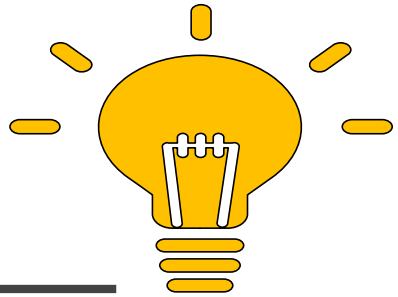
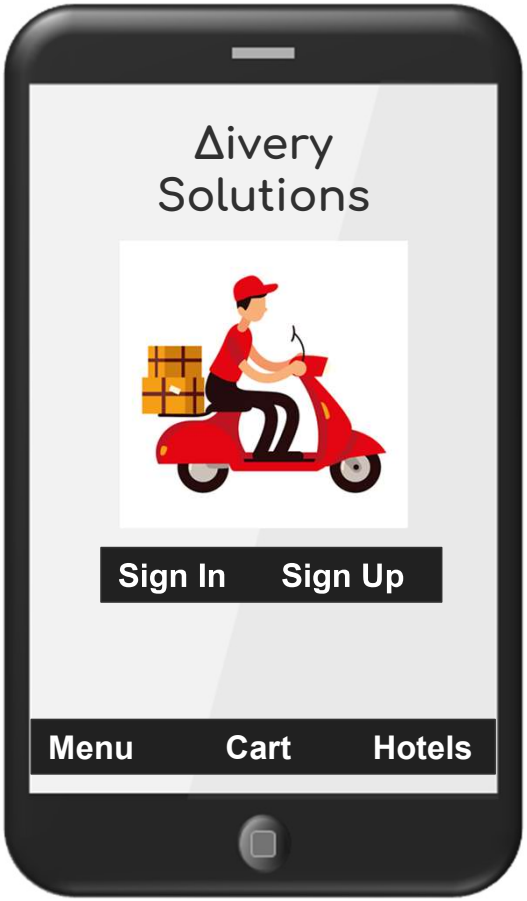
Problem Statement

As an entrepreneur, you are planning to start a service based business of food items delivery from restaurants in Jodhpur city to IIT Jodhpur Karwad campus. Identify the issues which would act as a challenge for you and come up with a plan resolving each of them suggesting a sound solution and a running plan.

Δivery Solutions

A venture by IIT Jodhpur students





Group-5

Team Members :

