Project report on

DEMANDEST - AI POWERED FOOD DEMAND FORECASTER

TEAM ID: PNT2022TMID36553

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1. INTRODUCTION

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 outof-stocks - and push customers to seek solutions from your competitors. The replenishment of the 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.

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 fulfillment center 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

EXISTING PROBLEM

The replenishment of the 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 fulfillment center is an prospect wherein the prediction of orders would be beneficial.

Although this is a process that can be done manually.

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PROBLEM STATEMENT DEFINITION

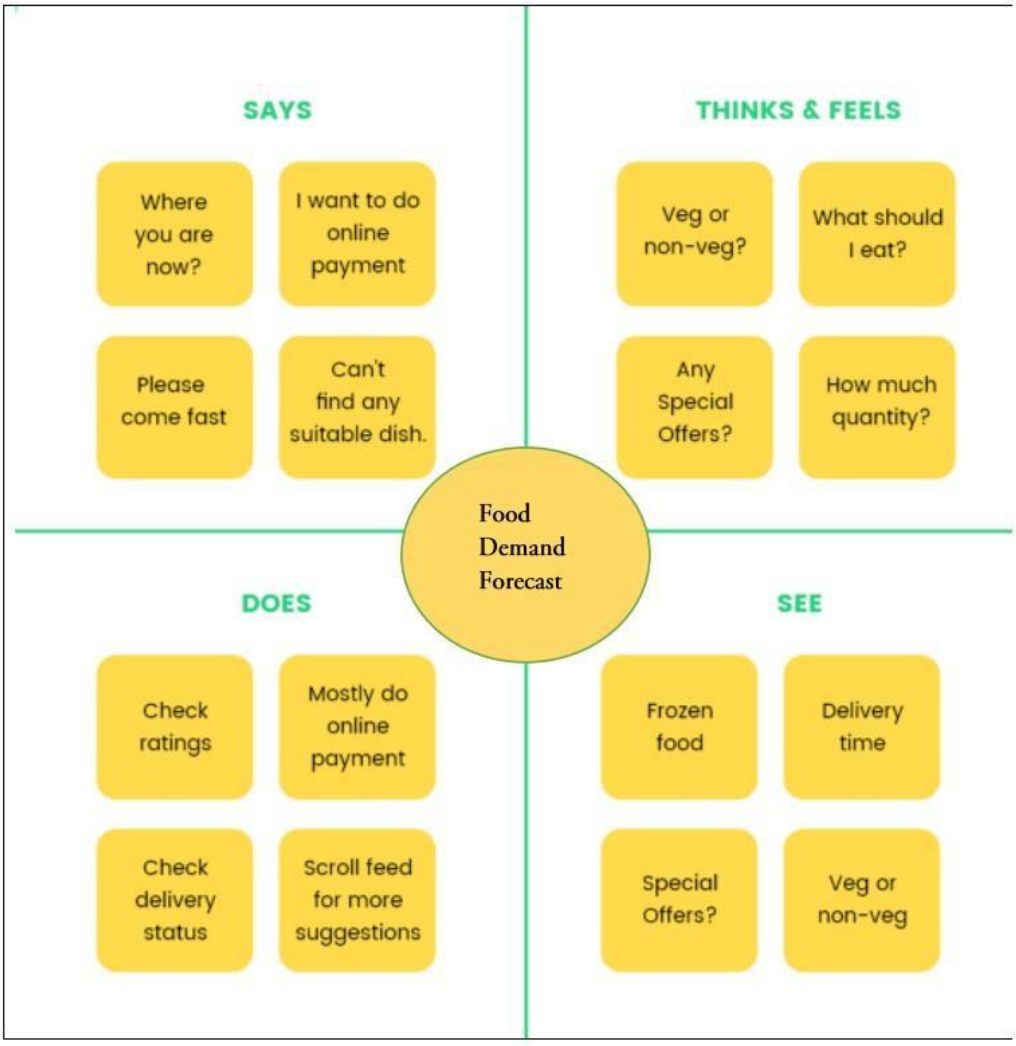
The client is a meal delivery company which operates in multiple cities. They have various fulfilment centers in these cities for dispatching meal orders to their customers. The client wants us to help these centers with demand forecasting for upcoming weeks so that these centers will plan the stock of raw materials accordingly. 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. Secondly, staffing of the centers is also one area wherein accurate demand forecasts are really helpful.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An empathy map is a collaborative visualization used to articulate what we know about a particular type of user. It externalizes knowledge about users in order to 1) create a shared understanding of user needs, and 2) aid in decision making.

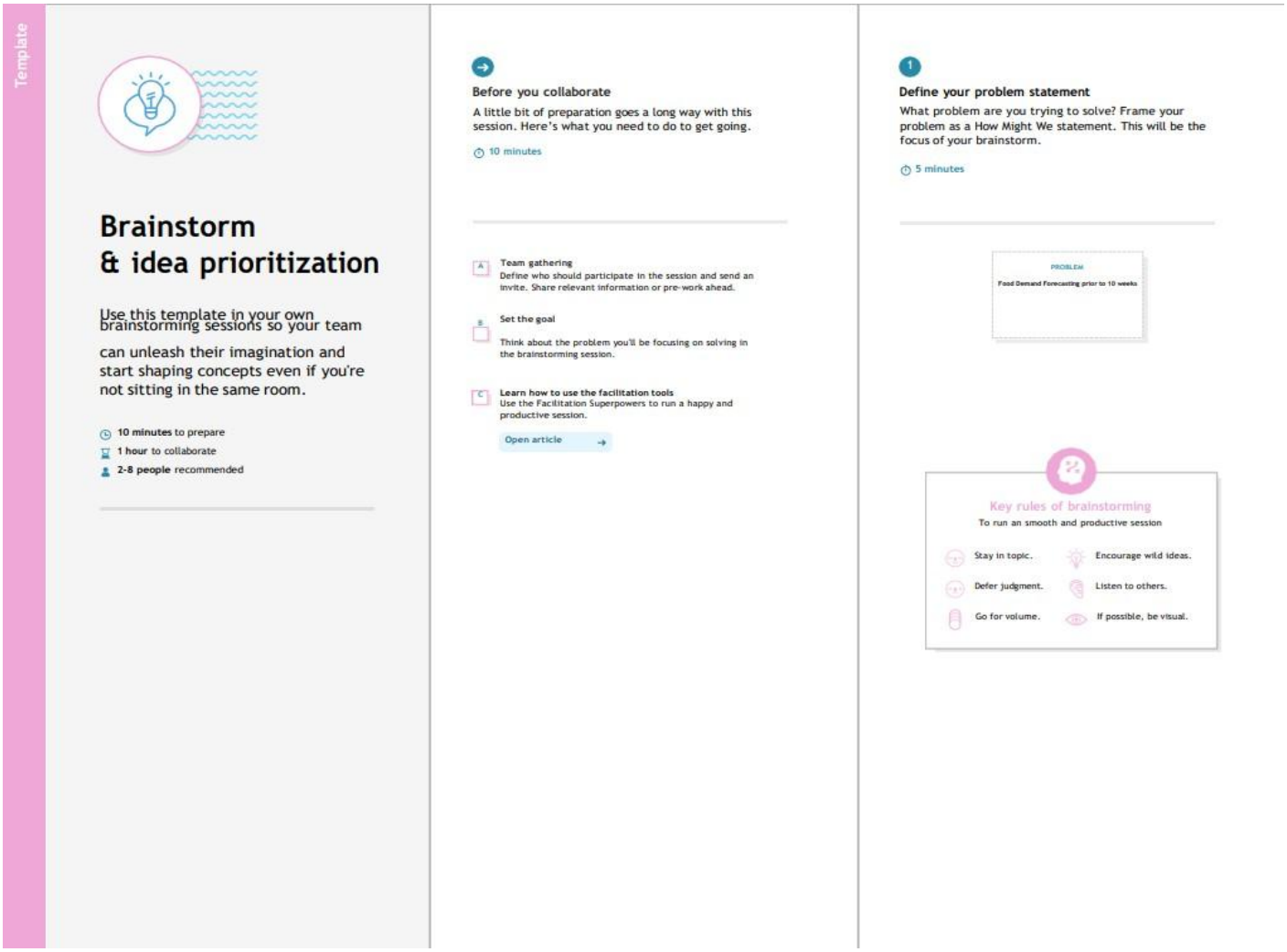
Traditional empathy maps are split into 4 quadrants (Says, Thinks, Does, and Feels), with the user or persona in the middle. Empathy maps provide a glance into who a user is as a whole and are not chronological or sequential.



