Project report on

Demandest - AI Powered Food Demand Forecaster

Prepared by

Sindhuja S
Sumaiya S
Swetha V
Visali S

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1. INTRODUCTION

1.1 OVERVIEW

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 ofstocks - 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.

1.2 PURPOSE

The main aim of this project is to create an appropriate machine learning model to forecast then number of orders to gather raw materials for next ten weeks. To achieve this, we should know the information about of fulfilment centre like area, city etc., and meal information like category of food, sub category of food, price of the food or discount in particular week. By using this data, we can use any classification algorithm to forecast the quantity for 10 weeks. For this a web application is built which is integrated with the model.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

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. Also the recruiting of staff members at the fulfilment centre is an prospect wherein the prediction of orders would be beneficial. Although this is a process that can be done manually.

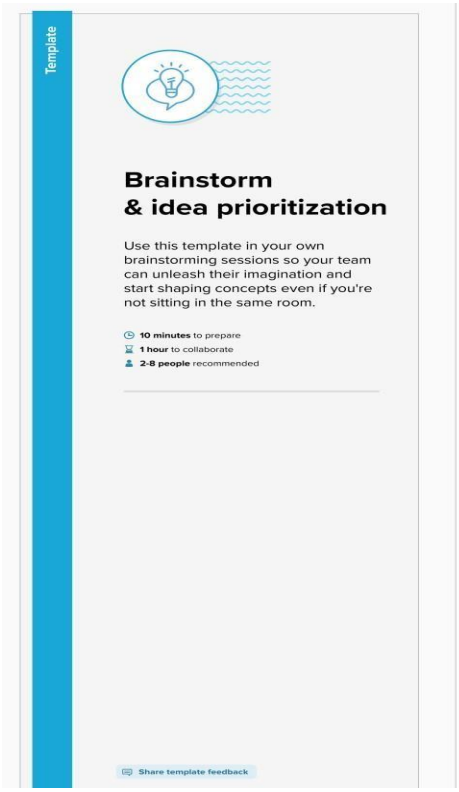
2.2 PROBLEM STATEMENT

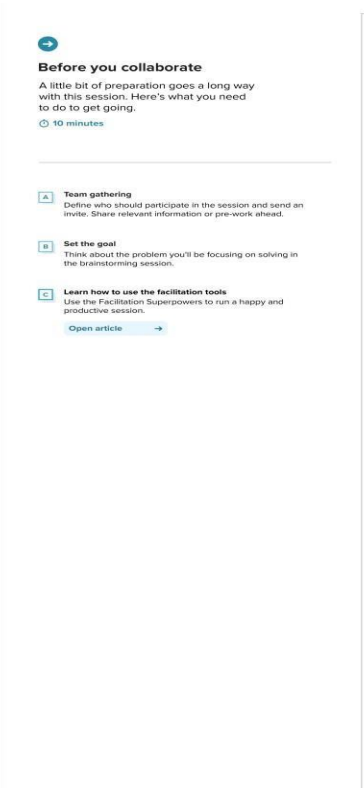
Given the following information, the main task of this project is to build an machine learning model to predict the demand for the next ten weeks for the center-meal combinations in the test set.

3. IDEATION AND PROPOSED SOLUTION

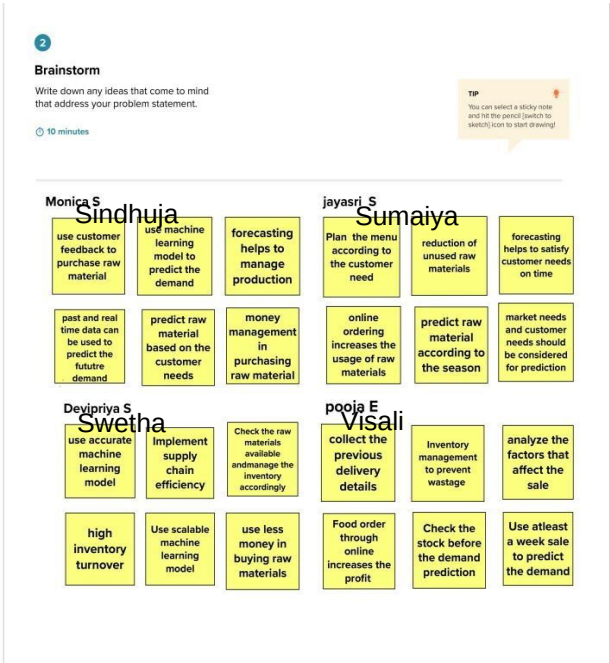
3.1 EMPATHY MAP CANVAS

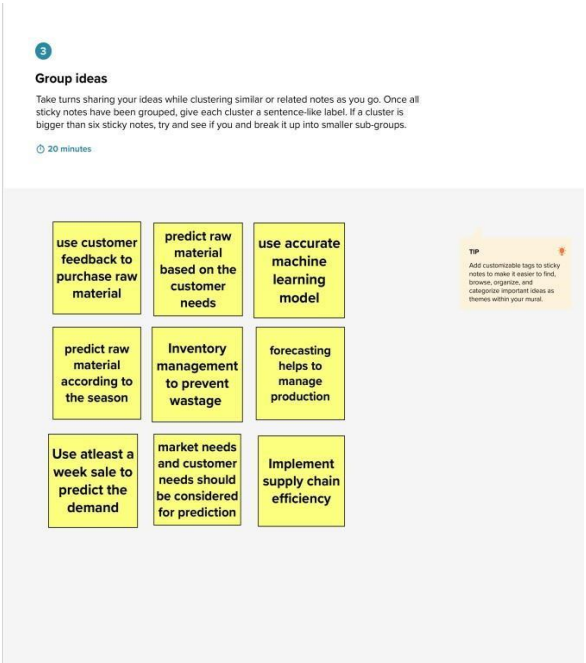
3.2 Ideation and Brainstorming

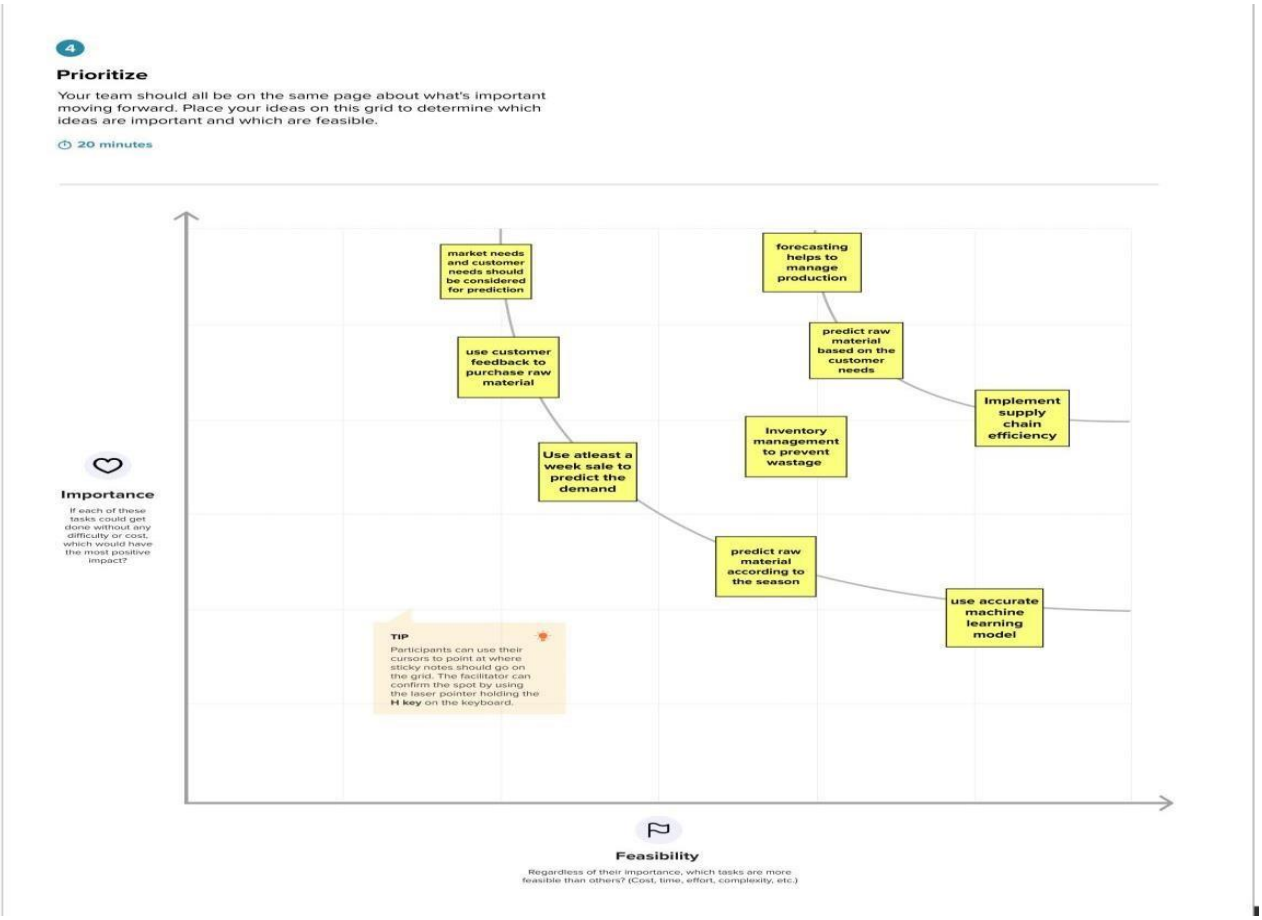

Template
Brainstorm
& idea prioritization
Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.
10 minutes to prepare
1 hour to collaborate
2-8 people recommended
Share template feedback


Before you collaborate
A little bit of preparation goes a long way with this session. Here's what you need to do to get going.
10 minutes
A Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
B Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.
C Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.
Open article


1
Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.
5 minutes
PROBLEM
Restaurants or food delivery companies as to manage raw materials inorder to prevent wastage and also to meet the customer needs.
Key rules of brainstorming
To run an smooth and productive session
Stay in topic.
Defer judgment.
Go for volume.
Encourage wild ideas.
Listen to others.
If possible, be visual.


2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
TIP
You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!
Monica S
Sindhuja
use customer feedback to purchase raw material
use machine learning model to predict the demand
forecasting helps to manage production
past and real time data can be used to predict the fututre demand
predict raw material based on the customer needs
money management in purchasing raw material
jayasri_S
Sumaiya
Plan the menu according to the customer need
reduction of unused raw materials
forecasting helps to satisfy customer needs on time
online ordering increases the usage of raw materials
predict raw material according to the season
market needs and customer needs should be considered for prediction
Devipriya S
Swetha
use accurate machine learning model
Implement supply chain efficiency
Check the raw materials available andmanage the inventory accordingly
high inventory turnover
Use scalable machine learning model
use less money in buying raw materials
pooja E
Visali
collect the previous delivery details
Inventory management to prevent wastage
analyze the factors that affect the sale
Food order through online increases the profit
Check the stock before the demand prediction
Use atleast a week sale to predict the demand


3
Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.
20 minutes
use customer feedback to purchase raw material
predict raw material based on the customer needs
use accurate machine learning model
predict raw material according to the season
Inventory management to prevent wastage
forecasting helps to manage production
Use atleast a week sale to predict the demand
market needs and customer needs should be considered for prediction
Implement supply chain efficiency
TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.



