**Price Prediction and Demand Forecasting for a Small Fruit Shop**

**A Mid Term report for the BDM capstone Project**

Submitted by

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**Declaration Statement**

I am working on a Project titled “Price Prediction and Demand Forecasting for a small Fruit Shop”. I extend my appreciation to **Mr. Narayan Das**, for providing the necessary resources that enabled me to conduct my project.

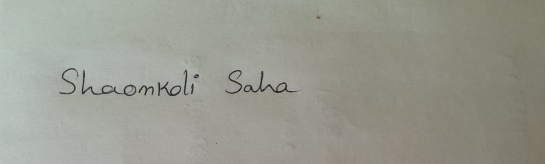
I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

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 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: Shaonkoli Saha

Date: 05-03-2024

# Executive Summary and Title

The project focuses on a small fruit shop located at Kalindi Housing Estate, Kolkata. The business is B2C and deals with different types of fruit.

The major business issues that the owner is facing are related to a very nominal profit due to wastage of inventory on daily basis. This problem pushes him so sell the product on higher price to make profit, which leads to less buyers to his shop.

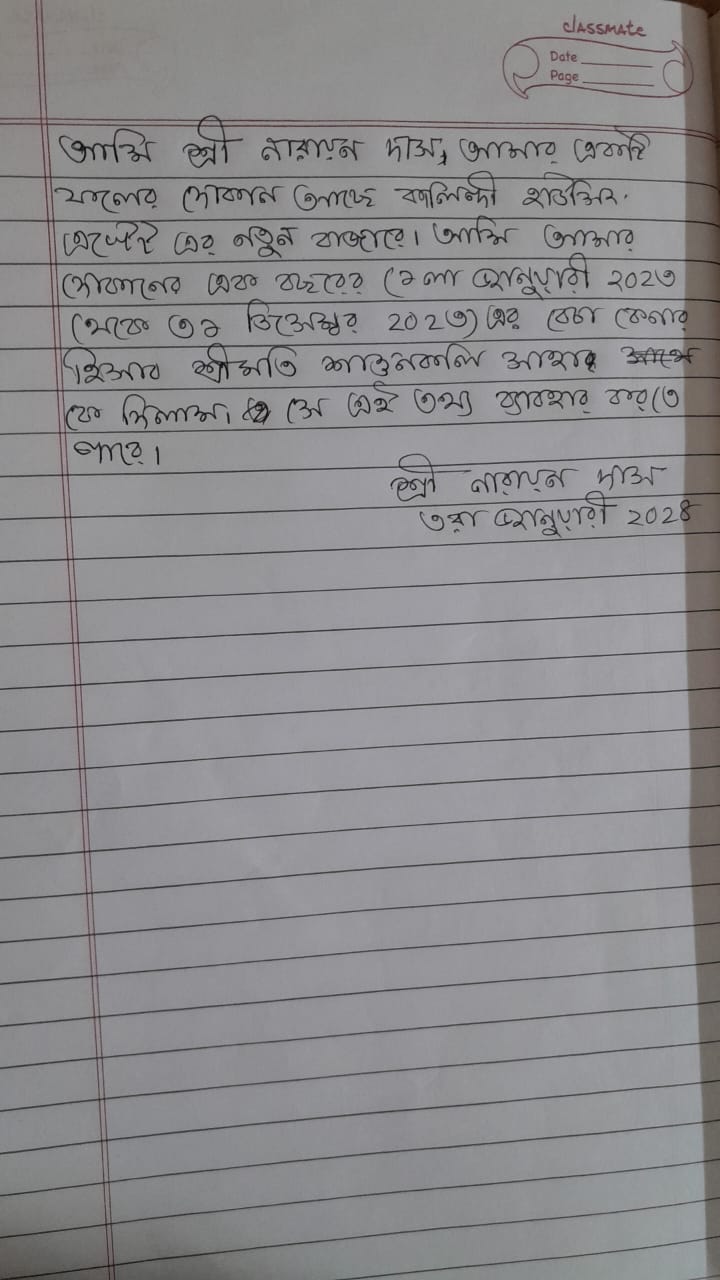
The issues will be addressed by analyzing the data and will provide effective solution so that it can help the business owner to reduce the money blockage in terms of inventory. This will help the business to increase the profitability of the organization.