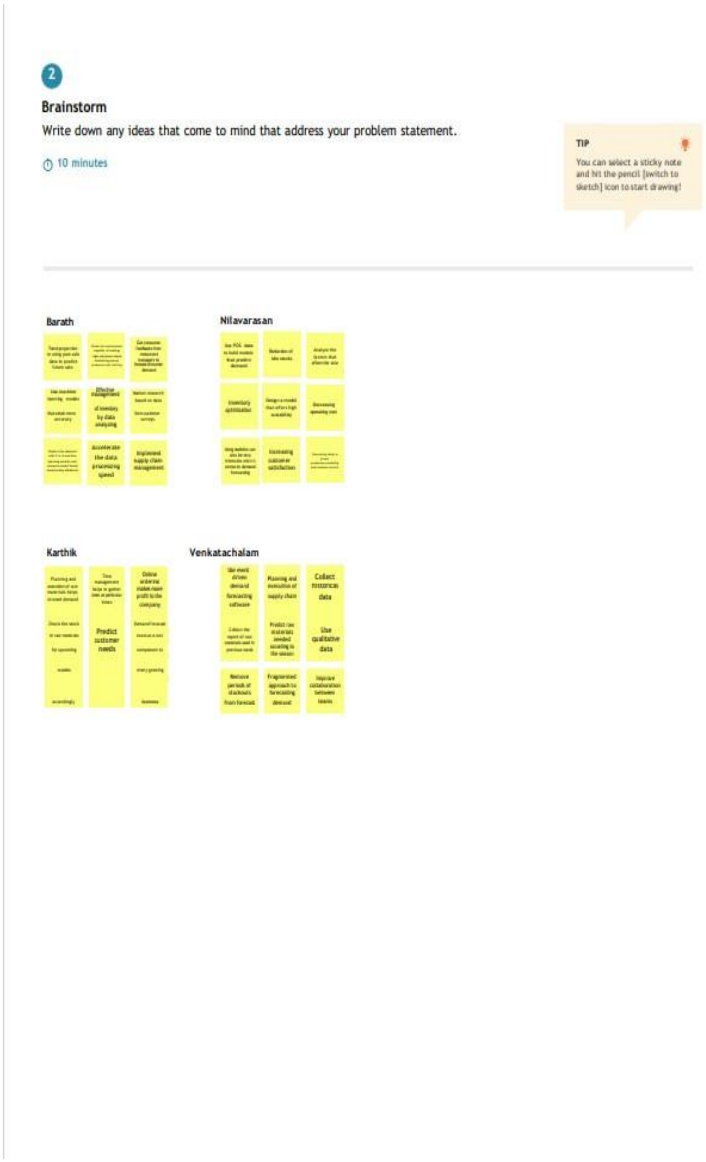
3.2 Ideation & Brainstorming

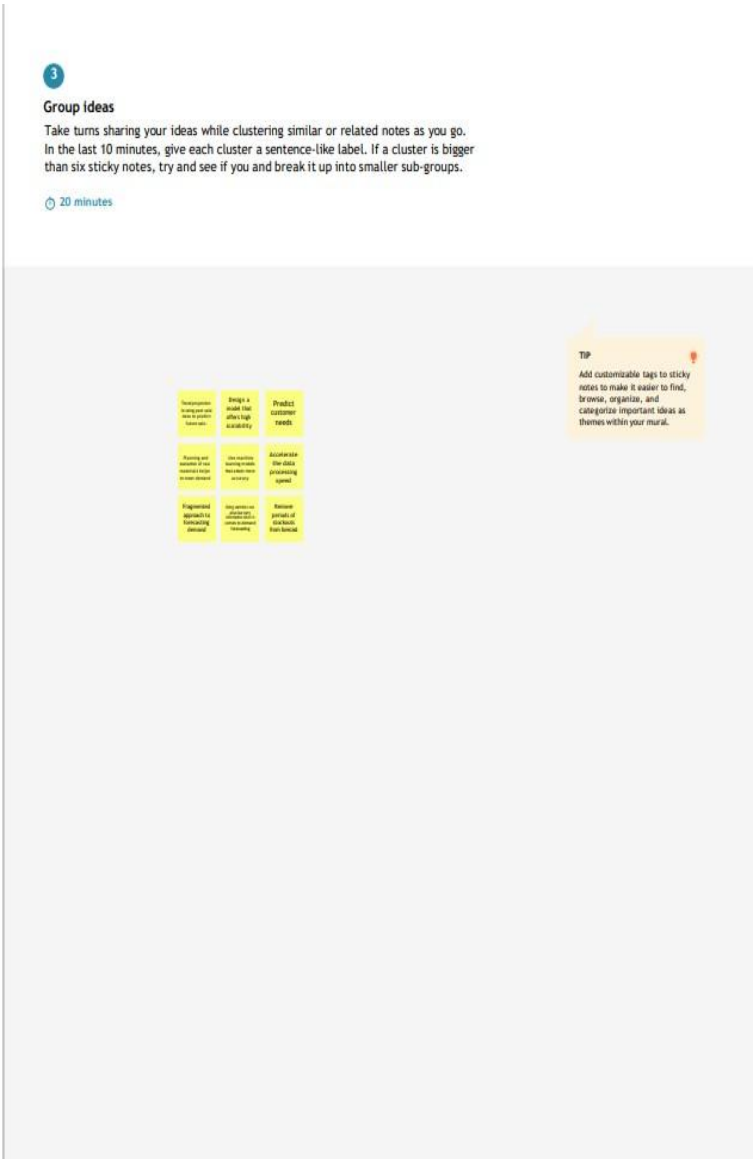
Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems. In controlled conditions and a free-thinking environment, teams approach a problem by such means as “How Might We” questions. They produce a vast array of ideas and draw links between them to find potential solutions .