3.3 PROBLEM SOLUTION FIT

DESIGN TRIGGERS THAT FIT REAL LIFE,SPARK ASSOCIATIONS,MAKE IT FAMILIAR	**YOUR "DOWN TO EARTH" SOLUTION GUESS** Ask help when it is needed Help small business to grow by buying raw materials	**BE WHERE YOUR CUSTOMER ARE** Analyse the customer requirements and specification If customer's Requirements are unsatisfiable then give them idea of other requirements
Optimize inventory **ADD EMOTIONS FOR STRONGER MESSAGE** Think in behalf of customer's place(empathy)		

WHO IS YOUR CUSTOMER ? Different manufacturers Restaurant owners	**EXPLORE LIMITATIONS TO BUY/USE YOUR PRODUCT OR SERVICE** Price services or products Create and implement growth strategies	**HOW ARE YOU GOING TO DIFFERENT THAN COMPETITION** First father than focusing on other's we must improve ourselves By implementing innovative ideas which is not used by competitors
FOCUS ON FREQUENT,COSTLY OR URGENT PROBLEM TO SOLVE Have alternative solutions for the same problem Discuss with subordinates for different	**. UNDERSTAND THE CAUSE OF THE PROBLEM** Price change Change in customer preference	**TAP INTO,RESEMBLE OR SUPPORT EXISTING BEHAVIOR** Make better supply decisions See your market potential

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

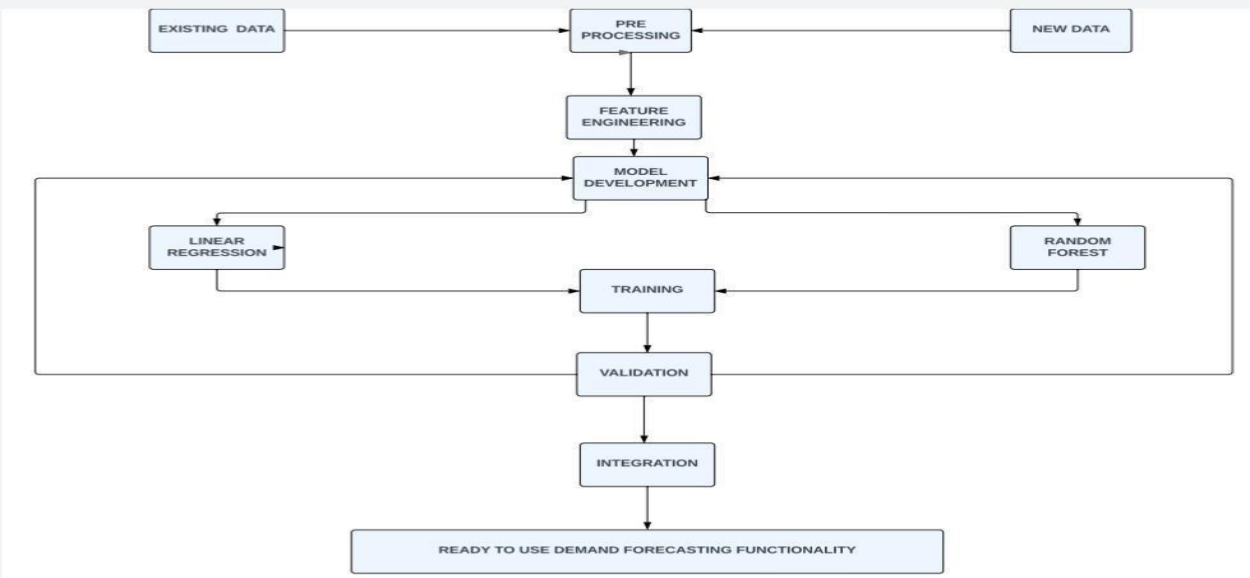
1. IBM Watson Studio
2. IBM Cloud
3. Jupyter notebook
4. Anaconda - Spyder
5. IBM Watson Machine Learning
6. Flask

4.2 NON-FUNCTIONAL REQUIREMENT

1.Usability
2.Performance
3.Reliability
4.Availability
5.Scalability

5. PROJECT DESIGN

5.1 Data flow diagram



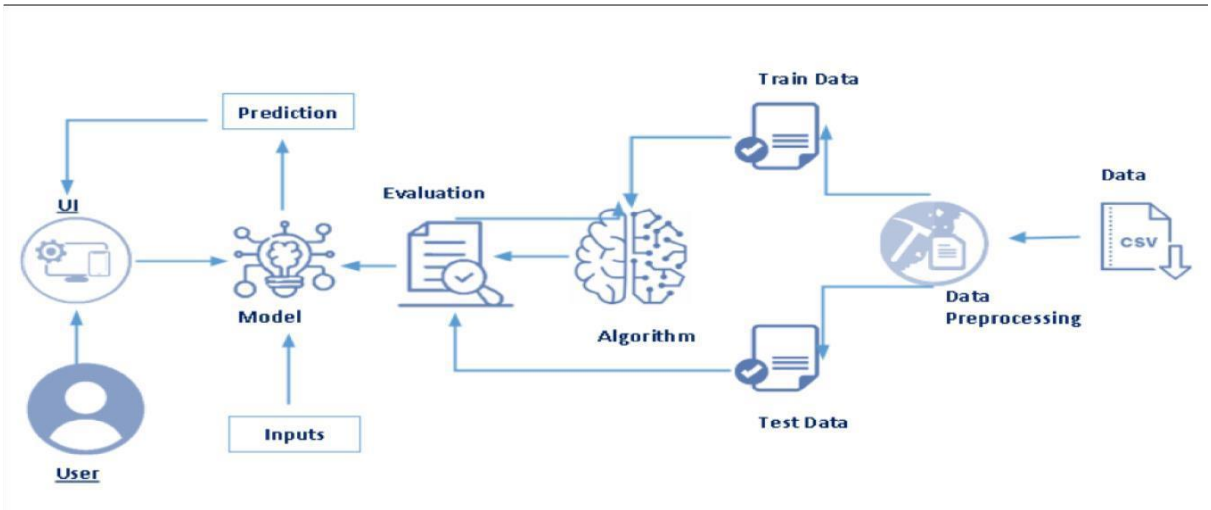
5.2 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release

	Login	USN-3	As a user, I can login to the application by entering email and password.	Check whether password and email is correct	High	Sprint1
	Dashboard	USN-4	If the email id and password is correct, the user can log in to the application otherwise it shows ‘incorrect password or Id’.	View the dashboard of user who is log in	High	Sprint1
Customer Care Executive	Help	USN-5	If the user faces any issues, he/she can reportit to our mail id.	Report option will be available in web app	High	Sprint2
		USN-6	We can provide an alternative solution to the problem.	We get the update of the alternate solution.	High	Sprint3
		USN-7	As admin I can provide some recommendation of the mostly purchased products.	I get recommendations from the centers	medium	Sprint 3
Administrator	Verification	USN-8	Administrator also has unique Id and password to login.	Check whether password and email is correct	High	Sprint4

		USN-9	He has additional users to organize the users of this web app	Checking user information.	High	Sprint4

5.3 SOLUTION ARCHITECTURE



6.PROJECT PLANNING AND SCHEDULING

1. The user interacts with the UI (User Interface) to upload the input features.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Home Page	USN-1	As a user, I can check if my buttons and the predicted image works fine in the main page	6	High	Sindhuja S

Sprint-1	Prediction Page	USN-2	As a user, I can click on the predict button and move the prediction page	6	High	Sumaiya S
Sprint -1	Input the Values	USN-3	As a customer , I can fill the details that is required to predict the output	8	Medium	Visali S
Sprint-2	Input the Values	USN-4	As a customer , I can change my cuisine type to whatever I need	6	Low	Swetha V
Sprint-3	Survey	USN-7	As an administrator , I conduct periodic	6	Medium	Sumaiya S
			surveys to keep track of food demands.			
Sprint-4	Inventory	USN-8	As an administrator , I should be able to alter or delete food options in the list.	13	Medium	Swetha V
Sprint-4	Maintenance	USN-9	As an administrator, I can edit the user's details and premium valet management.	7	High	Sindhuja S

6. 2 SPRINT DELIVERY SCHEDULE

Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date (Planned)**	**Story Points Completed (as on Planned End Date)**	**Sprint Release Date (Actual)**
Sprint-1	20	10 Days	24 Oct 2022	1 Nov 2022	20	1 Nov 2022
Sprint-2	20	10 Days	1 Nov 2022	7 Nov 2022	20	7 Nov 2022
Sprint-3	20	10 Days	7 Nov 2022	12 Nov 2022	20	12 Nov 2022

Sprint-4	20	10 Days	12 Nov 2022	17 Nov 2022	20	17 Nov 2022

7. CODING AND SOLUTIONING

7.1 Feature 1

App.py

```
 # import the necessary
packages import pandas as pd
import numpy as np
import pickle import os from flask import
Flask,request, render_template
app=Flask(__name__,template_folder="templates")
@app.route('/', methods=['GET']) def
index():
   return   render_template('home.html')
@app.route('/home', methods=['GET'])
def about():
   return render_template('home.html')
@app.route('/pred',methods=['GET'])
def page():
   return              render_template('upload.html')
@app.route('/predict', methods=['GET', 'POST'])
def predict():
   print("[INFO] loading model…")     model =
pickle.load(open('fdemand.pkl', 'rb'))     input_features =
[float(x) for x in request.form.values()]     features_value
= [np.array(input_features)]     print(features_value)

   features_name = ['homepage_featured', 'emailer_for_promotion',
'op_area', 'cuisine',
```

```
    'city_code', 'region_code', 'category']
prediction = model.predict(features_value)
  output=prediction[0]
print(output)
  return render_template('upload.html', prediction_text=output)


if __name__ == '__main__':
app.run(debug=False)
```

ibm.py

```
import requests
# NOTE: you must manually set API_KEY below using information
retrieved from your IBM Cloud account.
API_KEY = "-NU5W_9aFmD6AatFJ1KMQoxgE1Sh4wJ11Xv7pcv_cQee"
token_response = requests.post('https://iam.cloud.ibm.com/identity/token',
data={"apikey": API_KEY, "grant_type":
'urn:ibm:params:oauth:granttype:apikey'})
mltoken = token_response.json()["access_token"]

header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' +
mltoken}

# NOTE: manually define and pass the array(s) of values to be scored in the
next line payload_scoring = {"input_data":
 [{"field": [['homepage_featured', 'emailer_for_promotion', 'op_area',
'cuisine',
    'city_code', 'region_code', 'category']],
"values": [[0.,0.,3.,1.,647.,56.,11.]]}]}

response_scoring =
requests.post('https://ussouth.ml.cloud.ibm.com/ml/v4/deployments/fce
ca4bb-5665-47f6-bb690d91eb60e1b4/predictions?version=2021-11-17',
json=payload_scoring, headers={'Authorization': 'Bearer ' + mltoken})
```

```
print(“Scoring response”) print(response_scoring.json()) predictions
=response_scoring.json()
print(predictions)
print(‘Final Prediction Result’,predictions[‘predictions’][0][‘values’][0][0])
```

ibmapp.py

```
 # import the necessary packages import
pandas as pd
import numpy as np
import pickle import
os
import requests

# NOTE: you must manually set API_KEY below using information
retrieved from your IBM Cloud account.
API_KEY = "-NU5W_9aFmD6AatFJ1KMQoxgE1Sh4wJ11Xv7pcv_cQee"
token_response = requests.post('https://iam.cloud.ibm.com/identity/token',
data={"apikey": API_KEY, "grant_type":
'urn:ibm:params:oauth:granttype:apikey'})
mltoken = token_response.json()["access_token"]

header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' +
mltoken}

from flask import Flask,request, render_template
app=Flask(__name__,template_folder="templates")
@app.route('/', methods=['GET']) def
index():
   return render_template('home.html')
@app.route('/home', methods=['GET']) def
about():
   return render_template('home.html')
@app.route('/pred',methods=['GET'])
def page():
```

```
    return              render_template('upload.html')
@app.route('/predict', methods=['GET', 'POST'])
def predict():
    print("[INFO] loading model...")
    #model = pickle.load(open('fdemand.pkl', 'rb'))
input_features = [int(x) for x in request.form.values()]
print(input_features)
    features_value = [[np.array(input_features)]]
    print(features_value)


    payload_scoring = {"input_data":[{"field": [['homepage_featured',
'emailer_for_promotion', 'op_area', 'cuisine',
       'city_code', 'region_code', 'category']],"values": [input_features]}]}
```