# Proof of Originality of the Data

1. **Data from organization**



1. **Letter from business owner**



# Metadata

This file contains 1 year (01-jan-2023 to 31-dec-2023) of buy and sell information of the fruit shop. The owner used to keep book as ledger. I took the information from the book and put it into excel.

The excel contains:

1. Buy Data: Owner buys inventory on Sundays. Buy Data sheet contains information like:
   1. When the product bought (Date)
   2. What product bought
   3. In which price the product bought
   4. Quantity of the product bought.
2. Sell data: Owner opens his shop daily morning. Sell Data sheet contains information like:
   1. When the product sold (Date)
   2. What product sold
   3. Average price the product sold.
   4. Quantity of the product sold.

# Descriptive Statistics

* 1. **Descriptive Statistics of Buy Data**

|  |  |  |  |
| --- | --- | --- | --- |
| *Price* |  | *Quantity* |  |
|  |  |  |  |
| Mean | 60.49579832 | Mean | 15.11204482 |
| Standard Error | 2.360176098 | Standard Error | 0.340042614 |
| Median | 38 | Median | 10 |
| Mode | 25 | Mode | 10 |
| Standard Deviation | 44.59421423 | Standard Deviation | 6.424915994 |
| Sample Variance | 1988.643943 | Sample Variance | 41.27954553 |
| Kurtosis | -0.694368402 | Kurtosis | -0.801485104 |
| Skewness | 0.782300197 | Skewness | 0.708924025 |
| Range | 133 | Range | 25 |
| Minimum | 12 | Minimum | 5 |
| Maximum | 145 | Maximum | 30 |
| Sum | 21597 | Sum | 5395 |
| Count | 357 | Count | 357 |
| Confidence Level(95.0%) | 4.641640312 | Confidence Level(95.0%) | 0.668744804 |
| **4.2 Descriptive Statistics of sell Data** | | | |
| *Price* |  | *Quantity* |  |
|  |  |  |  |
| Mean | 73.08095238 | Mean | 7.497617913 |
| Standard Error | 1.492277377 | Standard Error | 0.181709217 |
| Median | 50 | Median | 4 |
| Mode | 30 | Mode | 2 |
| Standard Deviation | 68.3847404 | Standard Deviation | 8.324979584 |
| Sample Variance | 4676.472719 | Sample Variance | 69.30528508 |
| Kurtosis | -0.617588413 | Kurtosis | 4.976731277 |
| Skewness | 0.88572267 | Skewness | 2.029935108 |
| Range | 195 | Range | 64.5 |
| Minimum | 5 | Minimum | 0.5 |
| Maximum | 200 | Maximum | 65 |
| Sum | 153470 | Sum | 15737.5 |
| Count | 2100 | Count | 2099 |
| Confidence Level(95.0%) | 2.92649743 | Confidence Level(95.0%) | 0.356349102 |

# Detailed Explanation of Analysis Process/Method

Here I am analyzing the data for the problem “Lots of fruit sand getting soured on daily basis”. For the analysis, I am using excel pivot table method to understand the average buy and sell quantity of each product.

This method is easily available and very efficient to do the analysis. Below section, I have provided the data which shows each product buy and sell quantity on monthly basis.

# Results and Findings

Here is the analysis of Buy and Sell quantity. It indicates that, all the product and getting wastage on daily basis. There is less demand that the available inventory.