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping





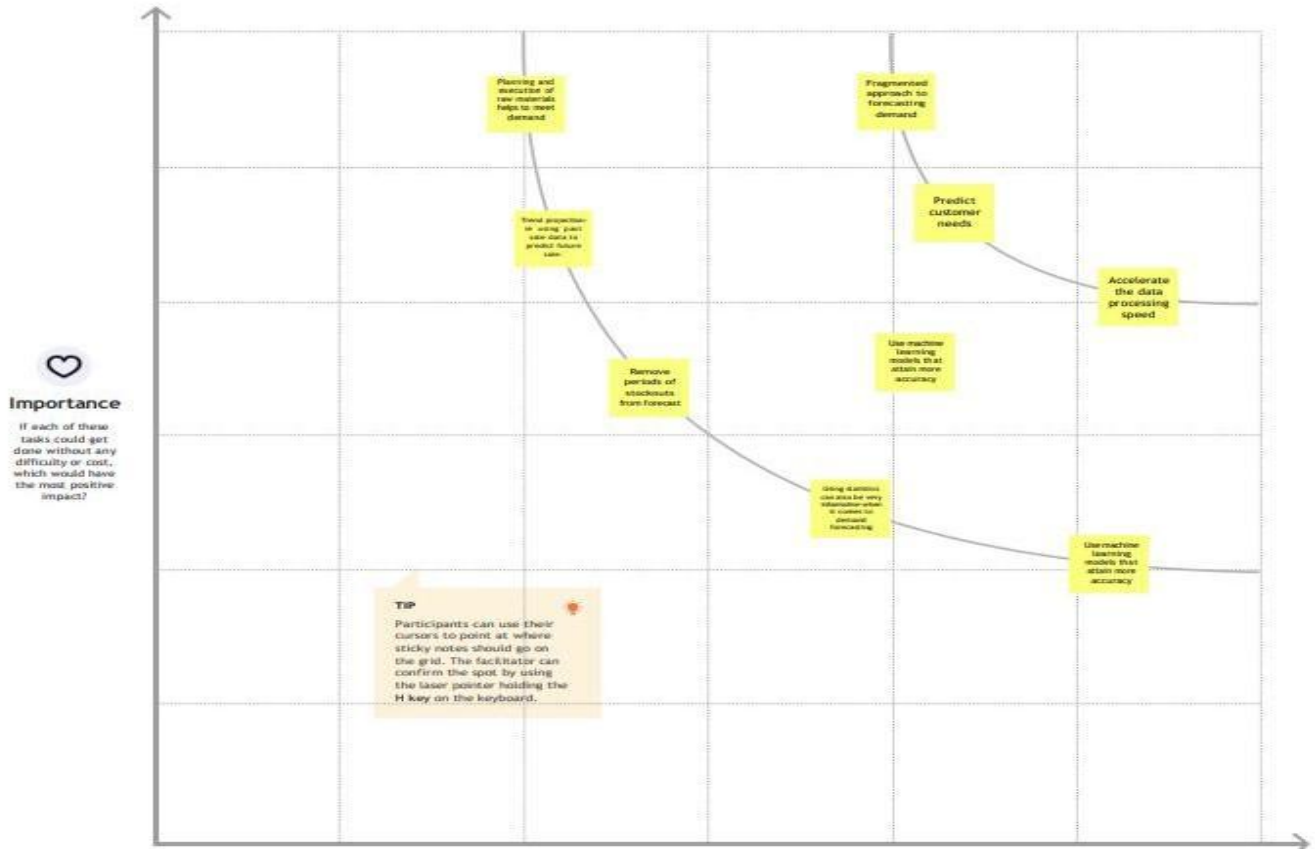
Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



Step 4:

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

A **Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

B **Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.

Open the template →

Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.

Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.

Open the template →

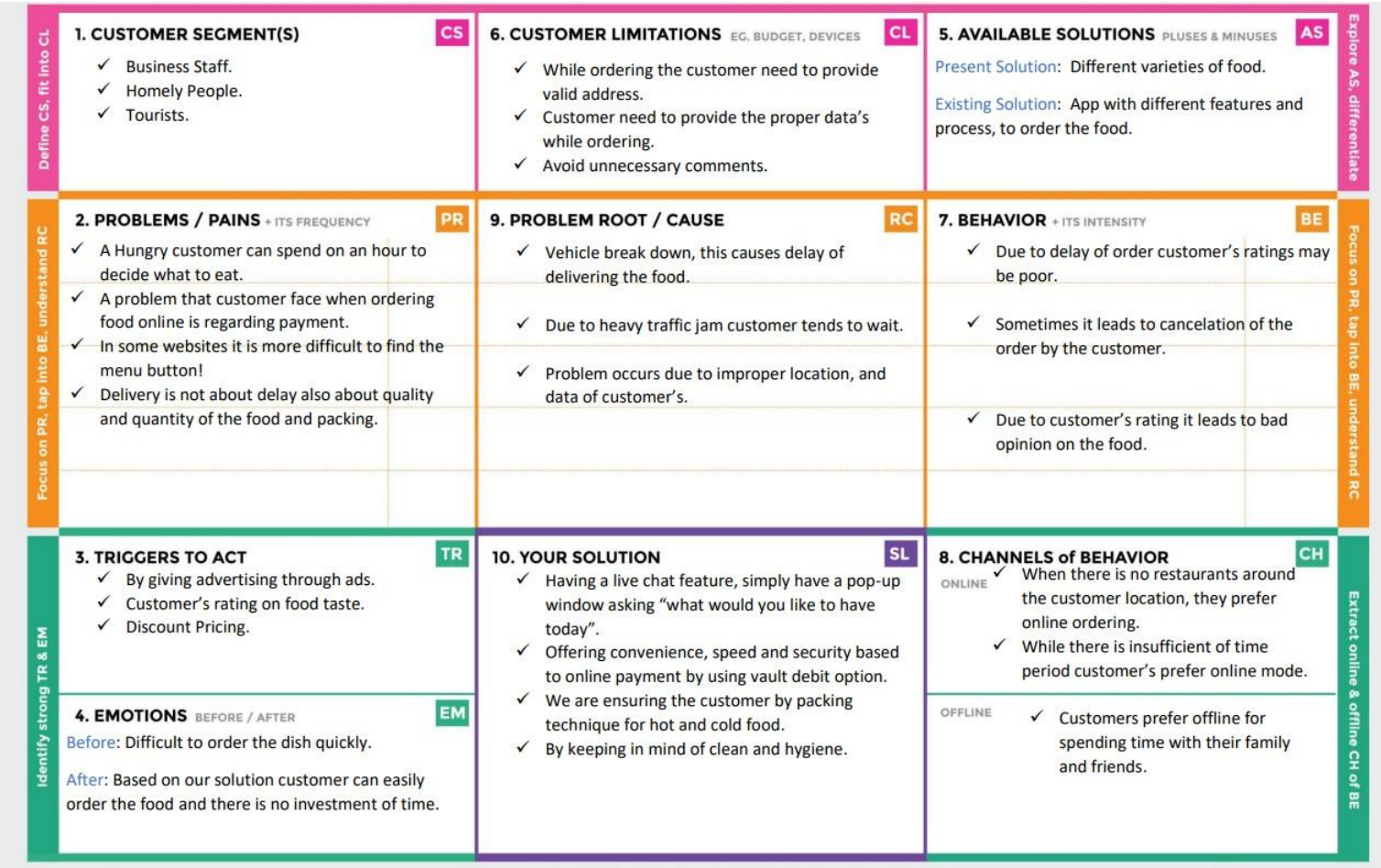
3.3 Proposed Solution

Proposed Solution means the technical solution to be provided by the Implementation agency in response to the requirements and the objectives of the Project. Proposed Solution means the Proposed System with modifications that meet the Agency's requirements as set forth in this RFP.Proposed Solution means the combination of software, hardware, other products or equipment, and any and all services (including any installation, implementation, training, maintenance and support services) necessary to implement the solution described by Vendor in its Proposal.

S.No	TOPIC	CONTENT
1.	Problem Statement (Problem to be solved)	• Reduce the order processing time. • Automate redundant work. • Deliver a great customer experience. • Determine profit & loss
2.	Idea / Solution description	• User friendly and fast interface. • Inventory management. • Integration with other tools. • Order management.
3.	Novelty / Uniqueness	• Tracking sales. • Automatic analysis. • Enhanced productivity. • Improve customer relationship.
4.	Social Impact / Customer Satisfaction	• Cleanliness. • Service. • Friendliness. • Order accuracy.
5.	Business Model (Revenue Model)	• Capacity management. • Time management. • Menu management. • Price management. • Customer management.
6.	Scalability of the Solution	• Based on quality. • Based on taste. • Based on maintenance

3.4 Problem Solution Fit

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem.