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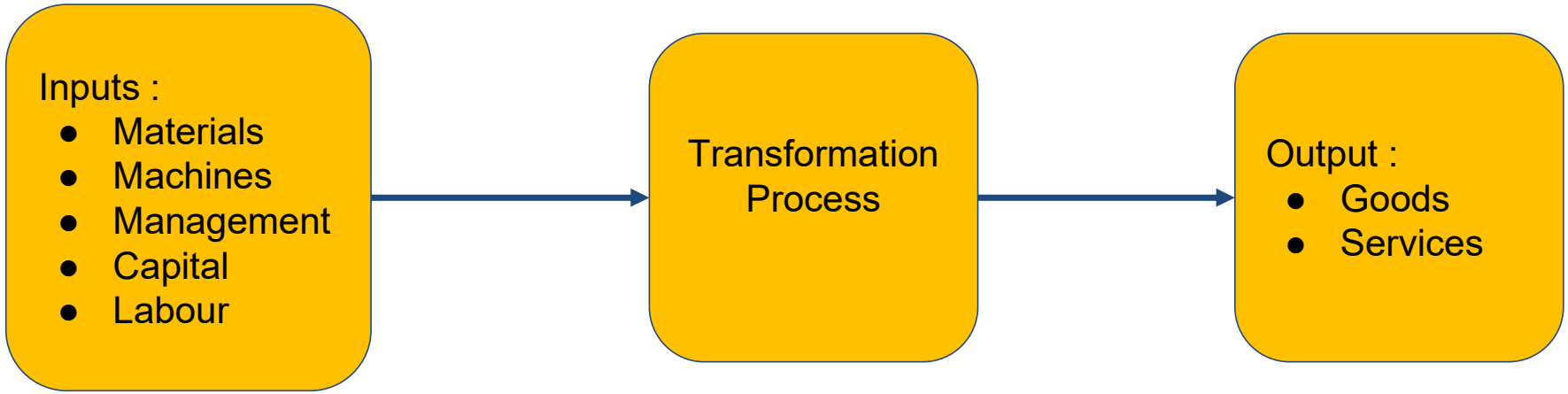
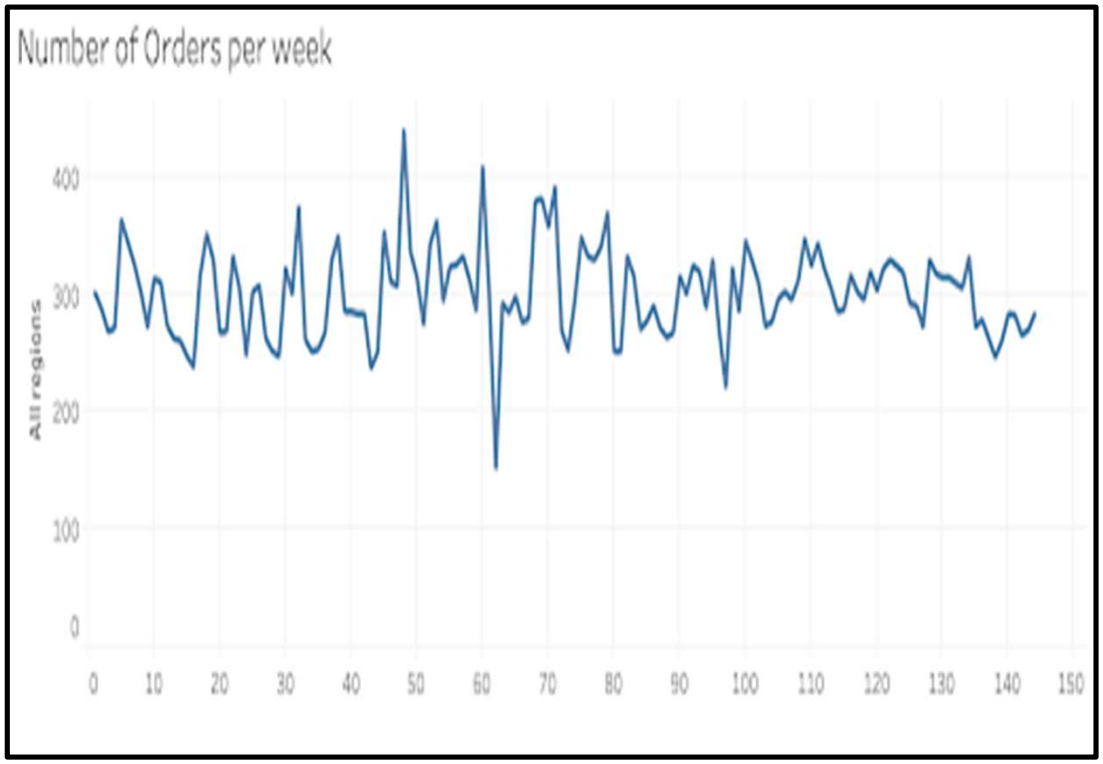
Class Concepts



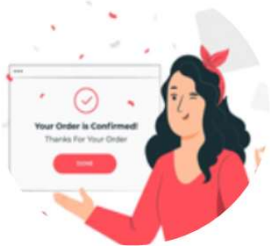
- The production system is the system whose function is to transform an input into a desired output by means of process and of resources.
- The product of these production system is - Tangible goods, Intangible services, combination of both.
- Since there is involvement of objective and constraints (production processes, raw material availability). So this problem can be optimised by linear programming in terms of profit.



- In case of more orders received, then how these order has to send in minimum time and cost(in terms of fuel charge).
- On analysing the previous data available , we can used it to forecast to make future plane.

- Since the forecasting method are never accurate to make the better plane for future. To avoid these we can take the help of some modern technique i.e. machine learning.