HTML FILES

Home.html

```
<!DOCTYPE html>
<html>
  <head>
   <meta name="viewport" content="width=device-width, initial-scale=1" />
   <title>Home</title>
   <link type="text/css" rel="stylesheet" href="/Flask/static/style.css" />
   <link rel="preconnect" href="https://fonts.googleapis.com" />
   <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin />
   <link
href="https://fonts.googleapis.com/css2?family=Poppins:wght@200;300;40
0;600;800&display=swap"
      rel="stylesheet"
    />     <link
rel="stylesheet"
      href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/6.0.0beta2/css/all.min.css"
```

```
   />     <link
rel="stylesheet"
     href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/6.0.0beta2/css/v4-shims.min.css"
   />
   <style>
body,       html
{ height:
96%;
       margin: 0;
       font-family: "Poppins", sans-serif;
      }

      * {
       box-sizing: border-box;
      }

      .bg-image {
       background-image: url("https://thumbs.dreamstime.com/b/healthyfood-
selection-healthy-food-selection-fruits-vegetables-seeds-superfoodcereals-
gray-background-121936825.jpg");
       height: 100%;
       background-position: center;         background-
repeat: no-repeat;
       background-size: cover;
      }

      .bg-text {
       background-color: rgba(0, 0, 0, 0.6);
       color: white;         border-
radius: 10px;         font-
weight: bold;         border: 3px
solid #f1f1f1;         position:
```

```
absolute;        top: 50%;
left: 50%;
      transform: translate(-50%, -50%);
      z-index: 2;
width: 80%;
padding: 20px;
text-align: center;
    }

    .bg-text h2 {        border-
radius: 5px;        font-size:
24px;        text-decoration:
underline;        padding-
bottom: 5px;
      background-color: rgba(255, 255, 255, 0.704);
      padding: 10px;
color: black;
    }       ul {        list-
style-type: none;
margin: 0;        padding:
0;        overflow: hidden;
      background-color: rgba(0, 0, 255, 0.415);
    }       li {
float: right;
    }
    li a {        display:
block;        color: white;
text-align: center;
padding: 14px 16px;
text-decoration: none;
      font-weight: 600;
    }
```

```
    li a:hover { color:
      orangered;
      transition-
      duration: 0.5s;
    }
  </style>
 </head>
 <body>
  <ul>
    <li style="font-size: 20px"><a href="/upload.html">Predict</a></li>
    <li style="font-size: 20px"><a href="/home.html">Home</a></li>
  </ul>
  <div class="bg-image"></div>
  <div class="bg-text">
    <h2>About Us</h2>
    <h1 style="font-size: 50px">Food Demand Forecasting</h1>
    <p>
      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.
    </p>
  </div>
 </body>
</html>
```

Upload.html

```
<!DOCTYPE html>
<html>
 <head>
 <meta name="viewport" content="width=device-width, initial-scale=1" />
  <title>Predict</title>
  <link rel="preconnect" href="https://fonts.googleapis.com" />
  <link rel="preconnect" href="https://fonts.gstatic.com" crossorigin />
<link

href="https://fonts.googleapis.com/css2?family=Poppins:wght@200;300;400;600;800&display=swap"
    rel="stylesheet"
  />    <link
rel="stylesheet"
    href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.0.0beta2/css/all.min.css"
  />
  <style>
body,      html {
height: 100%;
margin: 0;
      font-family: Arial, Helvetica, sans-serif;
    }

    * {
      box-sizing: border-box;
    }

    .bg-image {        background-
image:
url("https://www.specialityfoodmagazine.com/assets/images/other/herbs_and_spices.jpg");        height: 100%; background-position: center;
       background-repeat: no-repeat;
       background-size: cover;
```

```
    }

    .bg-text {
      background-color: rgba(0, 0, 0, 0.6);
      color: white;       font-
weight: bold;       border: 3px
solid #f1f1f1;       border-
radius: 25px;       position:
absolute;       top: 50%;
height: 95%;       left: 50%;
      transform: translate(-50%, -50%);
      z-index: 2;
width: 60%;
padding: 20px;
text-align: left;
    }
    .topic-predict {       border-
radius: 5px;       font-size: 26px;
text-decoration: underline;
padding-bottom: 5px;
      background-color: rgba(255, 255, 255, 0.704);
      padding:     10px;
text-align:       center;
color: black;
    }         label  {
width: 250px;
      font-size: 16px;
    }
    select            {
width:       200px;
height: 30px;
      padding: 5px;
    }      input {
width: 200px;
height: 30px;
```

```
outline: none;
padding: 5px;
    }
    .my-cta-button {
width: 120px;       height:
40px;       display: flex;
align-items: center;
justify-content: center;
margin: 0 auto;       cursor:
pointer;       background-
color: red;       color:
white;       font-weight:
bold;       border-radius:
5px;
      border: 1px solid white;
    }
    .my-cta-button:hover {       background-
color: green;
      transition-duration: 0.5s;
    }
    .home-btn {       color: white;
text-decoration: none;
background-color: blueviolet;
      border-radius: 5px;
      padding: 10px 20px;
      position: absolute;
top: 20px;          right:
30px;
    }
    .home-btn:hover {       background-
color: orange;
      transition-duration: 0.5s;
    }
  </style>
```

```
 </head>
 <body>
  <div class="bg-image"></div>

  <div class="bg-text">
   <div class="container">
    <div id="content">
     <h1 class="topic-predict">Food Demand Forecasting</h1>

     <form action="{{ url_for('predict') }}" method="POST">
      <div style="display: flex; justify-content: center">
<label for="homepage_featured" class="hi"
>Enter Homepage Featured :
       </label>
       <select id="homepage_featured" name="homepage_featured">
        <!-- <option value="">homepage_featured</option> -->
        <option value="none" selected disabled hidden>
         Select an Option
        </option>
        <option value="0">Yes</option>
        <option value="1">No</option>
       </select>
      </div>

      <br /><br />

      <div            style="
display: flex;              justify-
content: center;
        align-items: center;
       "
      >
       <label for="emailer_for_promotion"
>Enter Emailer for Promotion :
```

```
            </label>
            <select id="emailer_for_promotion"
name="emailer_for_promotion">
              <option value="none" selected disabled hidden>
                Select an Option
              </option>
              <option value="0">Yes</option>
              <option value="1">No</option>
            </select>
          </div>

          <br /><br />

          <div             style="
display: flex;               justify-
content: center;
              align-items: center;
            "
          >
            <label for="op_area">Enter Op Area : </label>
            <input
class="form-input"
type="text"
name="op_area"
              placeholder="Enter the op_area(2-7)"
            />
          </div>

          <br /><br />

          <div             style="
display: flex;               justify-
content: center;
              align-items: center;
```

```
            "
          >
            <label for="cuisine"> Enter Cuisine : </label>
            <select id="cuisine" name="cuisine">
              <option value="none" selected disabled hidden>
                Select an Option
              </option>
              <option value="0">Continental</option>
              <option value="1">Indian</option>
              <option value="2">Italian</option>
              <option value="3">Thai</option>
            </select>
          </div>

          <br /><br />

          <div             style="
display: flex;              justify-
content: center;               align-
items: center;
            "
          >
            <label for="city_code">Enter City Code : </label>
            <input
class="form-input"
type="text"
name="city_code"
              placeholder="Enter city_code"
            />
          </div>

          <br /><br />
```

```
        <div            style="
display: flex;              justify-
content: center;
            align-items: center;
          "
        >
          <label for="region_code">Enter the region code : </label>
          <input
class="form-input"
type="text"
name="region_code"
            placeholder="Enter region_code"
          />
        </div>

        <br /><br />

        <div
style="
display: flex;
justify-content: center;
            align-items: center;
          "
        >
          <label for="category">Enter the Category : </label>
          <select id="category" name="category">
            <option value="none" selected disabled hidden>
              Select an Option
            </option>
            <option value="0">Beverages</option>
            <option value="1">Biryani</option>
            <option value="2">Desert</option>
            <option value="3">Extras</option>
            <option value="4">Fish</option>
```

```
            <option value="5">Other Snacks</option>
            <option value="6">Pasta</option>
            <option value="7">Pizza</option>
            <option value="8">Rice Bowl</option>
            <option value="9">Salad</option>
            <option value="10">Sandwich</option>
            <option value="11">Seafood</option>
            <option value="12">Soup</option>
            <option value="13">Starters</option>
          </select>
        </div>

        <br /><br />

        <button type="submit" class="my-cta-button">Predict</button>
</form>

      <br />
      <h1 class="predict" style="text-align: center">
        Demand is: {{ prediction_text }}
      </h1>
    </div>
  </div>
 </div>
 <a href="/home.html" class="home-btn">Home</a>
</body>
</html>
```

7.2 Feature 2

In [15]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [16]:
```
import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='Jxb1xlKTkskW5UPZr6mh-a0Qxjd1nL71F3VdOqMErWon',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')

bucket = 'fooddemandfirst-donotdelete-pr-vkq9phml3ks7qg'
object_key = 'train.csv'

body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )

train= pd.read_csv(body)
train.head()
import os, types
import pandas as pd
```

```
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='Jxb1xlKTkskW5UPZr6mh-a0Qxjd1nL71F3VdOqMErWon',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')

bucket = 'fooddemandfirst-donotdelete-pr-vkq9phml3ks7qg'
object_key = 'test.csv'

body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )
test = pd.read_csv(body)
test.head()
```

Out[16]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured
0	1028232	146	55	1885	158.11	159.11	0	0
1	1127204	146	55	1993	160.11	159.11	0	0
2	1212707	146	55	2539	157.14	159.14	0	0
3	1082698	146	55	2631	162.02	162.02	0	0
4	1400926	146	55	1248	163.93	163.93	0	0

In [17]:
```
train.head()
```

Out[17]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders
0	1379560	1	55	1885	136.83	152.29	0	0	177
1	1466964	1	55	1993	136.83	135.83	0	0	270
2	1346989	1	55	2539	134.86	135.86	0	0	189
3	1338232	1	55	2139	339.50	437.53	0	0	54
4	1448490	1	55	2631	243.50	242.50	0	0	40