4. REQUIREMENT ANALYSIS

Functional requirement

Functional requirements may involve calculations, technical details, data manipulation and processing, and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describe all the cases where the system uses the functional requirements, these are captured in use cases.

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Home page	The user is directed to the home page
FR-4	Sample use	The user would use the web application for calculating sample ideas so that he would get an idea of using it
FR-5	Adding sub-users and creating network	The user could add his co-workers in his application page and form a network.
FR-6	Feedback and support	After deployment, continuous customer support using the feedback

Non-Functional requirements

In systems engineering and requirements engineering, a non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours.

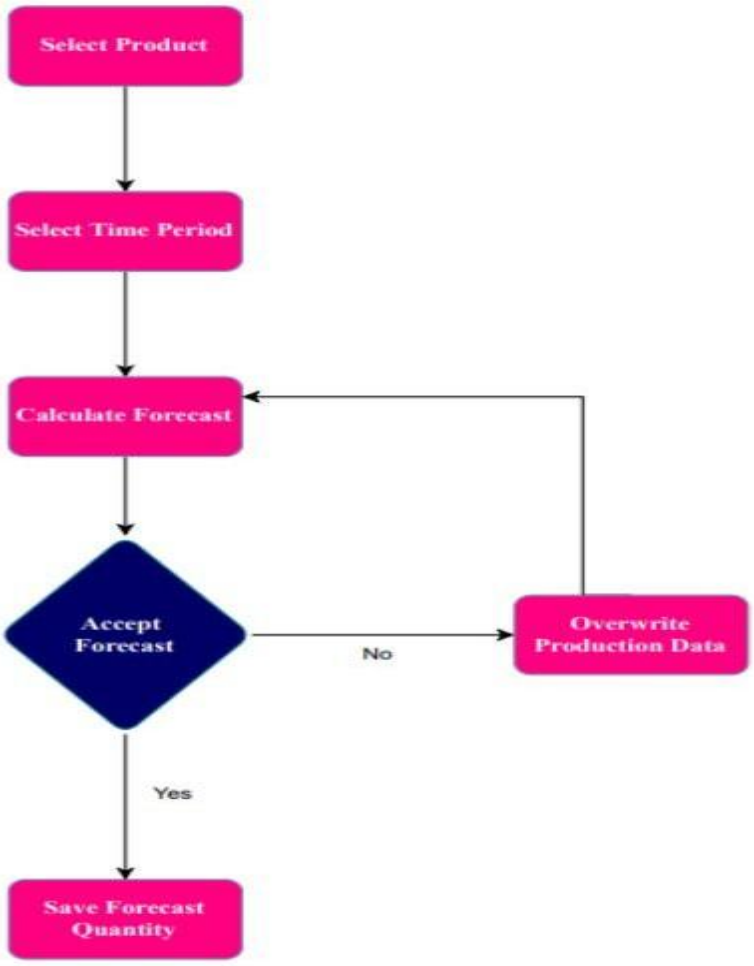
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The web application is required for the people working in food industry for calculating the required amount of food for a particular time period
NFR-2	**Security**	The passwords and emails of the users are stored in the encrypted form. Only if the password matches the encrypted form, the user would able to access their database
NFR-3	**Reliability**	The data stored in the web application is safe as it needs the correct password and verification to access the stored information
NFR-4	**Performance**	The web application is designed in such a way that, no matter how many users using it at a time, the performance of the application remains the same
NFR-5	**Availability**	The web application is available in all platforms
NFR-6	**Scalability**	It works in a fixed scalability

5. PROJECT DESIGN

Data Flow Diagrams

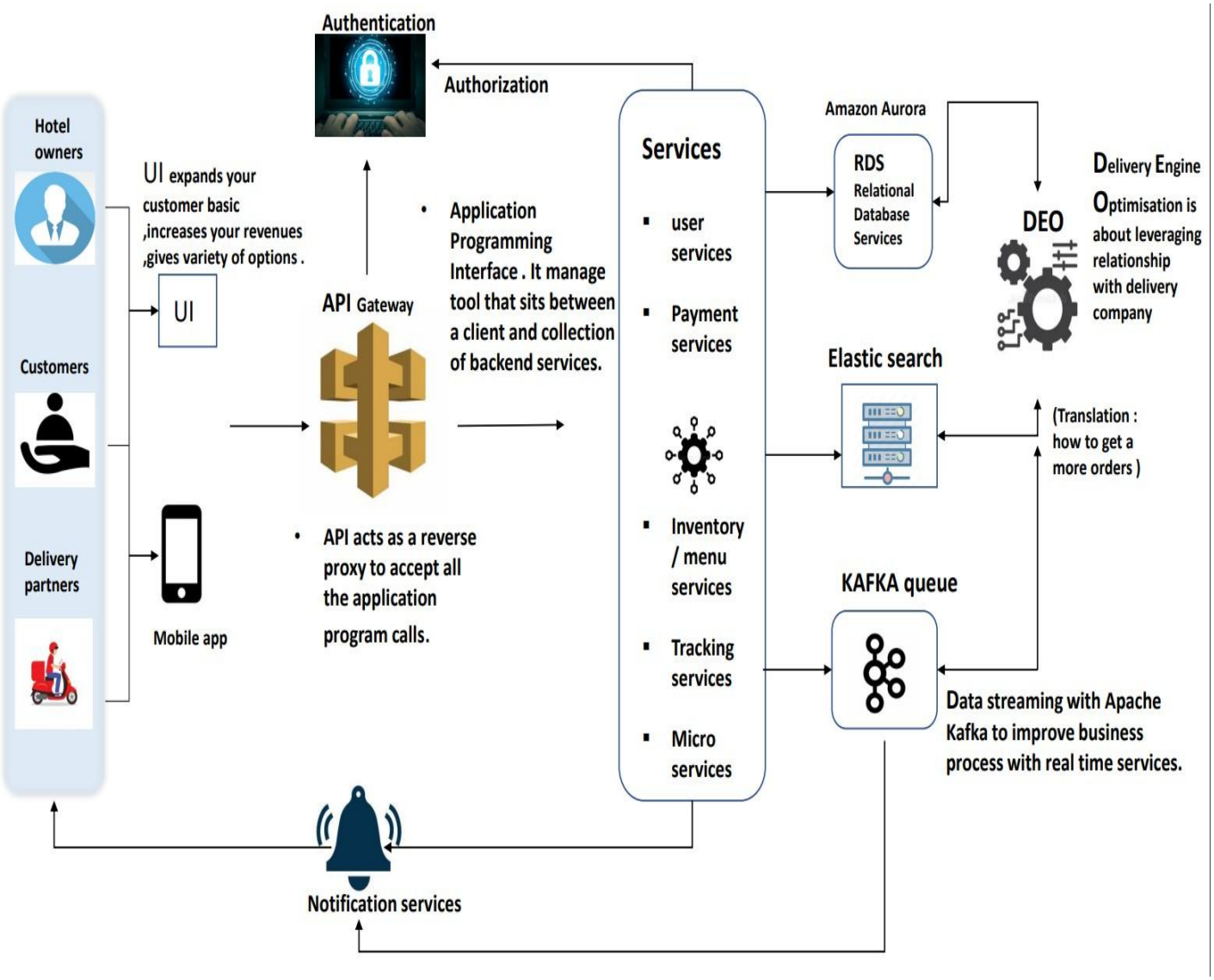
A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