Business Model



- Restaurants receive the order and confirms the order

- Customer pays for the order and food gets prepared

- Delivery boy picks the order from restaurant and brings at the IITJ gate

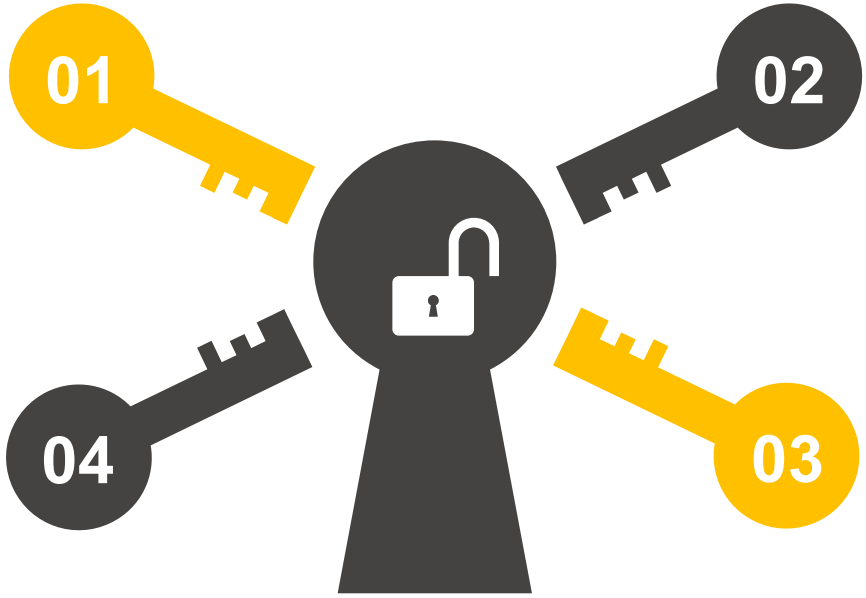
- Customers browse Restaurants and place order .

- Customer (Faculty members , UG, PG)

- From IITJ gate Order get delivered to the resp. customer .

Model Strategy

The main plan is to operate a **three-month trial business** model at a no loss- no profit . We would provide them with a lot of offers and coupons



We will tie up with the restaurants
with a 4-12% commission on each order placed through application/website/WhatsApp.

This all will add up with many factors like handling cost ,petrol charges,human labour cost ,and many more .

Faculty members,UG and PG students are free to browse the website

Optimization of transport and delivery using class concepts

20%

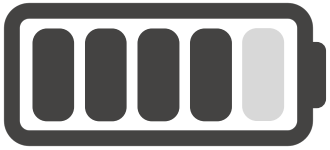
Productivity

40%

Linear programming

60%

Transportation



80%

Assignment

Productivity

productivity is a relationship between the output and input of a business system

linear programming

a linear programming model seeks to maximize or minimize a linear function , subject to a set of linear constraints

transportation

Transportation models deal with problems concerning as to what happens to the effectiveness function when we associate each of a number of origins (sources) with each of a possibly different number of destinations (jobs)

Assignment

Assignment model may be regarded as a special case of transportation model

Optimization of transportation & delivery

1. Grouping

After the orders are received we will divide the restaurants into two clusters using the k-means clustering algorithm with k=2.

