

Food Demand Forecasting For Food Delivery Company

SmartBridge - Remote Summer Internship Program
Category: Machine Learning

DONE BY:
P N S V SURYA TEJ

Index

1. Introduction
 - 1.1 Overview
 - 1.2 Purpose
2. Literature Survey
 - 2.1 Existing Problem
 - 2.2 Proposed Solution
3. Theoretical Analysis
 - 3.1 Hardware/Software Designing
 - 3.2 Block Diagram
4. Experimental Investigations
5. Flowchart
6. Result
7. Advantages & disadvantages
8. Applications
9. Conclusion
10. Future Scope
11. Bibliography
12. Appendix

1. Introduction:-

1.1 Overview:

- Food delivery and restaurants benefit from forecasting food demand since it increases profits by reducing uncertainty in labor and food waste which are the two largest costs for restaurants.
- The data for this project was obtained from this competition. This project tries to forecast weekly food deliveries for one company using historical data.
- We found the best model to forecast demand is a dynamic regression model which beat the baseline average model by over 40%.
- If implemented this model would drastically reduce labor and food costs for our company by creating more certainty in demand meaning our food delivery client could hire fewer drivers and reduce food waste.

1.2 Purpose:

Food demand forecasting is required mainly for monitoring purposes. Some importance of such assessment includes:

1. To check whether the food demand is in compliance with the standards, and hence, suitable or not for the designated use.
2. To monitor the efficiency of a system, working for food demand forecasting.
3. To check whether upgradation / change of an existing system is required and to decide what changes should take place.
4. To monitor whether food demand is in compliance with rules and regulations.

2 . Literature Survey

2.1 Existing Problem

A food delivery service has to deal with a lot of perishable raw materials which makes it all, the most important factor for such a company is to accurately forecast daily and weekly demand. Too much inventory in the warehouse means more risk of wastage, and not enough could lead to out-of-stocks - and push customers to seek solutions from your competitors. The replenishment of majority of raw materials is done on weekly basis and since the raw material is perishable, the procurement planning is of utmost importance, the task is to predict the demand for the next 10 weeks.

2.2 Proposed Solution

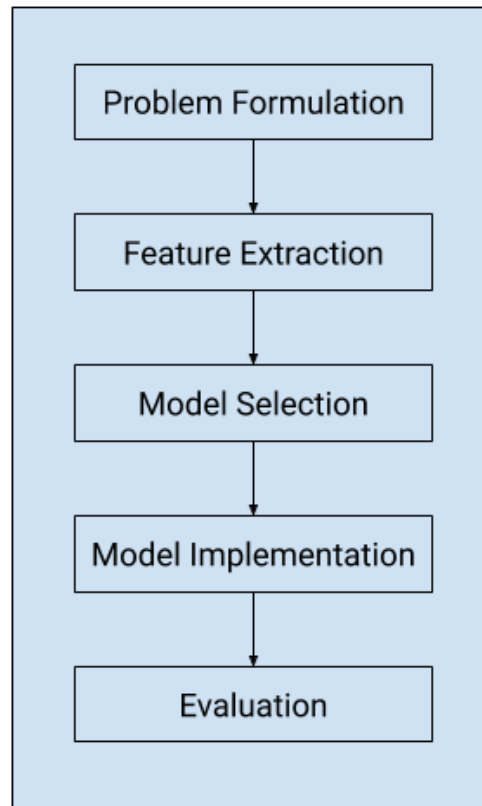
With the use of Machine Learning Model, there will be no limitation of the complexity increasing number of variables. This Model trains and tests the given factors which predicts the food demand and with the best performing machine learning model it can effortlessly predict the food demand forecasting with much higher accuracy than traditional methods.

3. Theoretical Analysis

3.1 Hardware/Software Designing:

Python, Python Web Frameworks, Python for Data Analysis, Python for Data Visualization, Data Pre-processing Techniques, Machine Learning, Regression Algorithms.