Solution & Technical Architecture Solution

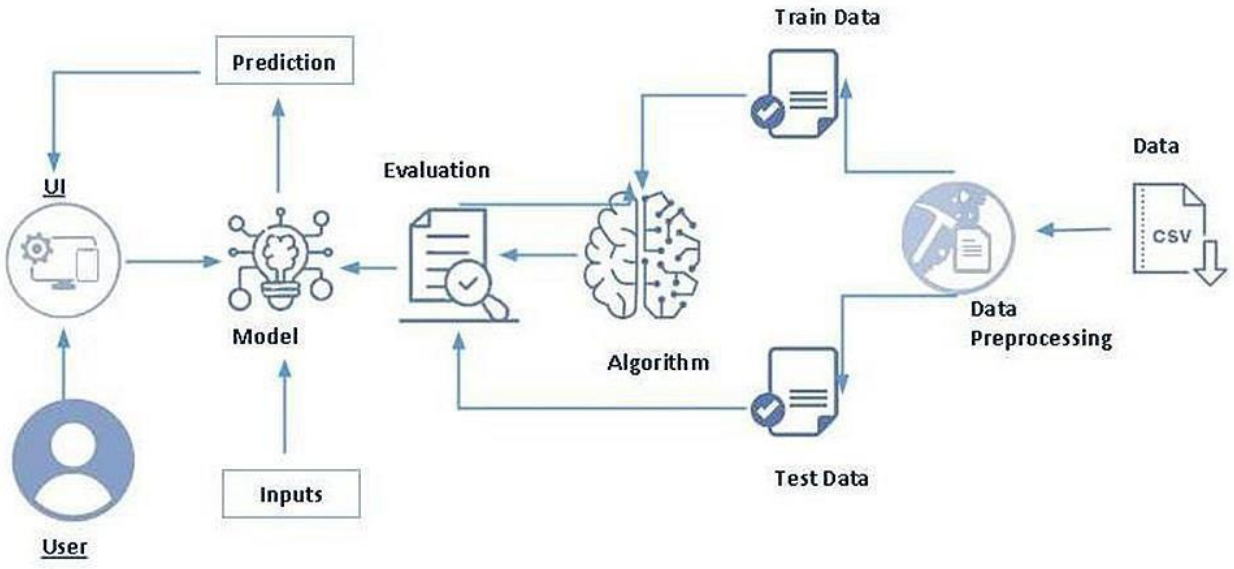
Architecture:

A solution architecture (SA) is an architectural description of a specific solution. SAs combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA).



Technical Architecture:

Technical Architecture (TA) is a form of IT architecture that is used to design computer systems. It involves the development of a technical blueprint with regard to the arrangement, interaction, and interdependence of all elements so that systemrelevant requirements are met.



User Stories

A user story is an informal, general explanation of a software feature written from the perspective of the end user or customer. The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer.

User Stories For DemandEst

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard through Gmail Login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can login to the application by entering respective email & password.	High	Sprint-1
	Dashboard	USN-6	As a user, I can access all the services provided in the dashboard.	I can predict the orders for next 10 weeks and I estimate of raw materials for the same.	High	Sprint-1
Customer (Web user)	Login & Dashboard	USN-8	As a user, I can login through web application and access the resources in the dashboard.	I can login with the credentials required and I can access the services	High	Sprint-1
User Type	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Acceptance criteria**	**Priority**	**Release**
				provided through web application.		
Customer Care Executive	Support	USN-9	As a user I can get support from the help desk and can get my queries cleared.	I can get guidance and any support to use the application.	High	Sprint-2
Administrator	Management	USN-10	As an admin I can maintain the application.	I can perform maintenance of the app even after the release.	Medium	Sprint-1
		USN-11	As an admin I can update the new datasets to the model and train them.	I can periodically update the datasets.	High	Sprint-1
		USN-12	As an admin I can update the features of the app and upgrade it to better versions .	I can perform upgrading of features and versions.	Medium	Sprint-1
		USN-13	As an admin I can maintain all the user details stored and the user's history.	I can maintain the application user's records.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

Sprint Planning & Estimation

In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	5	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-2	As a user, I will receive confirmation email once I have registered for the application	3	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-4		USN-3	As a user, I can register for the application through Facebook	8	Low	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-3		USN-4	As a user, I can register for the application through Gmail	8	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	5	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-4	As a user, I can login into the application through Google one Tap Sign in	3	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Dashboard	USN-5	As a user, I must be able to see my details on the dashboard.	3	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-6	As a user, I should be able to change password whenever I prefer.	2	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Inventory	USN-7	As a retailer, I should be able to alter food product details in the app	2	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-8	As a retailer, I should be able to add or remove quantity of food varities in the app.	3	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3		USN-9	As a retailer, I should get alert on food shortage or unavailability.	5	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Order	USN-7	As a user, I should be able to order food items on the app	2	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-8	As a user, I should be able to verify and pay in a secure payment gateway	3	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-3		USN-9	As a user, I should be able to get the food product on time.	5	Low	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Maintenance	USN-1	As a administrator, I should be able to edit details of the users of the app.	8	High	Barath Preetham Nilavarasan Karthik Venkatachalam

Sprint-2		USN-2	Termination user accounts temporarily or permanently if needed.	5	Low	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-1	Feedback	USN-1	As a customer care team member, I should be able to get feedback from the users.	2	High	Barath Preetham Nilavarasan Karthik Venkatachalam
Sprint-2		USN-2	As a customer care team member, I should be available 24/7 to increase customer base	8	Medium	Barath Preetham Nilavarasan Karthik Venkatachalam

Sprint Delivery Schedule

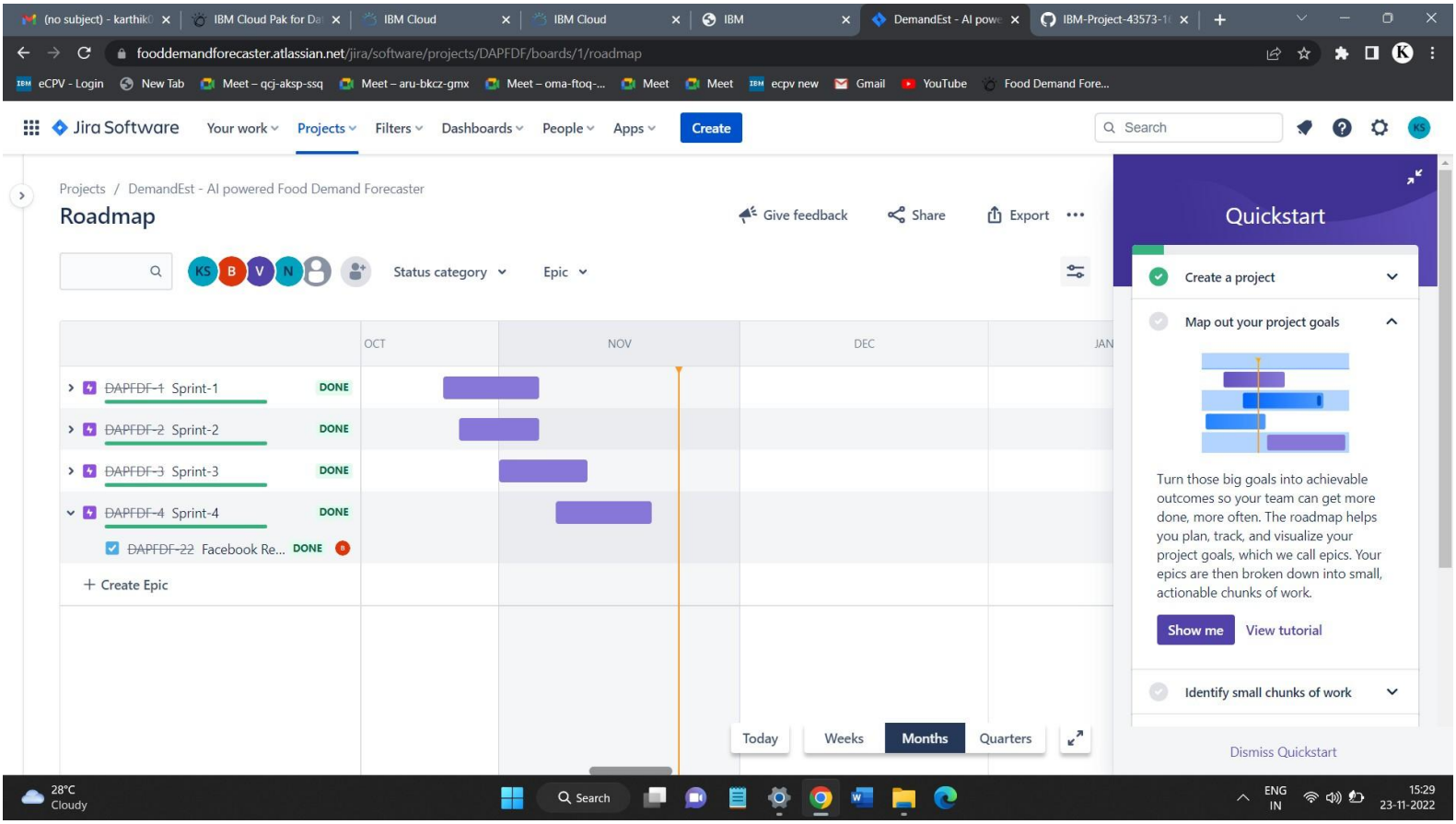
A sprint schedule is a document that outlines sprint planning from end to end. It's one of the first steps in the agile sprint planning process—and something that requires adequate research, planning, and communication.