2. Route optimization

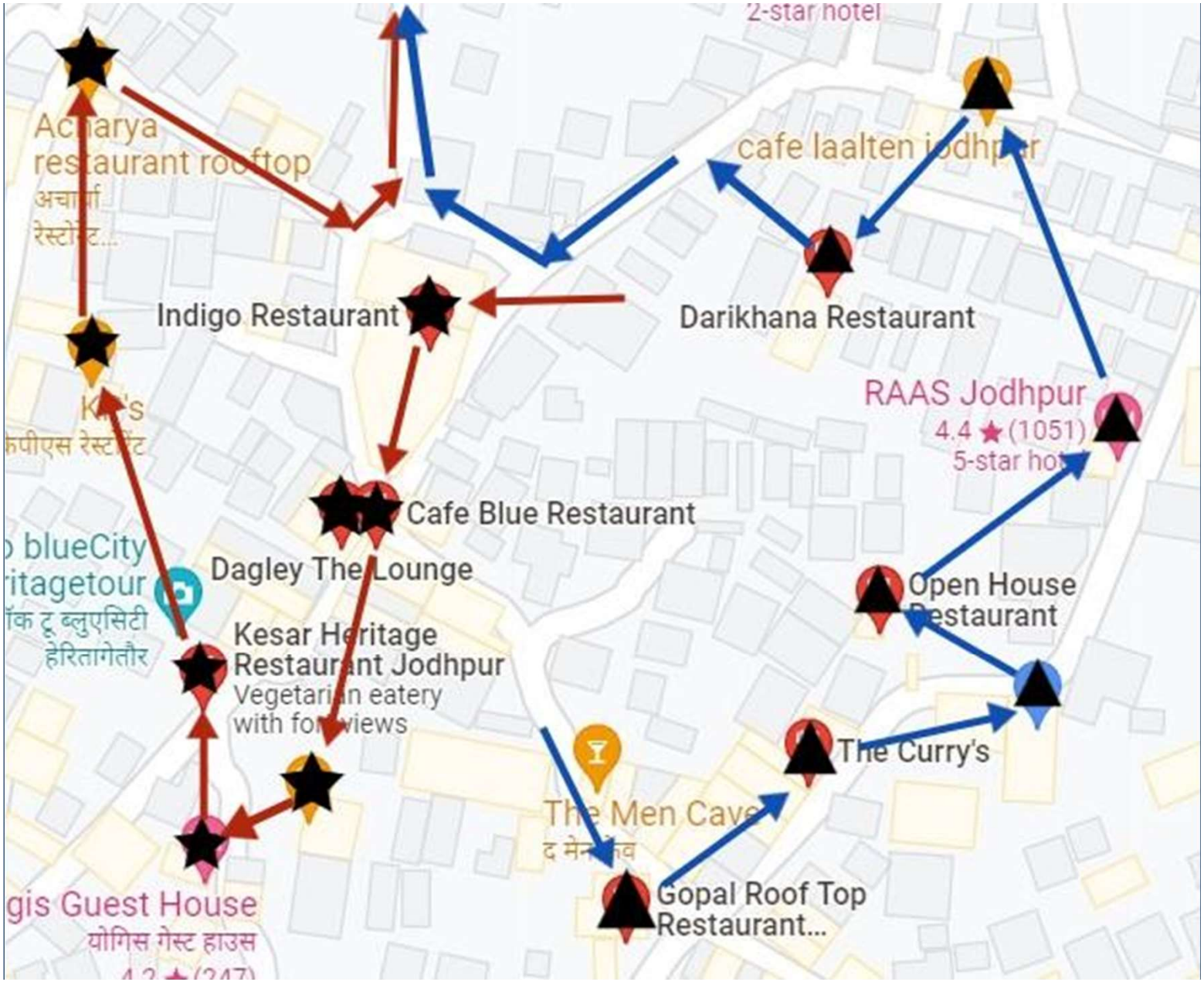
After the clustering is done then our task is to find the optimal route for riders in each cluster. Optimize route can be found using a modified version of the Dijkstra algorithm

3. Assignment

Now riders will be assigned clusters using the Assignment approach of operational research. For k = 3 clusters assignment, the problem looks as follows. Our goal is to minimize the time required to collect the orders

4. Hygiene

Predicted pickup time will be shared with the restaurant. So restaurants can prepare the food around the pickup time of order. Preparing food much before pickup time eventually reduces food quality