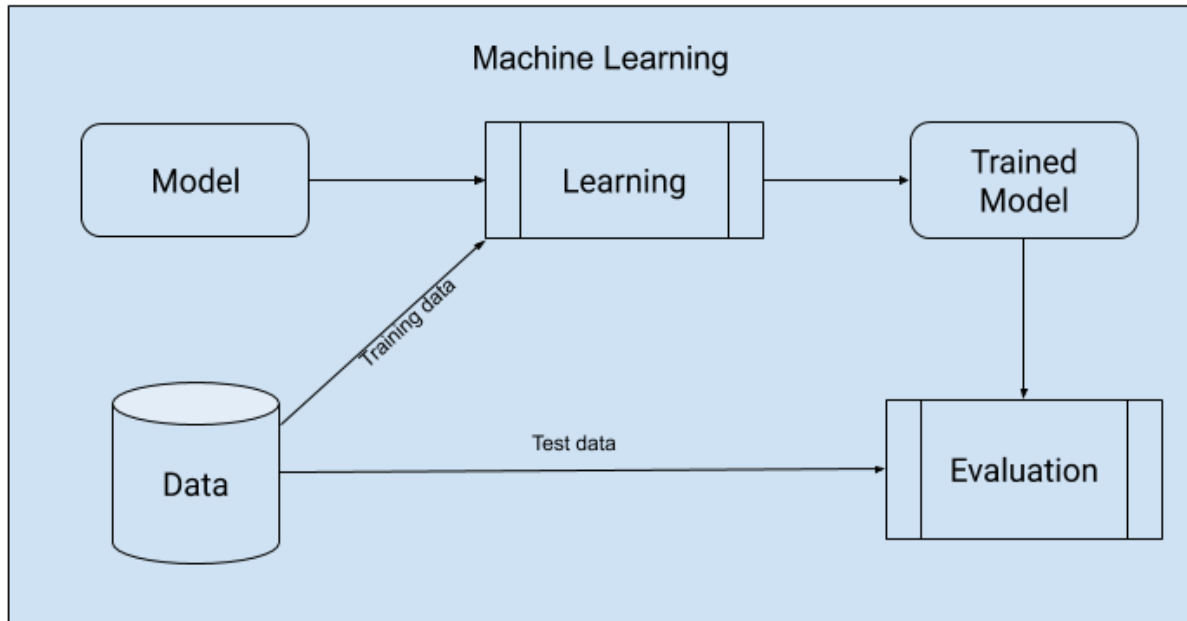
3.2 Block Diagram



4. Experimental Investigations:

In my project, I have used the Food demand forecasting dataset. The data that is used in this project originally comes from the kaggle machine learning dataset. I got to know all the required parameters to predict the food demand and also analysed different models and concluded the best model for predicting the output.

5. Flowchart :



6. Result:

I have used Random Forest Classifier, Linear Regression, Lasso model, Elastic net model, KNN model, Gradient Boost model to make predictions and compare their performance. Random Forest has the highest accuracy and is a good choice for this problem. Random Forest trains the model with subsets of data sampled from the training data, this will make our model more accurate.

Snapshots:

Food Demand Forecasting For Food Delivery Company

homepage_featured

homepage_featured

emailer_for_promotion

emailer_for_promotion

op_area

op_area

cuisine

cuisine

city_code

city_code

region_code

region_code

category

category

Predict Number of orders

Food Demand Forecasting For Food Delivery Company

homepage_featured

0

emailer_for_promotion

0

op_area

4.1

cuisine

1

city_code

009

region_code

03

category

01

Predict Number of orders

The Predicted Number of orders is:

Press Predict Number of orders

region_code

region_code

category

category

Predict Number of orders

The Predicted Number of orders is:

57.13

7. Advantages & disadvantages:

Advantages:

The benefits of this model are:

- No human interference is required
- Easy interface
- Accurate calculations
- Faster Results

Disadvantages:

- Random forests have been shown to fit over certain noisy classification or regression problems.
- For data with different values, attributes with more values will have a greater impact on random forests, so the attribute weights generated by random forests on such data are not credible.

8. Applications:

- Food demand forecasting using Random Forest algorithm tells the demand(number of orders) by giving all the required parameters.
- Predicted results are very accurate.
- Minimizing the physical efforts.

9. Conclusion:

This project helps the restaurant staff and common people to predict the demand(number of orders) very easily.

10. Future Scope:

The future Scope of this project is, we can know the demand of the food based upon the city code, area code, cuisine, category etc and can predict the number of orders that we can get for the given above credentials.

11. Bibliography:

<https://www.kaggle.com/kannanaikkal/food-demand-forecasting>

Data is taken from the above link which consists of 5 csv files.