# Optimized Warehouse Management of Perishable Goods for a Food Delivery Company

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# Abstract


- The need to feed an ever increasing world population makes it necessary to reduce the tons of perishable waste along the food supply chain
- Yet about one third of global fresh fruits and vegetables (FFVs) are thrown away due to their quality.
- It has been a formidable task to handle the perishable food supply chains due to its short lifespan and the possibility of spoilage of the product due to its deterioration nature.

# Introduction

- Maintaining high food quality standards is important for product market value, customer happiness and in turn for the long term reputation of the organization.
- With the use of Machine Learning and its algorithms we have created a way for the optimization of the goods so that the wastage of perishable goods can be minimized to a maximum level.

- A Machine Learning system and Cloud both integrated together taking into account supply chain constraints such as supplier delivery times and minimum or maximum order quantities.

Current Scenario

# Aim & Target

- The aim of this project is to present a predictable order of the perishable supply chain management modeling and optimization approach focusing on loss minimization along the supply chain.

# Literature Review

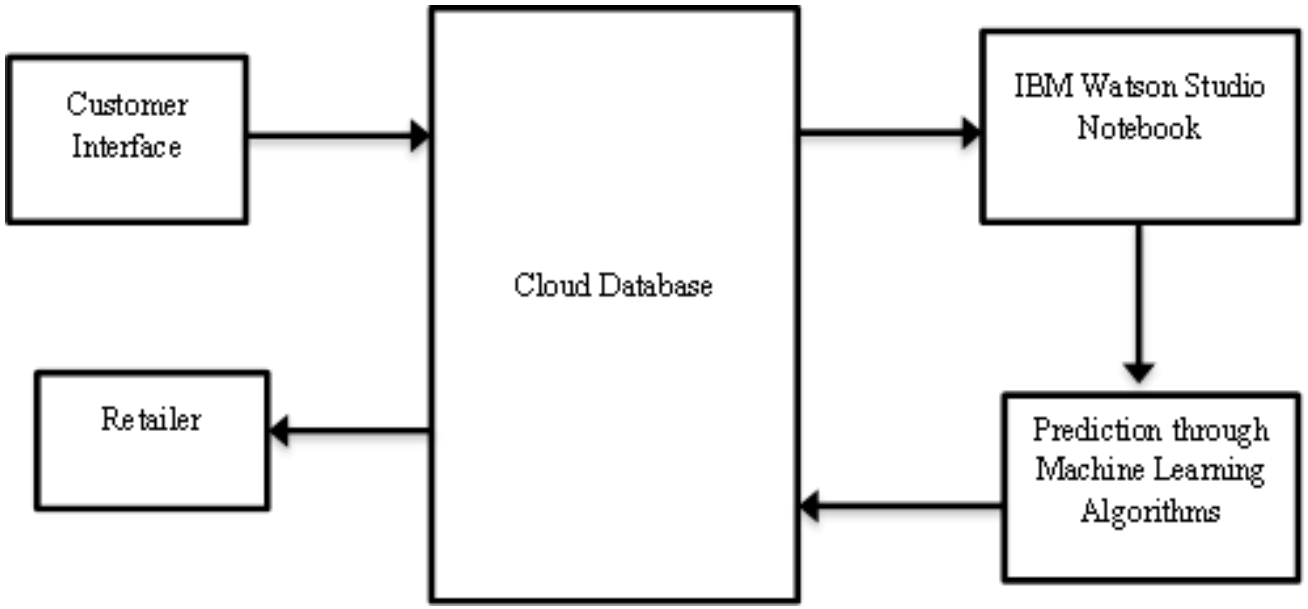
| S.No | Name of the Paper | Author | Published | Elements |
|---|---|---|---|---|
| 1 | Reducing Food Losses by Intelligent Food Logistics | Reiner Jedermann, Mike Nicometo, Ismail Uysal, Walter Lang | 2014 | Significance of preserving and maintaining the freshness of food products |
| 2 | A Literature Review on Machine Learning in Supply Chain Management | Wenzel, Hannah; Smit, Daniel; Sardesai, Saskia | 2019 | first-expired-first -out (FEFO) |