**Pivot table of Buy data**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Average of Quantity** | **Month** |  |  |  |  |  |  |  |  |  |  |  |
|  | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Fruits** |  |  |  |  |  |  |  |  |  |  |  |  |
| apple(kg) | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| banana(dozen) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| ber(kg) | 10 | 10 |  |  |  |  |  |  |  |  |  |  |
| Black Grapes(kg) |  |  |  |  |  |  | 5 |  |  |  |  |  |
| coconut(piece) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Green Grapes(kg) |  |  | 10 | 10 |  | 10 | 10 |  |  |  |  |  |
| Guava(kg) |  |  |  |  |  |  |  | 10 |  |  |  |  |
| mango(kg) |  |  |  | 15 | 15 | 15 |  |  |  |  |  |  |
| mousambi(dozen) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Muskmelon(piece) |  |  |  |  |  |  |  | 15 | 15 | 15 |  |  |
| orange(dozen) | 20 | 20 |  |  |  |  |  |  |  |  | 20 | 20 |
| Papaya(kg) |  |  | 25 | 25 | 25 |  |  |  |  | 25 |  |  |
| Pineapple(piece) |  |  |  |  |  |  | 25 |  | 25 | 25 | 25 |  |
| Pomegranate(kg) |  |  |  |  |  |  |  | 20 | 20 | 20 |  |  |
| Watermelon(piece) |  |  |  |  | 25 | 25 |  |  |  |  |  |  |
| yam bean(kg) | 30 | 30 |  |  |  |  |  |  |  |  |  | 30 |

**Pivot table of sell data**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Average of Quantity** | **Month** |  |  |  |  |  |  |  |  |  |  |  |
|  | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Fruits** |  |  |  |  |  |  |  |  |  |  |  |  |
| apple(kg) | 2.564516129 | 1.910714286 | 1.8 | 1.85 | 1.951612903 | 1.883333333 | 2.14516129 | 2.258064516 | 2.05 | 1.887096774 | 2 | 1.935483871 |
| banana(piece) | 18.21052632 | 22 | 20.47058824 | 20.05882353 | 18.73684211 | 19.4375 | 21.5 | 17.61111111 | 20 | 16.63157895 | 16.82352941 | 19.52941176 |
| ber(kg) | 2.421052632 | 2.3125 | 1 |  |  |  |  |  |  |  |  |  |
| Black Grapes(kg) |  |  |  |  |  |  | 2.305555556 | 0.5 |  |  |  |  |
| coconut(piece) | 4.451612903 | 5.071428571 | 4.838709677 | 5.033333333 | 5.290322581 | 6.266666667 | 5.612903226 | 5.677419355 | 5.466666667 | 5.741935484 | 6.133333333 | 5.419354839 |
| Green Grapes(kg) |  |  | 1.9375 | 2.264705882 | 1.666666667 | 2.125 | 1.972222222 | 1.5 |  |  |  |  |
| Guava(kg) |  |  |  |  |  |  |  | 1.75 |  |  |  |  |
| mango(kg) |  |  |  | 3.461538462 | 2.684210526 | 3.375 |  |  |  |  |  |  |
| mousambi(piece) | 13.80645161 | 15 | 15.06451613 | 15.5 | 9.322580645 | 8.166666667 | 13.25806452 | 13.48387097 | 12.53333333 | 11.5483871 | 8 | 10.96774194 |
| Muskmelon(piece) |  |  |  |  |  |  |  | 2.086956522 | 2.16 | 1.962962963 | 2 |  |
| orange(piece) | 29.77777778 | 26.66666667 | 40.33333333 |  |  |  |  |  |  |  | 19.39130435 | 25.73076923 |
| Papaya(kg) |  |  | 3.208333333 | 2.92 | 3.222222222 | 2.5 |  |  |  | 2.857142857 | 3 |  |
| Pineapple(piece) |  |  |  |  |  |  | 2.730769231 | 2.5 | 2.458333333 | 2.074074074 | 2.884615385 | 4 |
| Pomegranate(kg) |  |  |  |  |  |  |  | 2 | 1.616666667 | 1.642857143 |  |  |
| Watermelon(piece) |  |  |  |  | 3.47826087 | 3.566666667 | 4 |  |  |  |  |  |
| yam bean(kg) | 3.903225806 | 4.178571429 | 4.25 |  |  |  |  |  |  |  |  | 3.862068966 |