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	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	30 Oct 2022	04 Nov 2022	20	04 Nov 2022
Sprint-3	20	6 Days	05 Nov 2022	10 Nov 2022	20	10 Nov 2022
Sprint-4	20	6 Days	11 Nov 2022	16 Nov 2022	20	16 Nov 2022

Reports From JIRA

Jira helps teams plan, assign, track, report, and manage work and brings teams together for everything from agile software development and customer support to startups and enterprises.

Software teams build better with Jira Software, the #1 tool for agile teams.



7. CODING & SOLUTIONING

Data Dictionary

Our base data consists of four csv files containing information about test data, train data and other required information.

- train.csv: Contains information like id, week, center id, meal id, checkout price, base price, emailer for promotion, homepage featured, number of orders. This file is used for training.

Variable	Definition
id	Unique ID
week	Week No
center_id	Unique ID for fulfillment center
meal_id	Unique ID for Meal
checkout_price	Final price including discount, taxes & delivery charges
base_price	Base price of the meal
emailer_for_promotion	Emailer sent for promotion of meal
homepage_featured	Meal featured at homepage
num_orders	(Target) Orders Count

- test.csv: Containsinformation like id, week, centerid, meal id, checkout price, base price, emailer for promotion, homepage featured. This file is used for testing.
- fulfilment_center_info.csv: Contains information of each fulfilment center.

Variable	Definition
center_id	Unique ID for fulfillment center
city_code	Unique code for city
region_code	Unique code for region
center_type	Anonymized center type
op_area	Area of operation (in km^2)

- meal_info.csv: Contains information of each meal being served.

Variable	Definition
meal_id	Unique ID for the meal
category	Type of meal (beverages/snacks/soups....)
cuisine	Meal cuisine (Indian/Italian/...)

Libraries Used pandas, numpy, scikit learn, matplotlib, seaborn, xgboost, lightgbm, catboost.

Data Pre-Processing

- There are no Missing/Null Values in any of the three datasets.
- Before proceeding with the prediction process, all the three data sheets need to be merged into a single dataset. Before performing the merging operation, primary feature for combining the datasets needs to be validated.

- The number of Center IDs in train dataset is matching with the number of Center IDs in the Centers Dataset i.e 77 unique records. Hence, there won't be any missing values while merging the datasets together.
- The number of Meal IDs in train dataset is matching with the number of Meal IDs in the Meals Dataset i.e 51 unique records. Hence, there won't be any missing values while merging the datasets together.
- As checked earlier, there were no Null/Missing values even after merging the datasets.

Feature Engineering

Feature engineering is the process of using domain knowledge of the data to create features that improves the performance of the machine learning models.

With the given data, We have derived the below features to improve our model performance.

- Discount Amount : This defines the difference between the “base_Price” and “checkout_price”.
- Discount Percent : This defines the % discount offer to customer.
- Discount Y/N : This defines whether Discount is provided or not - 1 if there is Discount and 0 if there is no Discount.
- Compare Week Price : This defines the increase / decrease in price of a Meal for a particular center compared to the previous week.
- Compare Week Price Y/N : Price increased or decreased - 1 if the Price increased and 0 if the price decreased compared to the previous week.
- Quarter : Based on the given number of weeks, derived a new feature named as Quarter which defines the Quarter of the year.
- Year : Based on the given number of weeks, derived a new feature named as Year which defines the Year.

Data Transformation

- Logarithm transformation (or log transform) is one of the most commonly used mathematical transformations in feature engineering. It helps to handle skewed data and after transformation, the distribution becomes more approximate to normal.
- In our data, the target variable ‘num_orders’ is not normally distributed. Using this without applying any transformation techniques will downgrade the performance of our model.
- Therefore, we have applied Logarithm transformation on our Target feature ‘num_orders’ post which the data seems to be more approximate to normal distribution.
- After Log transformation, We have observed 0% of Outlier data being present within the Target Variable – num_orders using 3 IQR Method.

Evaluation Metric

The evaluation metric for this competition is 100*RMSLE where RMSLE is Root of Mean Squared Logarithmic Error across all entries in the test set.

Initial Approach

- Simple Linear Regression model without any feature engineering and data transformation which gave a RMSE : 194.402
- Without feature engineering and data transformation, the model did not perform well and could'nt give a good score.
- Post applying feature engineering and data transformation (log and log1p transformation), Linear Regression model gave a RMSLE score of 0.634.

Advanced Models

- With improvised feature engineering, built advanced models using Ensemble techniques and other Regressor algorithms.
- Decision Tree Regressors performed well on the model which gave much reduced RMSLE. ● With proper hyper-parameter tuning, Decision Tree Regressor performed well on the model and gave the lease RMSLE of 0.5237

8. TESTING

Test Cases

A test case includes information such as test steps, expected results and data while a test scenario only includes the functionality to be tested.

Test case ID	Feature Type	Component	Test Scenario
LoginPage_TC_OO1	Functional (Registration)	Home Page	As a user, I can register for the application by entering my email, password, and confirming my password.
LoginPage_TC_OO2	Functional (Conformation)	Home Page	As a User, I will receive confirmation email once I have registered for the application.
LoginPage_TC_OO3	Functional (Accessibility)	Home page	As a user, I can register for the application through Facebook
LoginPage_TC_OO4	Functional (Customer access through mail)	Login page	As a user, I can register for the application through Gmail.
LoginPage_TC_OO4	Functional (Login)	Login page	As a user, I can log out into the application by entering email & password.
LoginPage_TC_OO5	Functional (Dashboard)	Home page	Choosing the menu, Restaurant and payment process. after receiving the food rating process.
LoginPage_TC_OO6	Functional (Customers order)	Home page	Delivery partner simply tracks the order and lets the customer know when it will arrive.
LoginPage_TC_OO7	Functional (Customer order delivery)	Home page	Doorstep delivery. Easy process to get the order.
LoginPage_TC_OO8	Functional (Hotel Management)	Home page	Choosing the restaurant. Multiple choice for restaurant profile.

