchant of Onion, Potato) can benefit from improved data analysis and inventory management systems to enhance operational efficiency and financial stability.

Problem-Solving Approach

To solve the problem of price volatility, historical price information and seasonal trends will be used to predict price variations for them to develop strategies. For credit management, integrating a credit tracking system will ensure accurate recording and monitoring of all credit transactions and outstanding balances.

a. Data Driven Price Management

- **Price Forecasting** : Utilize historical pricing data and seasonal patterns to predict future price changes of potatoes and onions. Implement machine learning models to improve accuracy.
- **Scenario Planning** : Develop various pricing scenarios based on different seasonal forecasts to prepare flexible procurement and pricing strategies.

b. Credit Management System

- **Credit Tracking:** Implement an automated system to record and monitor all credit transactions, ensuring accurate tracking of outstanding balances.
- **Customer Analysis:** Analyze credit data to identify patterns and risk factors, enabling better credit management and reducing the risk of bad debts.
- **Payment Reminders:** Automate reminders for customers with outstanding balances to improve cash flow and ensure timely payments.

c. Intended Data Collection

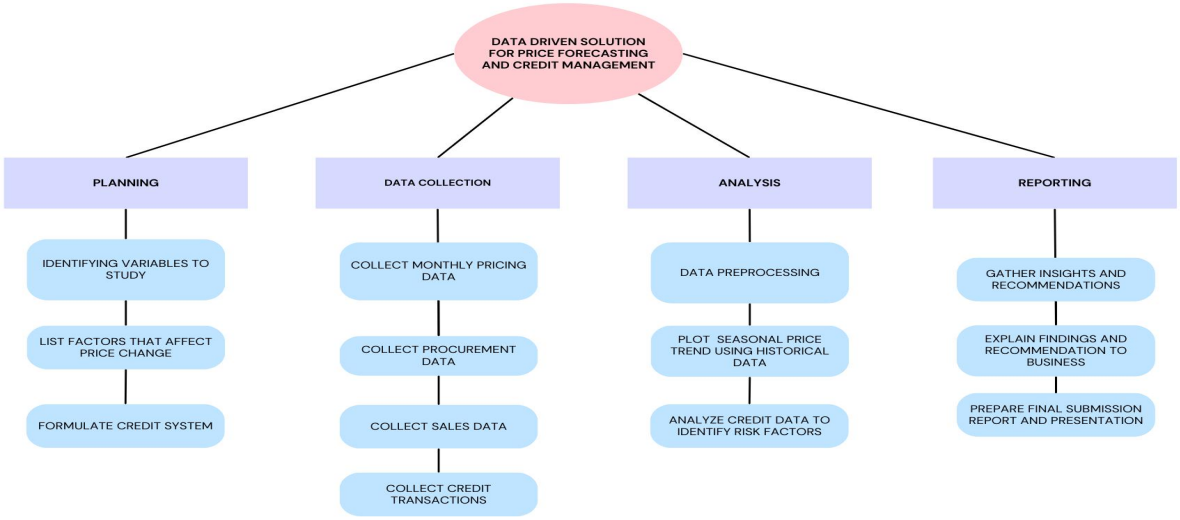
- The intended data collection for inventory management includes:
    i. **Pricing Data:** Historical pricing information of potatoes and onions to identify trends and predict seasonal variations.
    ii. **Procurement Data:** Records of purchase quantities and costs to analyze procurement patterns and adjust to seasonal changes.
    iii. **Sales Data:** Volume and revenue data for both wholesale and retail transactions to understand demand and price sensitivity.
    iv. **Credit Transactions Data:** Detailed records of all credit sales, including customer information, credit terms, outstanding balances, and payment history.

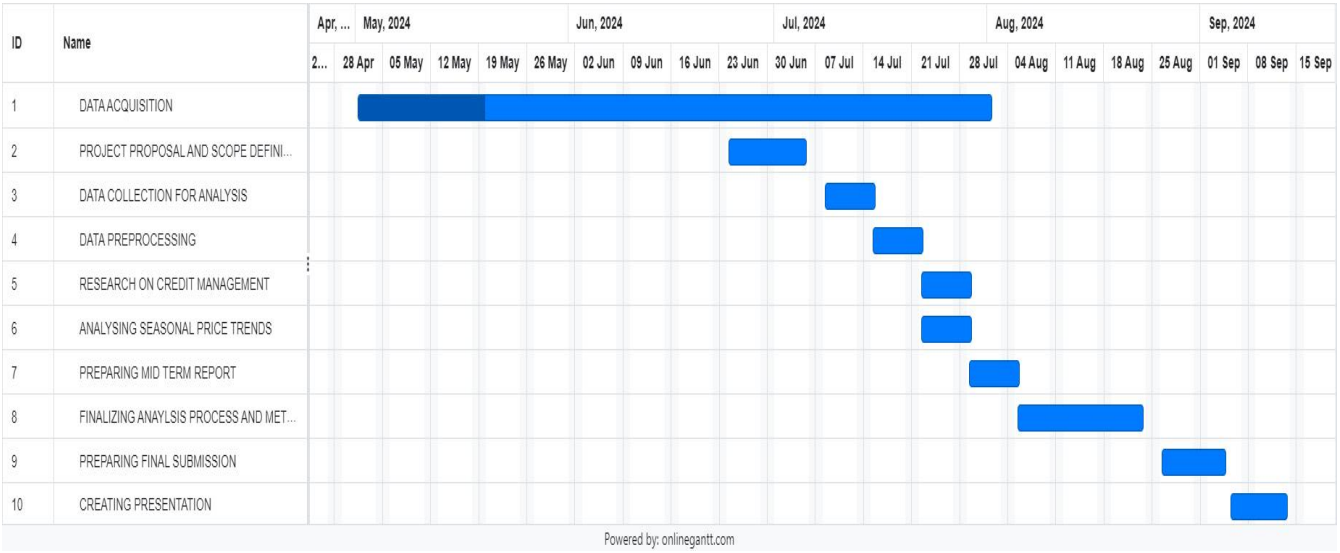
d. Analysis Tools

- **Microsoft Excel:** Excel will be used to manage and analyze pricing and procurement data, create visual representations of price trends, and track inventory levels. Pivot tables and charts will help visualize seasonal price variations and inventory status, aiding in strategic planning.
- **Python and Machine Learning (ML) Tools:** Python will be employed for advanced data analysis and forecasting. Libraries such as Pandas and NumPy will handle large datasets, perform statistical analysis, and generate predictive models for pricing trends and inventory needs. ML tools can be used to develop algorithms that forecast seasonal price changes and identify credit risk patterns.

The combination of these methods, data collection, and analysis tools will create a robust system to manage price volatility and credit transactions effectively. It will enable the supplier to make informed procurement decisions and maintain consistent profit margins despite seasonal fluctuations.It will also help to track credit transactions accurately and improve cash flow through timely collections.

Expected Timeline





Expected Outcomes

The plan to implement the complete data-driven approach should greatly enhance price management and credit tracking systems. As a result, it is anticipated that the approach will bring about precise price forecasting, strategic inventory buying practices, and pricing strategies that are optimized. Credit management will also benefit from this initiative, since all transactions will be tracked accurately while at the same time minimizing bad debts as well as improving cash flow.