In [18]:
```
test.head()
```

Out[18]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured
0	1028232	146	55	1885	158.11	159.11	0	0
1	1127204	146	55	1993	160.11	159.11	0	0
2	1212707	146	55	2539	157.14	159.14	0	0
3	1082698	146	55	2631	162.02	162.02	0	0
4	1400926	146	55	1248	163.93	163.93	0	0

In [19]:
```
train.info()
```

```
RangeIndex: 456548 entries, 0 to 456547
```

In [20]:
```
train['num_orders'].describe()
```

Out[20]:
```
count    456548.000000
mean        261.872760
std         395.922798
min          13.000000
25%          54.000000
50%         136.000000
75%         324.000000
max       24299.000000
Name: num_orders, dtype: float64
```

In [21]:
```
train.isnull().sum()
```

Out[21]:
```
id                     0
week                   0
center_id              0
meal_id                0
checkout_price         0
base_price             0
emailer_for_promotion  0
homepage_featured      0
num_orders             0
dtype: int64
```

In [22]:
```
import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0
```

```
# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='Jxb1xlKTKskW5UPZr6mh-a0Qxjd1nL71F3VdOqMErWon',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')

bucket = 'fooddemandfirst-donotdelete-pr-vkq9phml3ks7qg'
object_key = 'meal_info.csv'

body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )

meal_info = pd.read_csv(body)
meal_info.head()
import os, types
import pandas as pd
from botocore.client import Config
import ibm_boto3

def __iter__(self): return 0

# @hidden_cell
# The following code accesses a file in your IBM Cloud Object Storage. It includes your credentials.
# You might want to remove those credentials before you share the notebook.
cos_client = ibm_boto3.client(service_name='s3',
    ibm_api_key_id='Jxb1xlKTKskW5UPZr6mh-a0Qxjd1nL71F3VdOqMErWon',
    ibm_auth_endpoint="https://iam.cloud.ibm.com/oidc/token",
    config=Config(signature_version='oauth'),
    endpoint_url='https://s3.private.us.cloud-object-storage.appdomain.cloud')
```

```
body = cos_client.get_object(Bucket=bucket,Key=object_key)['Body']
# add missing __iter__ method, so pandas accepts body as file-like object
if not hasattr(body, "__iter__"): body.__iter__ = types.MethodType( __iter__, body )

center_info = pd.read_csv(body)
center_info.head()
```

Out[22]:

	center_id	city_code	region_code	center_type	op_area
0	11	679	56	TYPE_A	3.7
1	13	590	56	TYPE_B	6.7
2	124	590	56	TYPE_C	4.0
3	66	648	34	TYPE_A	4.1
4	94	632	34	TYPE_C	3.6

In [23]:

```
trainfinal = pd.merge(train, meal_info, on="meal_id", how="outer")
trainfinal = pd.merge(trainfinal, center_info, on="center_id", how="outer")
trainfinal.head()
```

Out[23]:

	id	week	center_id	meal_id	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders	category	cuisine	city_code	region_code	center_ty
0	1379560	1	55	1885	136.83	152.29	0	0	177	Beverages	Thai	647	56	TYPE
1	1018704	2	55	1885	135.83	152.29	0	0	323	Beverages	Thai	647	56	TYPE
2	1196273	3	55	1885	132.92	133.92	0	0	96	Beverages	Thai	647	56	TYPE
3	1116527	4	55	1885	135.86	134.86	0	0	163	Beverages	Thai	647	56	TYPE
4	1343872	5	55	1885	146.50	147.50	0	0	215	Beverages	Thai	647	56	TYPE

Out[24]:

	id	week	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders	category	cuisine	city_code	region_code	center_type	op_area
0	1379560	1	136.83	152.29	0	0	177	Beverages	Thai	647	56	TYPE_C	2.0
1	1018704	2	135.83	152.29	0	0	323	Beverages	Thai	647	56	TYPE_C	2.0
2	1196273	3	132.92	133.92	0	0	96	Beverages	Thai	647	56	TYPE_C	2.0
3	1116527	4	135.86	134.86	0	0	163	Beverages	Thai	647	56	TYPE_C	2.0
4	1343872	5	146.50	147.50	0	0	215	Beverages	Thai	647	56	TYPE_C	2.0

In [25]:
```
cols = trainfinal.columns.tolist()
print(cols)
```

```
['id', 'week', 'checkout_price', 'base_price', 'emailer_for_promotion', 'homepage_featured', 'num_orders', 'category', 'cuisine', 'city_code', 'regi
on_code', 'center_type', 'op_area']
```

In [26]:
```
cols = cols[:2] + cols[9:] + cols[7:9] + cols[2:7]
print(cols)
```

```
['id', 'week', 'city_code', 'region_code', 'center_type', 'op_area', 'category', 'cuisine', 'checkout_price', 'base_price', 'emailer_for_promotion',
'homepage_featured', 'num_orders']
```

In [27]:
```
trainfinal = trainfinal[cols]
trainfinal.dtypes
```

Out[27]:
```
id                        int64
week                      int64
city_code                 int64
region_code               int64
center_type              object
op_area                 float64
op_area                 float64
category                 object
cuisine                  object
checkout_price          float64
base_price              float64
emailer_for_promotion     int64
homepage_featured         int64
num_orders                int64
dtype: object
```

In [28]:
```
from sklearn.preprocessing import LabelEncoder
```

In [29]:
```
lb1 = LabelEncoder()
trainfinal['center_type'] = lb1.fit_transform(trainfinal['center_type'])
lb2 = LabelEncoder()
trainfinal['category'] = lb1.fit_transform(trainfinal['category'])
lb3 = LabelEncoder()
trainfinal['cuisine'] = lb1.fit_transform(trainfinal['cuisine'])
```

In [30]:
```
trainfinal.head()
```

Out[30]:

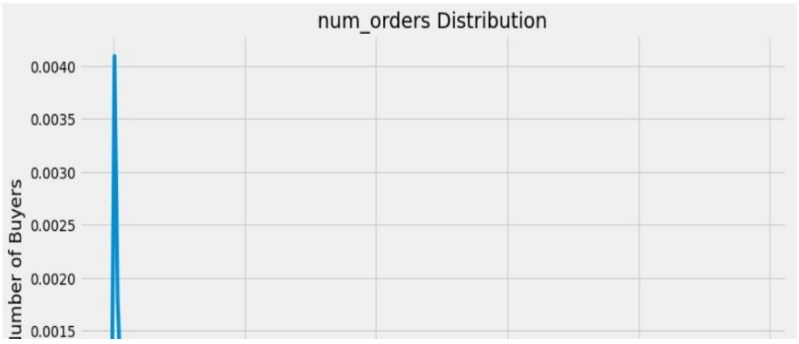
	id	week	city_code	region_code	center_type	op_area	category	cuisine	checkout_price	base_price	emailer_for_promotion	homepage_featured	num_orders
0	1379560	1	647	56	2	2.0	0	3	136.83	152.29	0	0	177
1	1018704	2	647	56	2	2.0	0	3	135.83	152.29	0	0	323
2	1196273	3	647	56	2	2.0	0	3	132.92	133.92	0	0	96
3	1116527	4	647	56	2	2.0	0	3	135.86	134.86	0	0	163
4	1343872	5	647	56	2	2.0	0	3	146.50	147.50	0	0	215

In [31]:
```
trainfinal.shape
```

Out[31]: (456548, 13)

In [32]:
```
plt.style.use('fivethirtyeight')
plt.figure(figsize=(12,7))
sns.distplot(trainfinal.num_orders, bins = 25)
plt.xlabel("num_orders")
plt.ylabel("Number of Buyers")
plt.title("num_orders Distribution")
```

Out[32]: Text(0.5, 1.0, 'num_orders Distribution')



In [35]:
```
features = columns.drop(['num_orders'])
trainfinal3 = trainfinal[features]
X = trainfinal3.values
y = trainfinal[ 'num_orders'].values
```

In [36]:
```
trainfinal3.head()
```

Out[36]:

	homepage_featured	emailer_for_promotion	op_area	cuisine	city_code	region_code	category
0	0	0	2.0	3	647	56	0
1	0	0	2.0	3	647	56	0
2	0	0	2.0	3	647	56	0
3	0	0	2.0	3	647	56	0
4	0	0	2.0	3	647	56	0

In [37]:
```
from sklearn.model_selection import train_test_split
X_train, X_val, y_train, y_val = train_test_split(X, y, test_size=0.25)
```

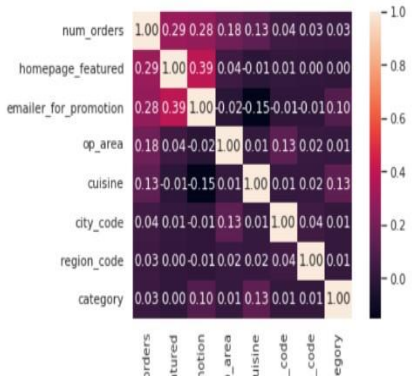
In [ ]:
```

```

In [38]:
```
from sklearn.linear_model import LinearRegression
from sklearn.linear_model import Lasso
from sklearn.linear_model import ElasticNet
from sklearn.tree import DecisionTreeRegressor
from sklearn.neighbors import KNeighborsRegressor
from sklearn.ensemble import GradientBoostingRegressor
```

In [33]:
```
trainfinal2 = trainfinal.drop(['id'], axis=1)
correlation = trainfinal2.corr(method='pearson')
columns = correlation.nlargest (8, 'num_orders').index
columns
```

Out[33]:
```
Index(['num_orders', 'homepage_featured', 'emailer_for_promotion', 'op_area',
       'cuisine', 'city_code', 'region_code', 'category'],
      dtype='object')
```

In [34]:
```
correlation_map = np.corrcoef(trainfinal2[columns].values.T)
sns.set(font_scale=1.0)
heatmap = sns.heatmap(correlation_map, cbar=True, annot=True, square=True, fmt='.2f',
yticklabels=columns.values, xticklabels=columns.values)
plt.show()
```




```
from sklearn.ensemble import GradientBoostingRegressor
from xgboost import XGBRegressor
```

In [39]:
```
XG=XGBRegressor()
XG.fit(X_train,y_train)
y_pred= XG.predict(X_val)
y_pred[y_pred<0] = 0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 70.68819581225507
```

In [40]:
```
LR= LinearRegression()
LR.fit(X_train, y_train)
y_pred= LR.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 130.24981254213216
```

In [41]:
```
L= Lasso()
L.fit(X_train, y_train)
y_pred= L.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 129.70127380155466
```

In [42]:
```
EN= ElasticNet()
```

In [42]:
```
EN= ElasticNet()
EN.fit(X_train, y_train)
y_pred=EN.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 130.82188913457742
```

In [43]:
```
DT=DecisionTreeRegressor()
DT.fit(X_train, y_train)
y_pred= DT.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 62.91311343435455
```

In [44]:
```
KNN=KNeighborsRegressor()
KNN.fit(X_train, y_train)
y_pred= KNN.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 66.84807768200979
```

In [45]:
```
GB=GradientBoostingRegressor()
GB.fit(X_train, y_train)
y_pred=GB.predict(X_val)
y_pred[y_pred<0]=0
from sklearn import metrics
print('RMSLE:',100*np.sqrt(metrics.mean_squared_log_error(y_val, y_pred)))
```

```
RMSLE: 99.84638233179736
```