Pre-Requisite	Steps To Execute
Network Accessing device	1. Check all the textboxes, radiobuttons, buttons.etc. 2. Check the required fields by not fillingany data. 3. Check user shouldRegister by fillingallthe required fields.
Network Accessing device	1. Check results on enteringvalid user ID & Password. 2. Check results on entering invalid User ID & Password. 3. Check response when a user ID is empty & login button ispressed, and many more.
Network Accessing device	1. Ifthe labels are correctly written andplaced or not. 2. If the audio/video content is properlyaudible/visible or not. 3. Ifthecolor contrast ratioismaintained or not. 4. If the control actionsforvideo are workingtineor
Network Accessing device	1. Enter URL(http://127.0.0.1:5000/) and click go 2. Click on My Account dropdown button 3. Enter InValid username/email in Emailtextbox 4. Enter valid password in password textbox 5. Click on login button
Network Accessingdevice	1. Logio wrth validcredentials. 2. Check the showpassword feature. 3. Check the Remember Mecheckbox. 4. Check the email. 5. Click on login button
NetworkAccessing device	1. Test Case ID. 2. Test Description. 3. Assumptions and Pre-Conditions. 4. Test Data.
Network Accessing device	1. Keep things simpleand transparent. 2. Make test casesreusable. 3. Peer reviewis important. 4. Keep test casesIDs unique.
Network Accessing device	1. Making surethatfunctionalities areeasy to find 2. Navigation shouldbe easyand user-friendly 3. Buttons of the application should be visible. 4. Verification that font shouldbe of appropriate size so that anyone can read them.

Network Accessing device	1. Making sure that functionalities are easy to find 2. Navigation should be easy and user-friendly 3. Buttons of the application should be visible. 4. Verification that font should be of appropriate size so that anyone can read them.

Test Data	Expe<:ted Result	Actual Result	Status
http:/ /127.0.0.1:5000	Login/Signup popup shoulddisplay	Working as expected	Pass
http•//127.0.0 1:5000	Application shouldshow below UI elements: a.email textbox a. password text box b. **Login button with orange colour** c. **New customer?Create account link**	**Working as** expected	Pass
Username: Jdk@gmail.com password:FDF123	**User should navigate to user account** homepage	**Working as** expected	Pass
Username:Jdk@gmall password: FDF123	Application should show 'Incorrect email or password 'validation message.	Working as expected	Pass
Username:Jdk@gmail.com password: FDF123678686786876876	Application shouldshow 'Incorrect email **or password 'validation message.**	Working as expected	**Pass**
Username:Jdk **pasS'Word:** FDF123678686786876876	"pplication shouldshow 'Incorrect email **or password 'validation message.**	**Working as** expected	Pass
Username: jdk@gmail password:FDF123	**Everything that a customer expectsfrom a ptoduct, service or organisation.**	Working as expected	Pass
username:Jdk@gmail password:FDF123	It should be made clearhow many days a delivery might take to process.	Working as expected	**Pass**
Username:Jdk@gmall password:FDF123	Il will becommercially accountable for budgeting and financial management and Willneed to plan;organise amd dire<:t all hotel services.	Working as expected	Pass

Defect Analysis:

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won'tFix	0	0	0	1	1
Totals	24	9	11	26	71

Test Case Analysis:

Section	TotalCases	Not Tested	Fail	Pass
PrintEngine	7	0	0	7
ClientApplication	51	0	0	51
Security	2	0	0	2
OutsourceShipping	3	0	0	3
ExceptionReporting	9	0	0	9
FinalReportOutput	4	0	0	4
VersionControl	2	0	0	2

9. RESULTS

Performance Metrics

Performance testing is the practice of evaluating how a system performs in terms of responsiveness and stability under a particular workload. Performance tests are typically executed to examine speed, robustness, reliability, and application size.

S.No.	Parameter	Values	Screenshot
1.	Metrics	**Regression Model:** MAE 89.10334778841495, MSE - 43129.82977026746, RMSLE -207.67722496765856, R2 score -0.6946496854280233,	**Evaluating the model** In [33]: from sklearn.metrics import mean_squared_error In [34]: RMLSE=np.sqrt(mean_squared_error(y_test,pred)) RMLSE Out[34]: 209.71961740281198 In [39]: from sklearn import metrics from sklearn.metrics import mean_absolute_error In [40]: MSE=print(metrics.mean_squared_error(y_test,pred)) MSE 43982.31792324628 In [41]: R2S=print(metrics.r2_score(y_test,pred)) R2S 0.6886142448276894 In [42]: MAE=print(mean_absolute_error(y_test,pred)) 89.10334778841495

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 precised, 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.

14. APPENDIX

SOURCE CODE:

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.google
apis.com/css2?family=Poppins:wght@2
00;300;400;600;800&display=swap"
rel="stylesheet"
```

```
/>
<link
rel="stylesheet"
href="https://cdnjs.cloudfl
are.com/ajax/libs/font-awesome/6.0.0-
beta2/css/all.min.css"
/>
<link
rel="stylesheet"
href="https://cdnjs.cloudfl
are.com/ajax/libs/font-awesome/6.0.0-
beta2/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/h
ealthy-food-selection-healthy-food-
selection-fruits-vegetables-seeds-
```

```
superfood-cereals-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="/pred">Predict</a></li>
<li style="font-size:
20px"><a
href="/home">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>