2-star hotel
Acharya
restaurant rooftop
अचार्या
रेस्टोरेंट...
cafe laalten jodhpur
Indigo Restaurant
Darikhana Restaurant
RAAS Jodhpur
4.4 ★ (1051)
5-star hot
Cafe Blue Restaurant
blueCity
ritagetour
ॉक टू ब्लुएसिटी
हेरितागेतौर
Dagley The Lounge
Kesar Heritage
Restaurant Jodhpur
Vegetarian eatery
with fo views
Open House
Restaurant
The Curry's
The Men Cave
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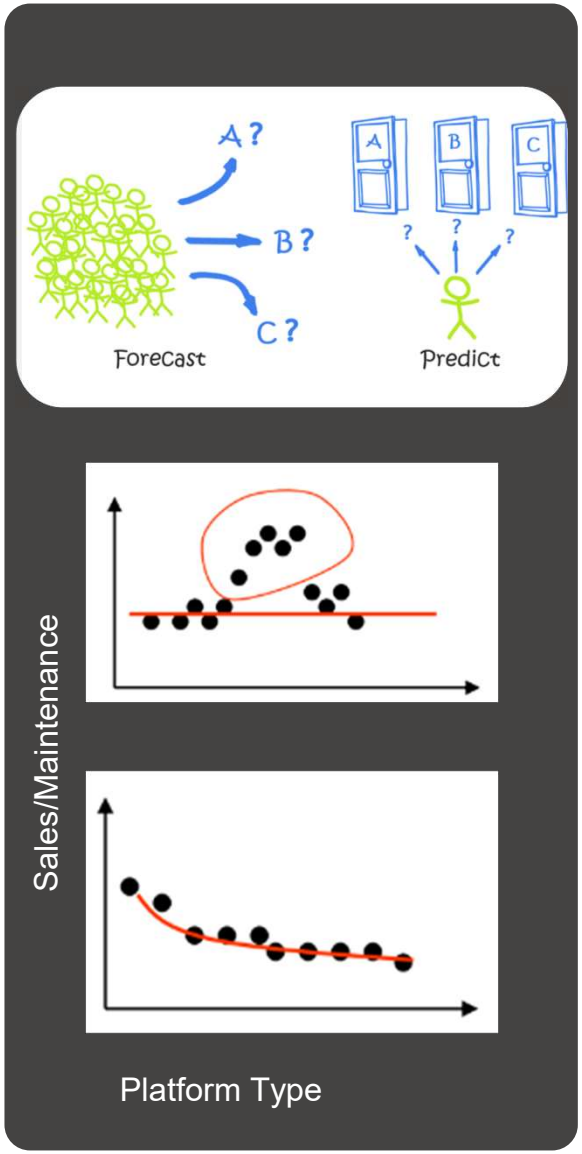
Gopal Roof Top
Restaurant...
gis Guest House
योगिस गेस्ट हाउस



Prediction & Forecasting

(customer acquisition)

Prediction is an estimate of future events made by subjective considerations.

Forecasting is an estimation of a future events which one can make by incorporating and casting forward data related to the past in a pre-determined and systematic manner.

Every business model requires strong customer support in order to keep its balance sheet on a positive incline, achieved by using an intermix of marketing strategies and investing in them efficiently to gain as many customers as possible. We will be using **3 major platforms** for getting orders:

a. Website **b. Smartphone Application** **c. Whatsapp Chatbot**

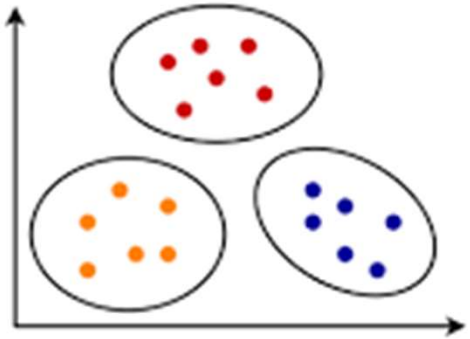
- Maintaining these facilities requires monetary expenditure.
- We will have a 3-month pilot run to get the required dataset which can make it possible to invest in all domains to maximize our interest.
- Initially, we will check the individual contribution of sales vs maintaining the cost of each method to give us a rough idea of which platform is performing better and need more updates and exciting offers to increase sales.
- We will proceed further by using a popular quantitative method known as weighted moving average .

Prediction & Forecasting

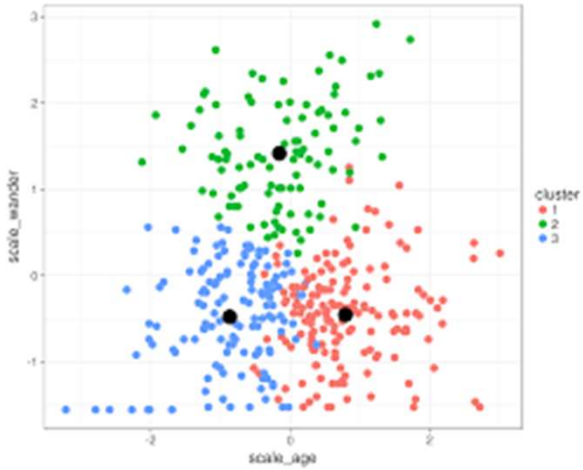
(customer acquisition)