In [46]:
```
import pickle
pickle.dump(DT,open('fdemand.pkl','wb'))
```

In [47]:
```
testfinal= pd.merge(test ,meal_info, on="meal_id", how="outer")
testfinal= pd.merge(testfinal ,center_info, on="center_id", how="outer")
testfinal= testfinal.drop(['meal_id' ,'center_id'], axis=1)

tcols= testfinal.columns.tolist()
tcols= tcols[:2] + tcols[8:] +tcols[6:8] + tcols[2:6]
testfinal= testfinal[tcols]

lb1=LabelEncoder()
testfinal['center_type'] = lb1.fit_transform(testfinal['center_type'])

lb2=LabelEncoder()
testfinal['category'] = lb1.fit_transform(testfinal['category'])

lb3=LabelEncoder()
testfinal['cuisine'] = lb1.fit_transform(testfinal['cuisine'])
X_test = testfinal[features].values
```

In [48]:
```
pred = DT.predict(X_test)
pred[pred<0] =0
submit = pd.DataFrame({
    'id' :testfinal['id'],
    'num_orders' :pred
})
```

In [49]:
```
submit.to_csv("submission.csv",index=False)
submit.describe()
```

Out[49]:

	id	num_orders
count	3.257300e+04	32573.000000
mean	1.248476e+06	262.959516
std	1.441580e+05	364.311822
min	1.000085e+06	14.400000
25%	1.123969e+06	64.580524
50%	1.247296e+06	148.401515
75%	1.372971e+06	322.454545
max	1.499996e+06	5882.400000

In [50]:
```
!pip install ibm_watson_machine_learning
```

```
Requirement already satisfied: ibm_watson_machine_learning in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (1.0.253)
Requirement already satisfied: ibm-cos-sdk==2.11.* in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2.
11.0)
Requirement already satisfied: certifi in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2022.9.24)
Requirement already satisfied: tabulate in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (0.8.9)
Requirement already satisfied: requests in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (2.26.0)
Requirement already satisfied: urllib3 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (1.26.7)
Requirement already satisfied: lomond in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (0.3.3)
Requirement already satisfied: packaging in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (21.3)
Requirement already satisfied: importlib-metadata in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning) (4.
8.2)
Requirement already satisfied: pandas<1.5.0,>=0.24.2 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm_watson_machine_learning)
```

```
ibm_watson_machine_learning) (2.11.0)
Requirement already satisfied: ibm-cos-sdk-core==2.11.0 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm-cos-sdk==2.11.*->ibm_wa
tson_machine_learning) (2.11.0)
Requirement already satisfied: python-dateutil<3.0.0,>=2.1 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from ibm-cos-sdk-core==2.11.0
->ibm-cos-sdk==2.11.*->ibm_watson_machine_learning) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm_watson_machi
ne_learning) (2021.3)
Requirement already satisfied: numpy>=1.17.3 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from pandas<1.5.0,>=0.24.2->ibm_watson_mach
ine_learning) (1.20.3)
Requirement already satisfied: six>=1.5 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from python-dateutil<3.0.0,>=2.1->ibm-cos-sdk-co
re==2.11.0->ibm-cos-sdk==2.11.*->ibm_watson_machine_learning) (1.15.0)
Requirement already satisfied: idna<4,>=2.5 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from requests->ibm_watson_machine_learning)
(3.3)
Requirement already satisfied: charset-normalizer~=2.0.0 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from requests->ibm_watson_machi
ne_learning) (2.0.4)
Requirement already satisfied: zipp>=0.5 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from importlib-metadata->ibm_watson_machine_lea
rning) (3.6.0)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /opt/ibm/conda/miniconda3.9/lib/python3.9/site-packages (from packaging->ibm_watson_machi
ne_learning) (3.0.4)
```

In [78]:
```
from ibm_watson_machine_learning import APIClient
wml_credentials = {
                   "url" : "https://us-south.ml.cloud.ibm.com",
                   "apikey":"LYP69rQcW9m7KNr6-6ghEE7mDy7D4xdhoxj7z4KC5qKb"
                  }
client = APIClient(wml_credentials)
```

In [79]:
```
def guid_from_space_name(client,space_name):
    space = client.spaces.get_details()
    return(next(item for item in space['resources'] if item['entity']["name"] == space_name)['metadata']['id'])
```

In [80]:
```
space_uid = guid_from_space_name(client,'model')
```

In [79]:
```
def guid_from_space_name(client,space_name):
    space = client.spaces.get_details()
    return(next(item for item in space['resources'] if item['entity']["name"] == space_name)['metadata']['id'])
```

In [80]:
```
space_uid = guid_from_space_name(client,'model')
print("SPACE UID = "  + space_uid)
```

```
SPACE UID = 0b051466-e3f9-4d57-a6bc-8653bfd485c2
```

In [81]:
```
client.set.default_space(space_uid)
```

Out[81]:
```
'SUCCESS'
```

In [82]:
```
client.software_specifications.list()
```

```
------------------------------  ------------------------------------  ----
NAME                            ASSET_ID                              TYPE
default_py3.6                   0062b8c9-8b7d-44a0-a9b9-46c416adcbd9  base
kernel-spark3.2-scala2.12       020d69ce-7ac1-5e68-ac1a-31189867356a  base
pytorch-onnx_1.3-py3.7-edt      069ea134-3346-5748-b513-49120e15d288  base
scikit-learn_0.20-py3.6         09c5a1d0-9c1e-4473-a344-eb7b665ff687  base
spark-mllib_3.0-scala_2.12      09f4cff0-90a7-5899-b9ed-1ef348aebdee  base
pytorch-onnx_rt22.1-py3.9       0b848dd4-e681-5599-be41-b5f6fccc6471  base
ai-function_0.1-py3.6           0cdb0f1e-5376-4f4d-92dd-da3b69aa9bda  base
shiny-r3.6                      0e6e79df-875e-4f24-8ae9-62dcc2148306  base
tensorflow_2.4-py3.7-horovod    1092590a-307d-563d-9b62-4eb7d64b3f22  base
pytorch_1.1-py3.6               10ac12d6-6b30-4ccd-8392-3e922c096a92  base
tensorflow_1.15-py3.6-ddl       111e41b3-de2d-5422-a4d6-bf776828c4b7  base
autoai-kb_rt22.2-py3.10         125b6d9a-5b1f-5e8d-972a-b251688ccf40  base
runtime-22.1-py3.9              12b83a17-24d8-5082-900f-0ab31fbfd3cb  base
tensorflow_1.15-py3.6-ddl       111e41b3-de2d-5422-a4d6-bf776828c4b7  base
autoai-kb_rt22.2-py3.10         125b6d9a-5b1f-5e8d-972a-b251688ccf40  base
runtime-22.1-py3.9              12b83a17-24d8-5082-900f-0ab31fbfd3cb  base
scikit-learn_0.22-py3.6         154010fa-5b3b-4ac1-82af-4d5ee5abbc85  base
default_r3.6                    1b70aec3-ab34-4b87-8aa0-a4a3c8296a36  base
pytorch-onnx_1.3-py3.6          1bc6029a-cc97-56da-b8e0-39c3880dbbe7  base
kernel-spark3.3-r3.6            1c9e5454-f216-59dd-a20e-474a5cdf5988  base
pytorch-onnx_rt22.1-py3.9-edt   1d362186-7ad5-5b59-8b6c-9d0880bde37f  base
tensorflow_2.1-py3.6            1eb25b84-d6ed-5dde-b6a5-3fbdf1665666  base
spark-mllib_3.2                 20047f72-0a98-58c7-9ff5-a77b012eb8f5  base
tensorflow_2.4-py3.8-horovod    217c16f6-178f-56bf-824a-b19f20564c49  base
runtime-22.1-py3.9-cuda         26215f05-08c3-5a41-a1b0-da66306ce658  base
do_py3.8                        295addb5-9ef9-547e-9bf4-92ae3563e720  base
autoai-ts_3.8-py3.8             2aa0c932-798f-5ae9-abd6-15e0c2402fb5  base
tensorflow_1.15-py3.6           2b73a275-7cbf-420b-a912-eae7f436e0bc  base
kernel-spark3.3-py3.9           2b7961e2-e3b1-5a8c-a491-482c8368839a  base
pytorch_1.2-py3.6               2c8ef57d-2687-4b7d-acce-01f94976dac1  base
spark-mllib_2.3                 2e51f700-bca0-4b0d-88dc-5c6791338875  base
pytorch-onnx_1.1-py3.6-edt      32983cea-3f32-4400-8965-dde874a8d67e  base
spark-mllib_3.0-py37            36507ebe-8770-55ba-ab2a-eafe787600e9  base
spark-mllib_2.4                 390d21f8-e58b-4fac-9c55-d7ceda621326  base
autoai-ts_rt22.2-py3.10         396b2e83-0953-5b86-9a55-7ce1628a406f  base
xgboost_0.82-py3.6              39e31acd-5f30-41dc-ae44-60233c80306e  base
pytorch-onnx_1.2-py3.6-edt      40589d0e-7019-4e28-8daa-fb03b6f4fe12  base
pytorch-onnx_rt22.2-py3.10      40e73f55-783a-5535-b3fa-0c8b94291431  base
default_r36py38                 41c247d3-45f8-5a71-b065-8580229facf0  base
autoai-ts_rt22.1-py3.9          4269d26e-07ba-5d40-8f66-2d495b0c71f7  base
autoai-obm_3.0                  42b92e18-d9ab-567f-988a-4240ba1ed5f7  base
pmml-3.0_4.3                    493bcb95-16f1-5bc5-bee8-81b8af80e9c7  base
spark-mllib_2.4-r_3.6           49403dff-92e9-4c87-a3d7-a42d0021c095  base
xgboost_0.90-py3.6              4ff8d6c2-1343-4c18-85e1-689c965304d3  base
pytorch-onnx_1.1-py3.6          50f95b2a-bc16-43bb-bc94-b0bed208c60b  base
autoai-ts_3.9-py3.8             52c57136-80fa-572e-8728-a5e7cbb42cde  base
spark-mllib_2.4-scala_2.11      55a70f99-7320-4be5-9fb9-9edb5a443af5  base
spark-mllib_3.0                 5c1b0ca2-4977-5c2e-9439-ffd44ea8ffe9  base
```

```
autoai-obm_3.0                42b92e18-d9ab-567f-988a-4240ba1ed5f7  base
pmml-3.0_4.3                  493bcb95-16f1-5bc5-bee8-81b8af80e9c7  base
spark-mllib_2.4-r_3.6         49403dff-92e9-4c87-a3d7-a42d0021c095  base
xgboost_0.90-py3.6            4ff8d6c2-1343-4c18-85e1-689c965304d3  base
pytorch-onnx_1.1-py3.6        50f95b2a-bc16-43bb-bc94-b0bed208c60b  base
autoai-ts_3.9-py3.8           52c57136-80fa-572e-8728-a5e7cbb42cde  base
spark-mllib_2.4-scala_2.11    55a70f99-7320-4be5-9fb9-9edb5a443af5  base
spark-mllib_3.0               5c1b0ca2-4977-5c2e-9439-ffd44ea8ffe9  base
autoai-obm_2.0                5c2e37fa-80b8-5e77-840f-d912469614ee  base
spss-modeler_18.1             5c3cad7e-507f-4b2a-a9a3-ab53a21dee8b  base
cuda-py3.8                    5d3232bf-c86b-5df4-a2cd-7bb870a1cd4e  base
runtime-22.2-py3.10-xc        5e8cddff-db4a-5a6a-b8aa-2d4af9864dab  base
autoai-kb_3.1-py3.7           632d4b22-10aa-5180-88f0-f52dfb6444d7  base
----------------------------  ------------------------------------  ----
Note: Only first 50 records were displayed. To display more use 'limit' parameter.
```