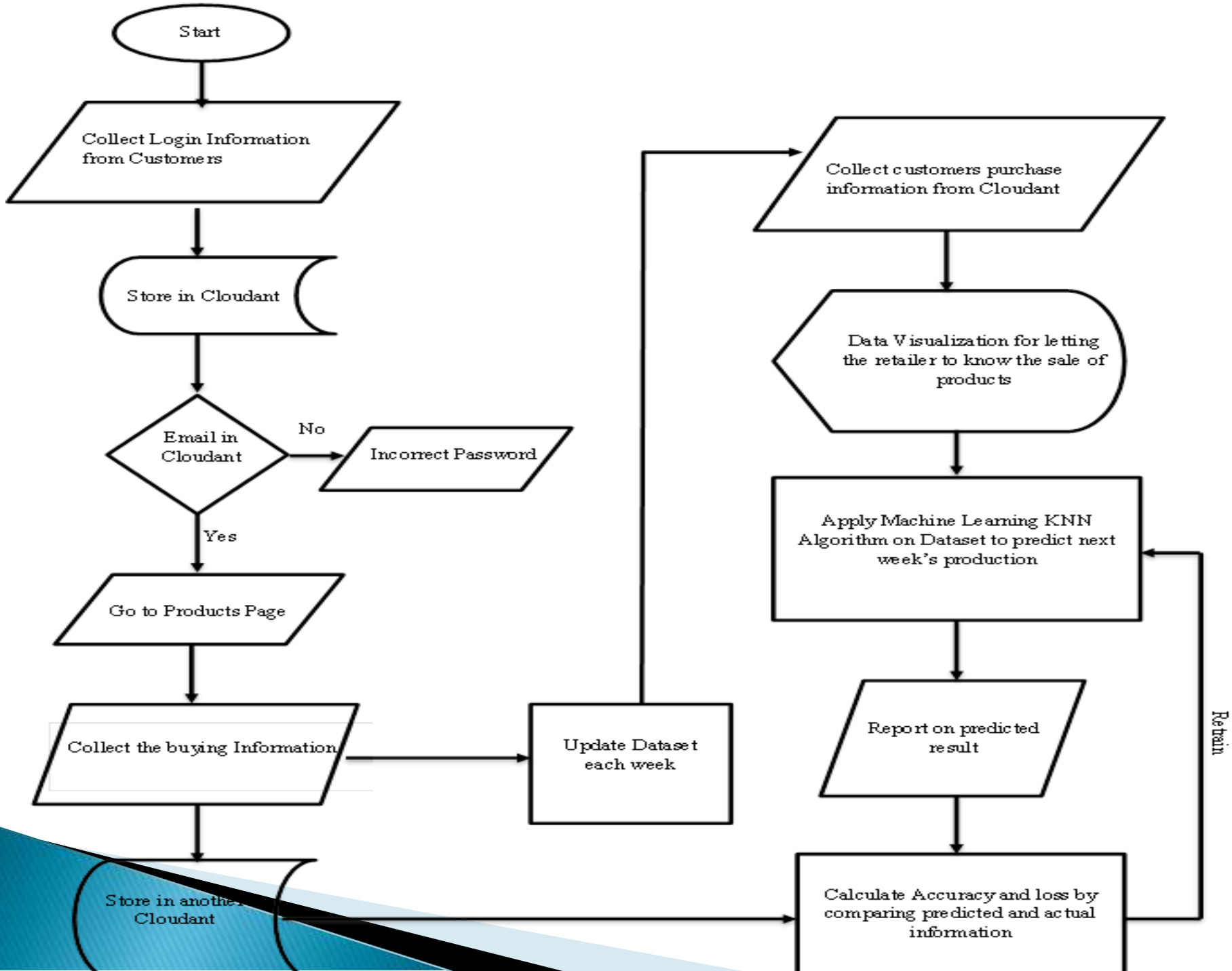
# Proposed Solution

- The solution to this problem we have proposed concentrates on both Cloud for collecting dataset and Machine Learning though Python to predict the amount of goods to be ordered in a range of one week.
- We have implemented and integrated the idea of webpage for online shopping and machine learning and cloud-based services.
- This helps both the retailer and customer in a way that the loss for retailers will be minimized with customer satisfaction as the customers get good quality food products.

# Aim in the Future

# Block Diagram




Start
Collect Login Information from Customers
Store in Cloudant
Email in Cloudant
No
Incorrect Password
Yes
Go to Products Page
Collect the buying Information
Store in another Cloudant
Update Dataset each week
Collect customers purchase information from Cloudant
Data Visualization for letting the retailer to know the sale of products
Apply Machine Learning KNN Algorithm on Dataset to predict next week's production
Report on predicted result
Calculate Accuracy and loss by comparing predicted and actual information
Retrain

# Implementation

- The data collected from the cart page will be given as the dataset to the Watson Studio Notebook
- With Random Forest Algorithm the model predicts the amount of goods needed for the week
- Then when a retailer requests the predicted amount in UI, the model replies with the amount of goods

# Advantages

- The user interface is user friendly
- The machine learning prediction is highly reliable
- It prevents wastage of valuable perishable food products
- The retailers are benefited as their losses are reduced
- The customers get good quality food product as retailers buy food products as per their needs

# Disadvantages

- It cannot be implemented based on various seasons
- At the time of traffic in the cloud, the server may get slowed down

# Applications

- This idea can be used to predict the future sale of a store based on its previous performances.
- It suggests the required amount of perishable food products to be bought and stored in the warehouse by the retailer for better sales.

# Conclusion

- The retailers will know how much quantity of goods they must need to store in the warehouse and at the same time, there will not be any shortage of goods to sell to the customers.
- The customers will get good quality food products as the retailers buy the products as per the needs of the customers. This improves the customer-retailer relationship.
- For more accuracy we may also use AI technology with Time Series Analysis which will use Weather Forecasting Algorithm to predict the next week purchase with the help of the current week.

# Future Scope

- Further, Market Basket Analysis can be implemented to suggest the combination of products can be bought together by the customers.
- Also, recommender systems can be included to suggest recommendations to the customers.

# References


- Wenzel, Hannah; Smit, Daniel; Sardesai, Saskia (2019) A Literature Review on Machine Learning in Supply Chain Management, Artificial Intelligence and Digital Transformation in Supply Chain Management, Vol. 27, ISBN 978-3-7502-4947-9, pp. 413-441
- Reiner Jedermann, Mike Nicometo, Ismail Uysal, Walter Lang (2014) Reducing Food Losses by Intelligent Food Logistics, Philos Trans A Math Phys Eng Sci., PMCID: PMC4006167

# Thank You!

**“The best research will give**
**the best teaching and**
**the best teaching will give**
**the best research”**

**“An Innovation with Intelligence rules the World!”**