</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.google
apis.com/css2?family=Poppins:wght@2
00;300;400;600;800&display=swap"
rel="stylesheet"
/>
<link
rel="stylesheet"
href="https://cdnjs.cloudfl
are.com/ajax/libs/font-awesome/6.0.0-
beta2/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.specialityfoodmagazin
e.com/assets/images/other/herbs_and_s
pices.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= '/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;
```

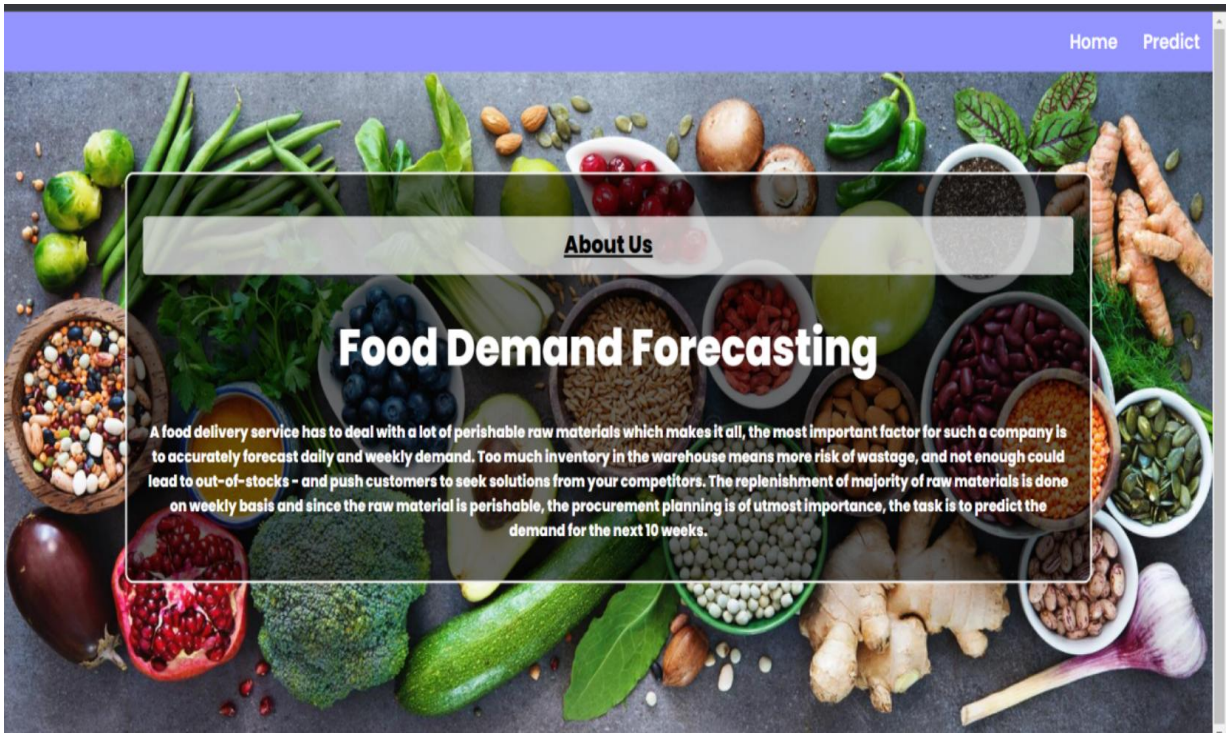
```
                    align-items: center;
                                "
                                >
                                <label
for="category">Enter the Category :
                    </label>
                    <select id="category"
            name="category">
                    <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>
```

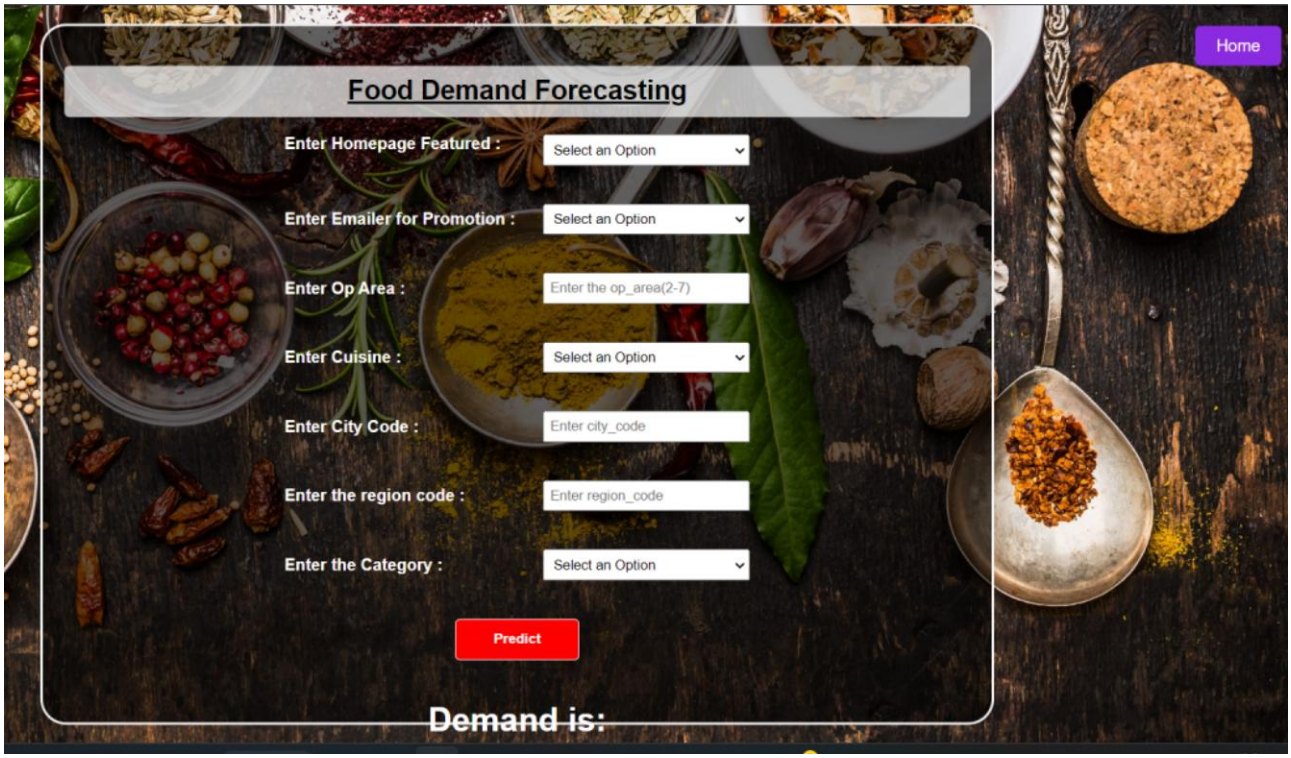
```
</body>
</html>
```

SCREENSHOTS

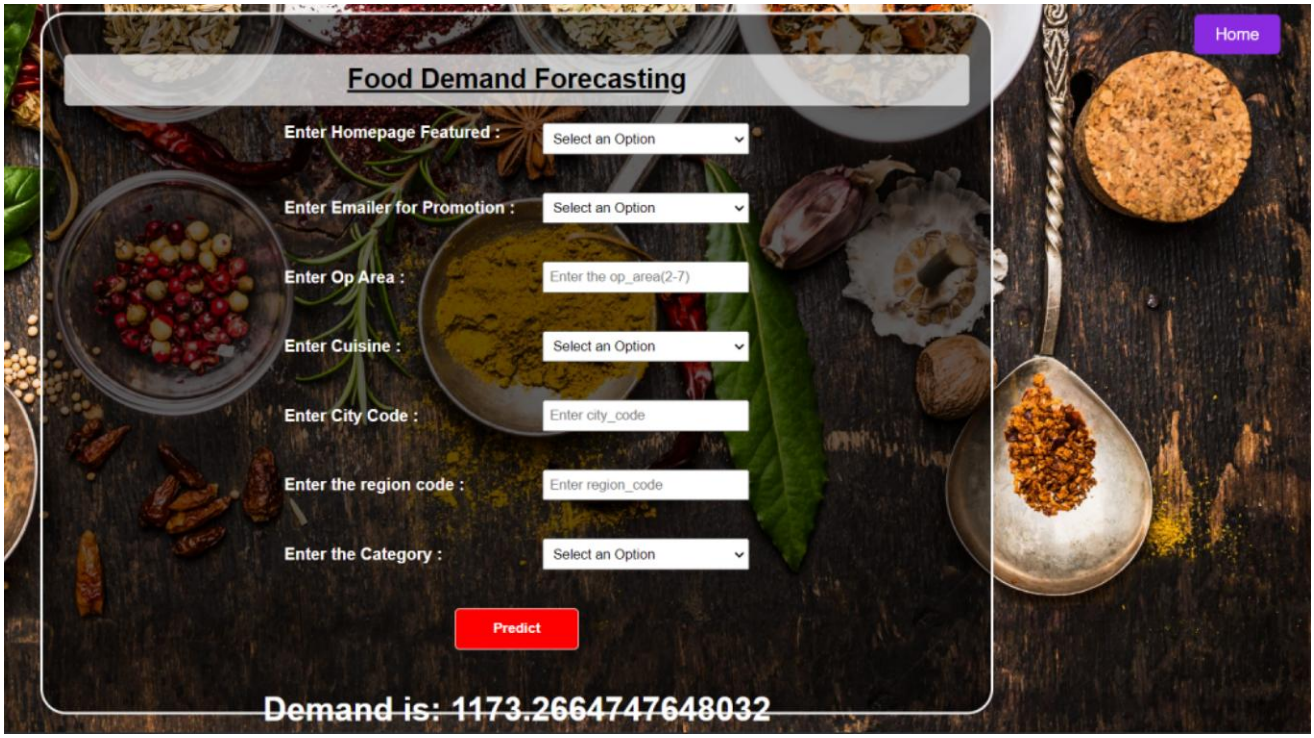
HOME PAGE



PREDICT PAGE



PREDICT RESULT PAGE



GITHUB LINK

https://github.com/IBM-EPBL/IBM-Project-43573-1660718133

PROJECT DEMONSTRATION VIDEO LINK

https://drive.google.com/drive/folders/1Cfp_9uRrYiEce3SSlbBK2xBgp5liUf7k