In [93]:
```
software_spec_uid = client.software_specifications.get_uid_by_name("tensorflow_rt22.1-py3.9")
software_spec_uid
```

Out[93]:
```
'acd9c798-6974-5d2f-a657-ce06e986df4d'
```

In [94]:
```
!tar -zcvf Food_Demand.tgz fdemand.pkl
```

```
fdemand.pkl
```

In [95]:
```
model_details = client.repository.store_model(model = 'Food_Demand.tgz', meta_props={
    client.repository.ModelMetaNames.NAME:"model",
    client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_spec_uid}
                                                  )
model_id = client.repository.get_model_uid(model_details)
```

```
    client.repository.ModelMetaNames.NAME: 'model',
    client.repository.ModelMetaNames.TYPE:"tensorflow_2.7",
    client.repository.ModelMetaNames.SOFTWARE_SPEC_UID:software_spec_uid}
                                                       )
model_id = client.repository.get_model_uid(model_details)
```

```
This method is deprecated, please use get_model_id()
```

model_id()

In [86]:
```
model_details
```

Out[86]:
```
{'entity': {'hybrid_pipeline_software_specs': [],
  'software_spec': {'id': 'acd9c798-6974-5d2f-a657-ce06e986df4d',
   'name': 'tensorflow_rt22.1-py3.9'},
  'type': 'tensorflow_2.7'},
 'metadata': {'created_at': '2022-11-17T15:42:07.485Z',
  'id': '07b9ca67-b7fc-4bc2-b017-d054367d9ab7',
  'modified_at': '2022-11-17T15:42:09.229Z',
  'name': 'model',
  'owner': 'IBMid-665002N0UP',
  'resource_key': '15a3ce9a-cb8f-421a-8c7d-10ac5d16f305',
  'space_id': '0b051466-e3f9-4d57-a6bc-8653bfd485c2'},
 'system': {'warnings': []}}
```

In [87]:
```
model_id = client.repository.get_model_id(model_details)
model_id
```

Out[87]:
```
'07b9ca67-b7fc-4bc2-b017-d054367d9ab7'
```

In [89]:
```
#client.repository.download(model_id,'Food Demand Forecaster.tar.gb')
client.repository.download(model_id,'Food Demand Forecasters.tar.gb')
```


```
'metadata': {'created_at': '2022-11-17T15:42:07.485Z',
 'id': '07b9ca67-b7fc-4bc2-b017-d054367d9ab7',
 'modified_at': '2022-11-17T15:42:09.229Z',
 'name': 'model',
 'owner': 'IBMid-665002N0UP',
 'resource_key': '15a3ce9a-cb8f-421a-8c7d-10ac5d16f305',
 'space_id': '0b051466-e3f9-4d57-a6bc-8653bfd485c2'},
'system': {'warnings': []}}
```

In [87]:
```
model_id = client.repository.get_model_id(model_details)
model_id
```

Out[87]:
```
'07b9ca67-b7fc-4bc2-b017-d054367d9ab7'
```

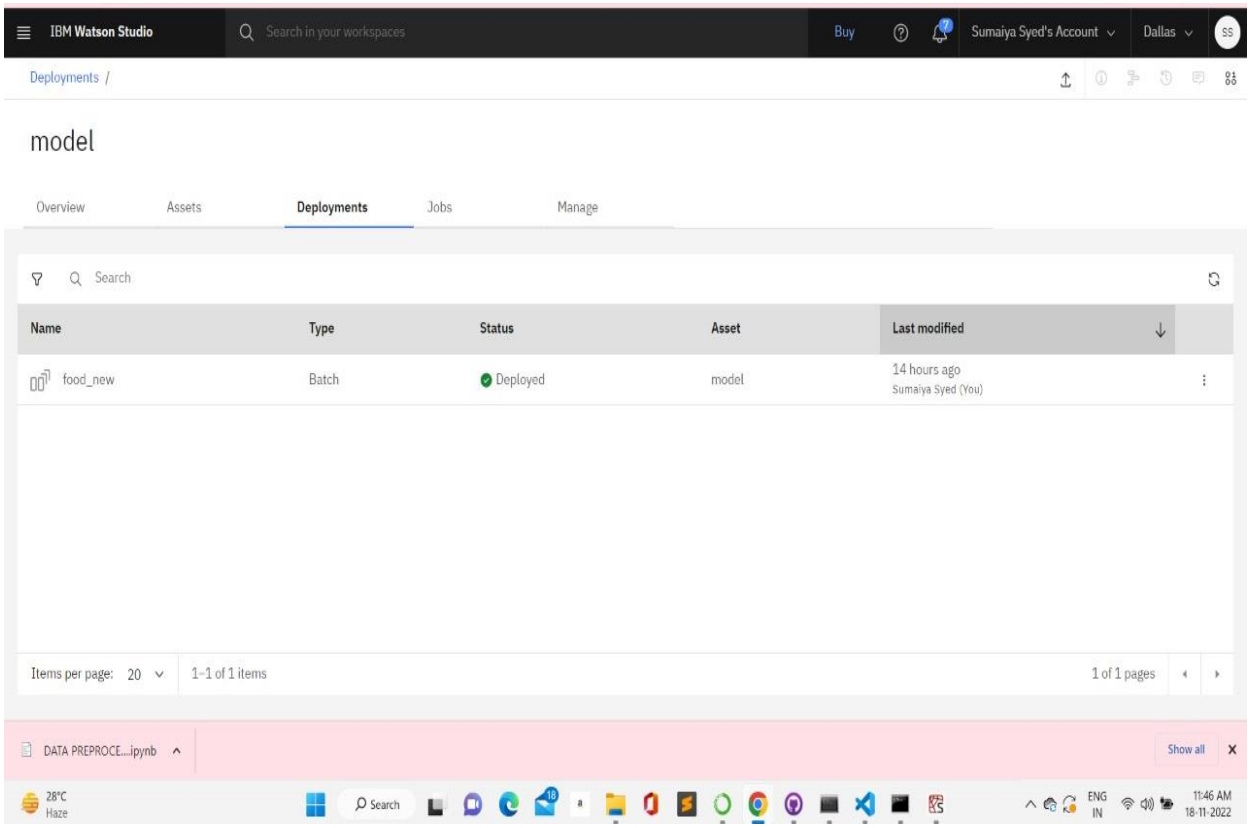
In [89]:
```
#client.repository.download(model_id,'Food Demand Forecaster.tar.gb')
client.repository.download(model_id,'Food Demand Forecasters.tar.gb')
```


```
Successfully saved model content to file: 'Food Demand Forecasters.tar.gb'
```

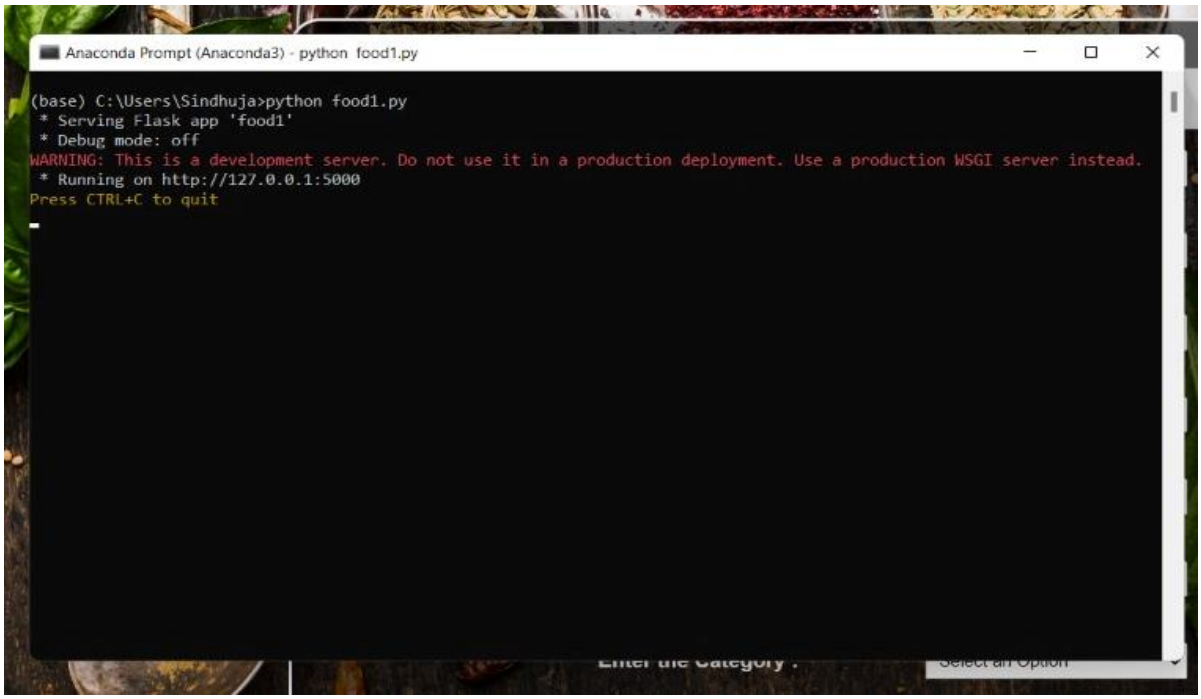
Out[89]:
```
'/home/spark/shared/Food Demand Forecasters.tar.gb'
```

In [ ]:
```

```

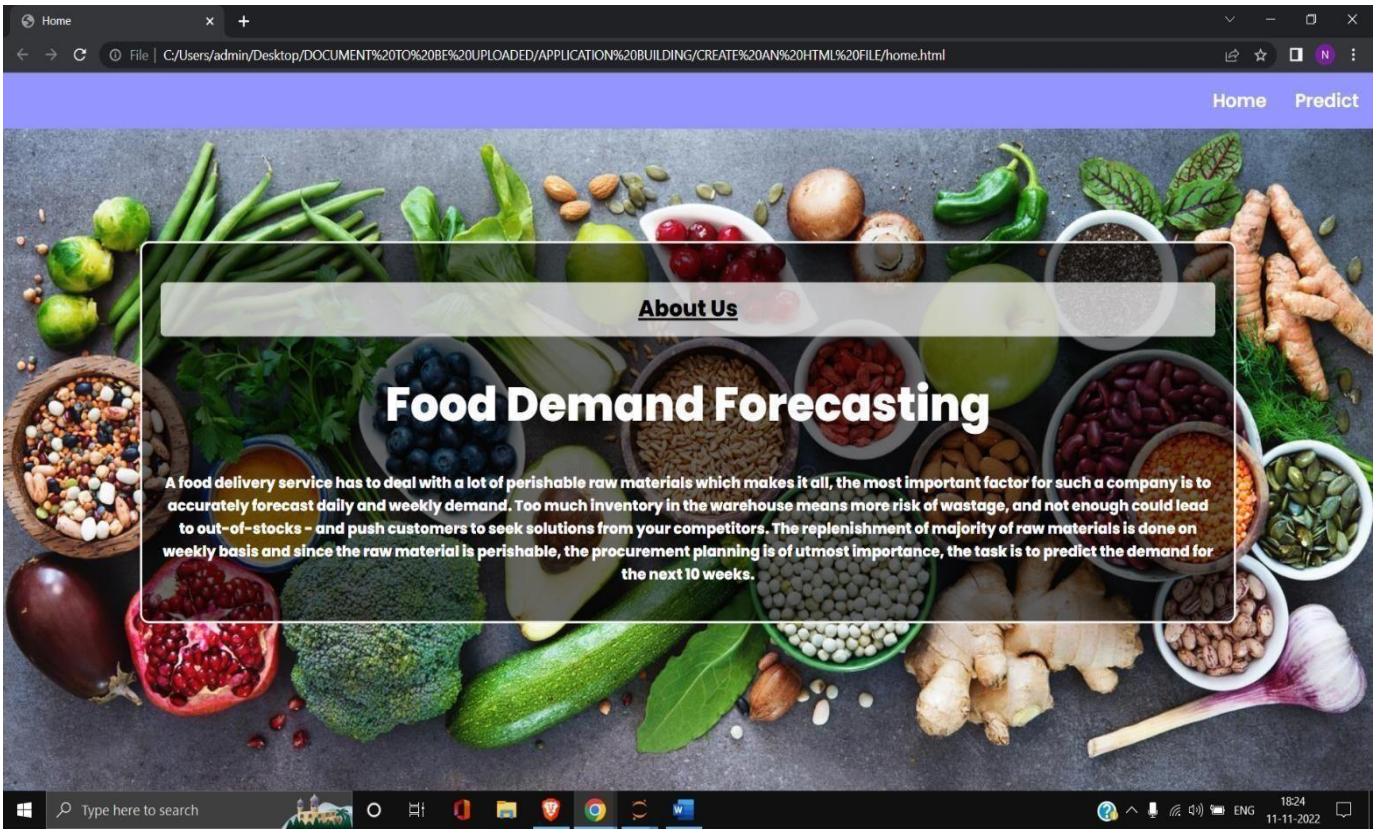
SOLUTIONING

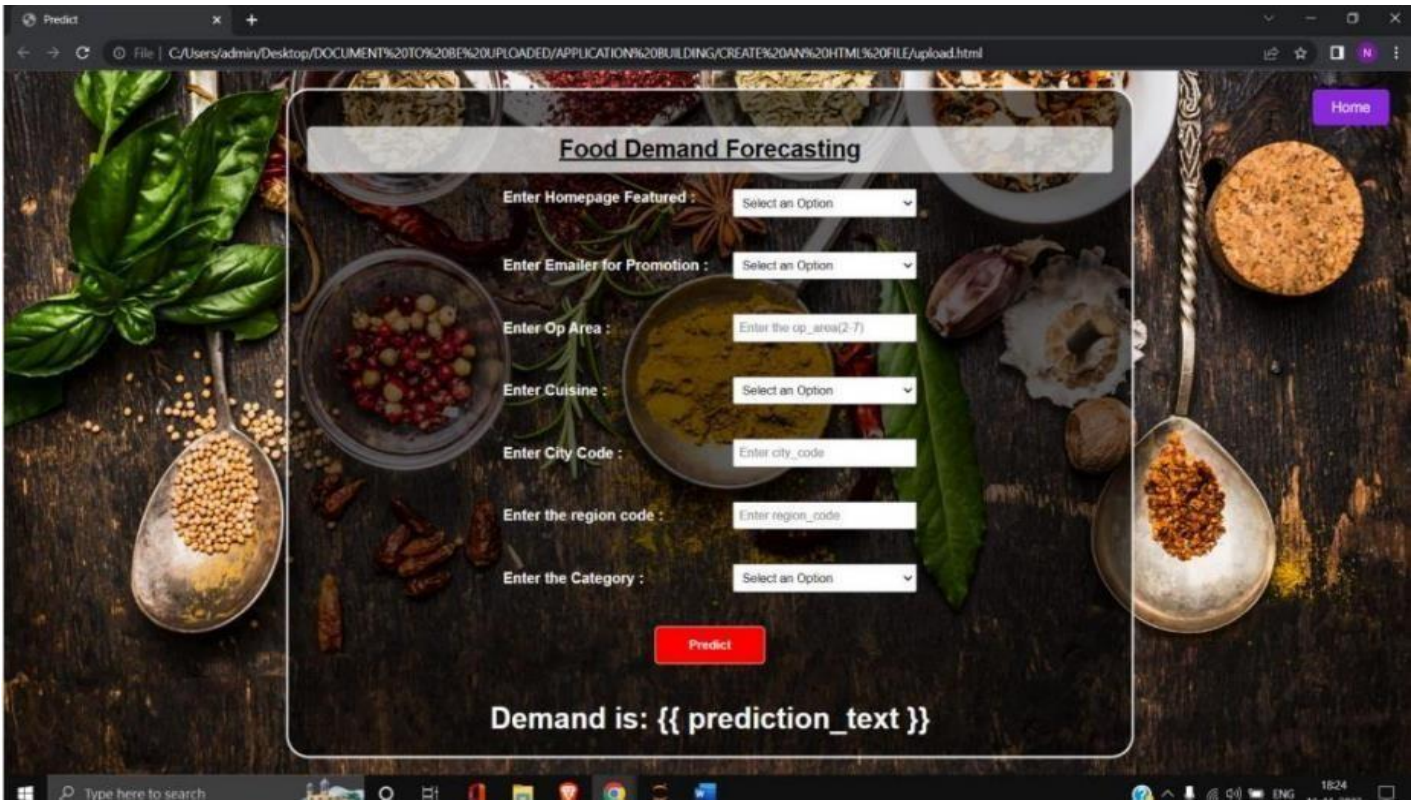


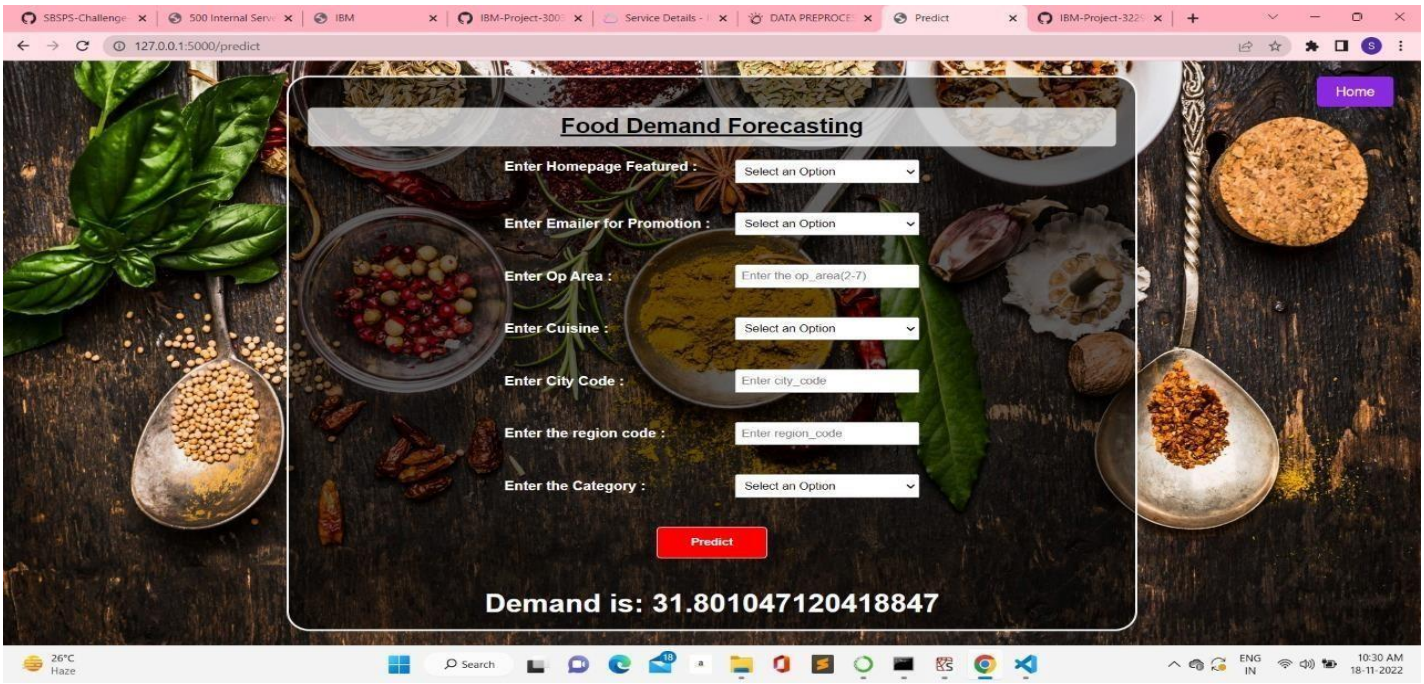
(Model is deployed in cloud)



(To run the app)







8.TESTING

Testing is done by changing the options and features and available, the output is accurately displayed according to that.

8.1 User Acceptance Testing

1. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	2	0	1	0	2
Duplicate	0	0	2	0	0
External	0	0	0	1	2
Fixed	2	2	2	0	2
Not Reproduced	0	0	0	0	1
Skipped	0	0	0	0	1
Won't Fix	1	0	1	1	1
Totals	5	2	6	2	9

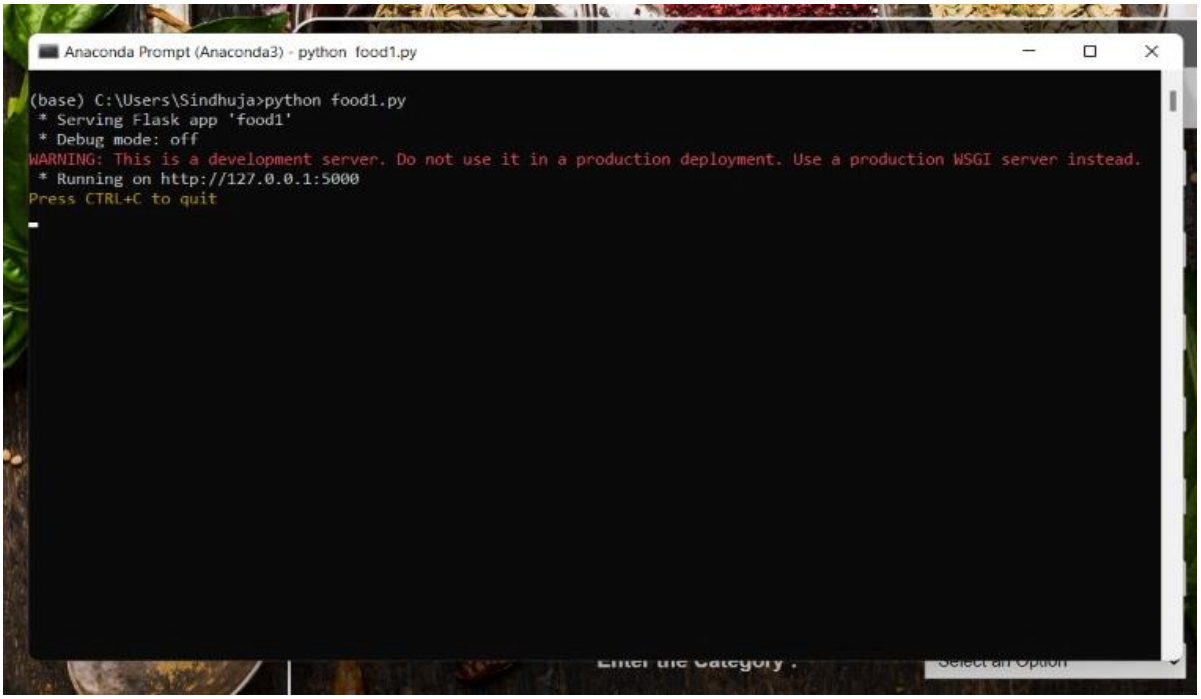
Test Case Analysis

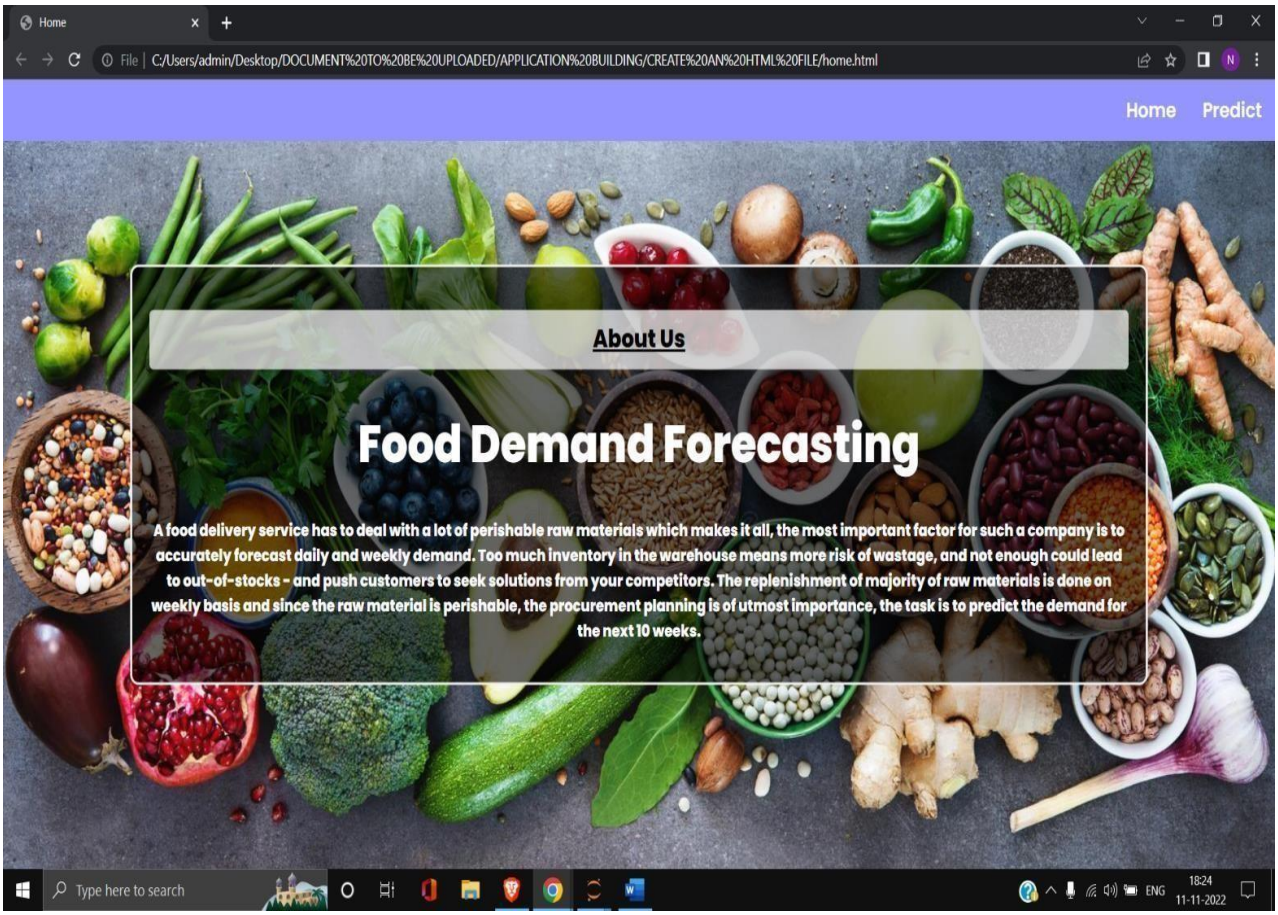
This report shows the number of test cases that have passed, failed, and untested

Outsource Shipping	0	0	0	0
Exception Reporting	1	0	0	1
Final Report Output	1	0	0	1
Version Control	0	0	0	0

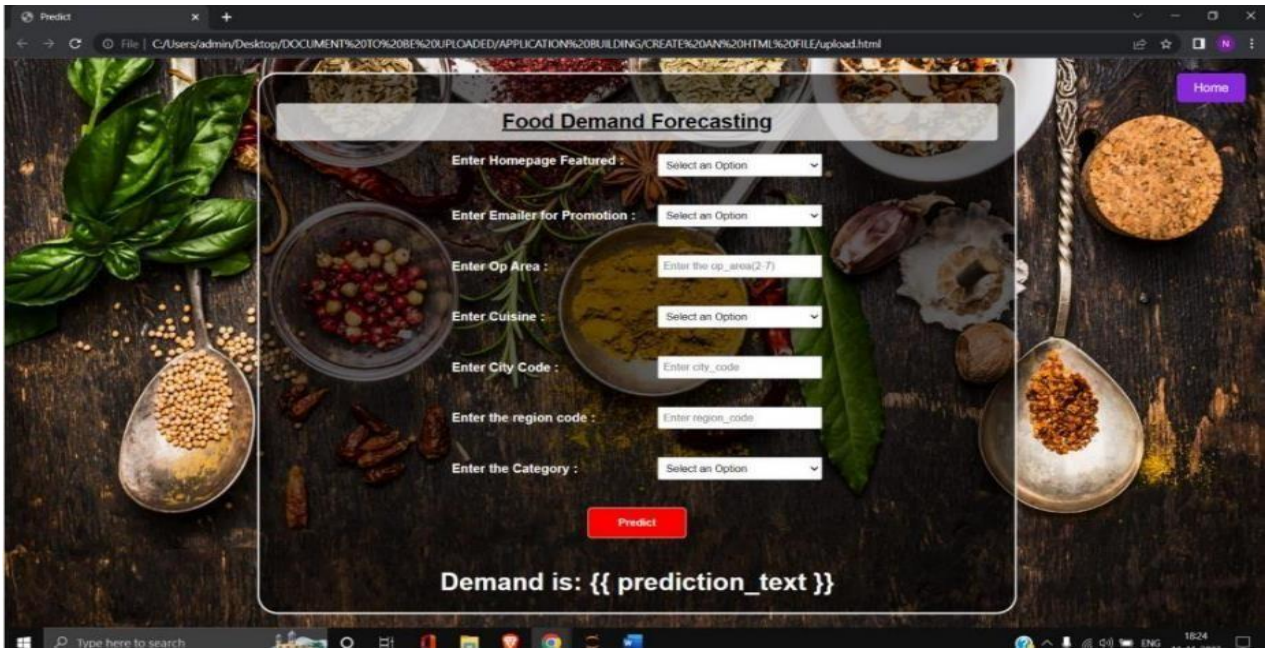
9. EXPERIMENT AND RESULTS

We have made an accurate predictive system for the analysis and prediction of the food demand for different food items at different places.

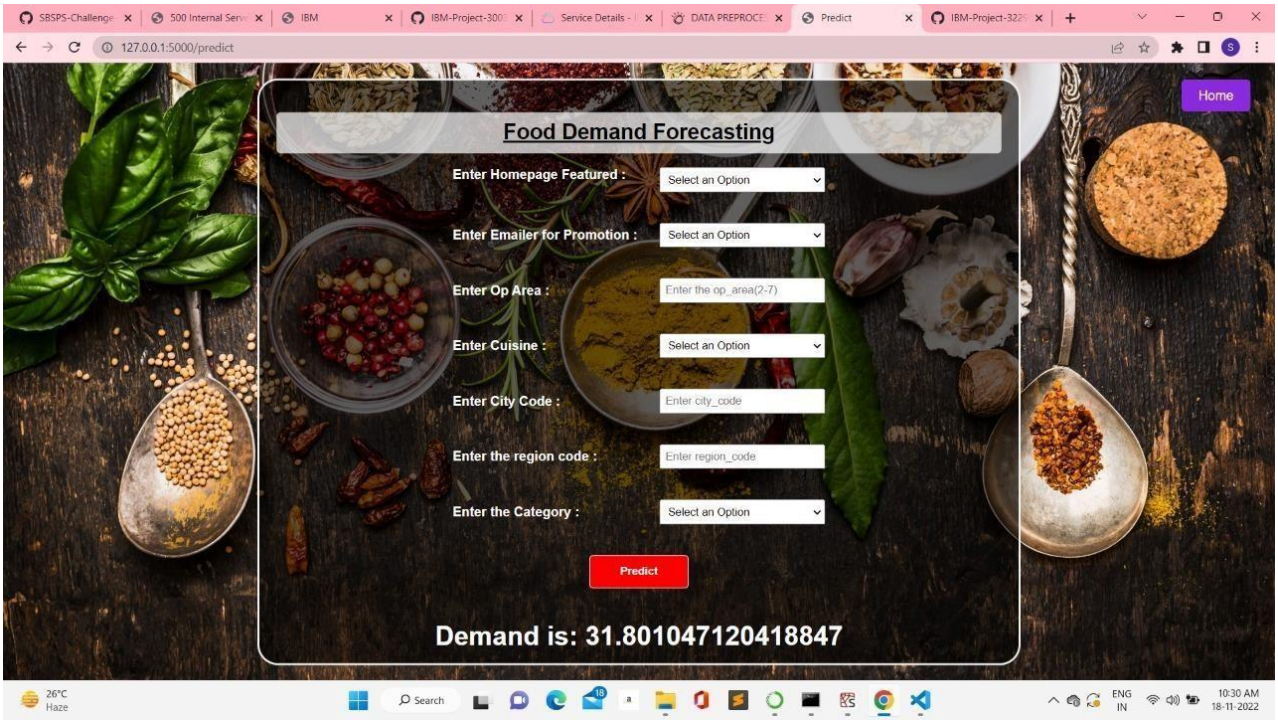




(fig1. Homepage)



(fig2. Predict page)



(fig3. Output page)

10. ADVANTAGES/DISADVANTAGES

Advantages:

1. Food wastage will be minimized.
2. Simple and easy to use framework.

Disadvantages:

1. The output obtained may not be précised, due to the use of limited datasets**.**

11. APPLICATIONS

This project focuses on one food delivery client, which delivers food in many different cities through distribution networks and fulfillment centers.

12. CONCLUSION

The main moto behind this project is to reduce food wastage. The availability of the food items makes the society better. Our purposed model would definitely come handy to a company for predicting then number of food orders and help them to serve their customers better.

13. FUTURE SCOPE

1. Working on the frontend to make the framework more dynamic.
2. In the future, we also plan to improve forecasting accuracy and research on the efficiency of store management.

GITHUB LINK : https://github.com/IBM-EPBL/IBM-Project-26457-1660027020

DEMO LINK :

https://drive.google.com/file/d/1RweDavSgIem1v3P1u6UrEYfmLY4BB-RZ/view?usp=share_link