- We are not using other better options like the exponential smoothing method because we lack the amount of data.
- biggest problems we face with forecasting methods is that they are never accurate.
- to avoid these, we can take the help of some modern techniques available such as Machine Learning. Where we will not only focus on platforms acquiring customers but also the type of customers availing our service. We will use the **K-Map clustering algorithm** to segregate customers into 3 major groups:
  1. UG students 2. PG students 3. Faculty/Staff
- On implementing our machine learning algorithm we hope to find a clear graph where we can find which type of customers tend to repeat their visit on our platforms and need more focus for being loyal to us.
- Such small details might not make a huge impact initially but can promise good returns in the long run.
- One major benefit we get from use of machine learning is that with time the amount of data becomes huge and number of factors also increases which increases the amount of computation and such smart tools allow us to manage time properly

Before K-Means



After K-Means



Business Insights with Machine Learning

Why are we using Machine Learning ?

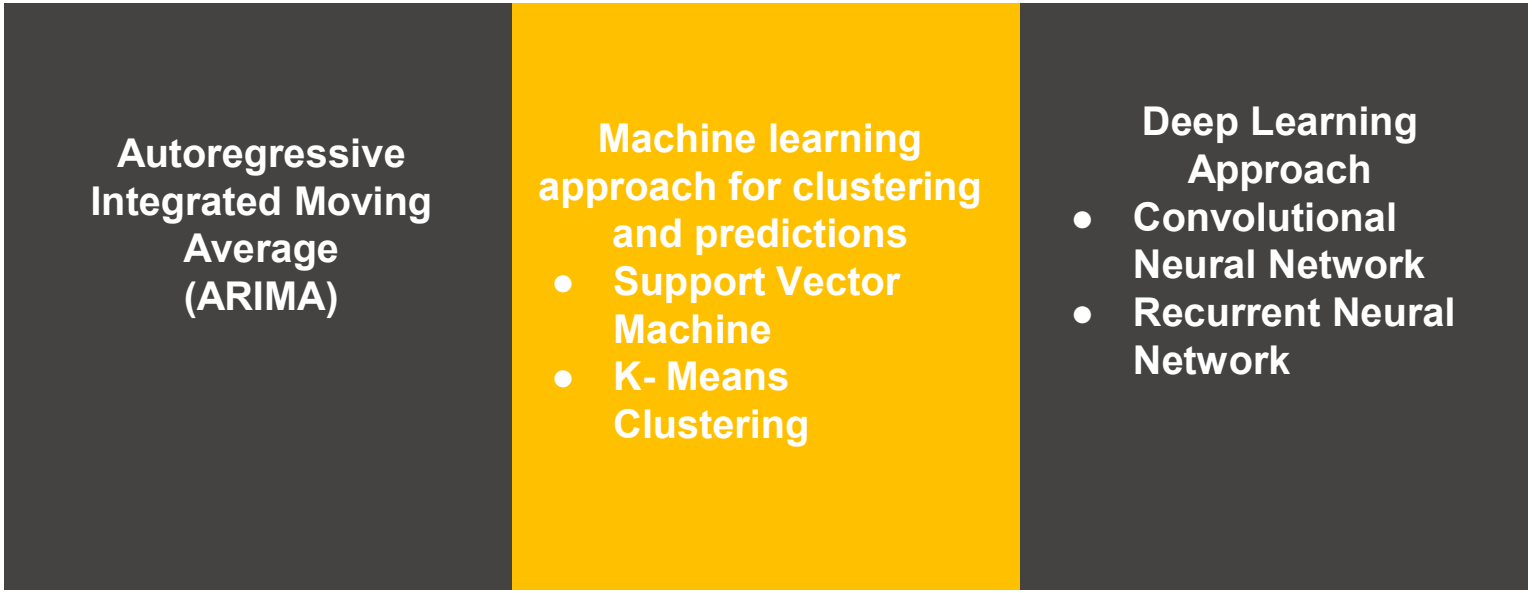
Data generated is huge which cannot be forecasted using using manual techniques and computational efficiency needs to be taken care of.

How our Machine Learning and Data Scientists Team works ?

EDA (Exploratory Data Analysis)	Model Development	Model Evaluation
EDA(Exploratory Data Analysis) on the dataset - Data Visualization and Feature exploration	• **Customer Segmentation** • **Restaurants Segmentation**	**We are using this model to predict which specific traits are continuously going non-profitable. So that over a period of time we could eliminate or modify them.**

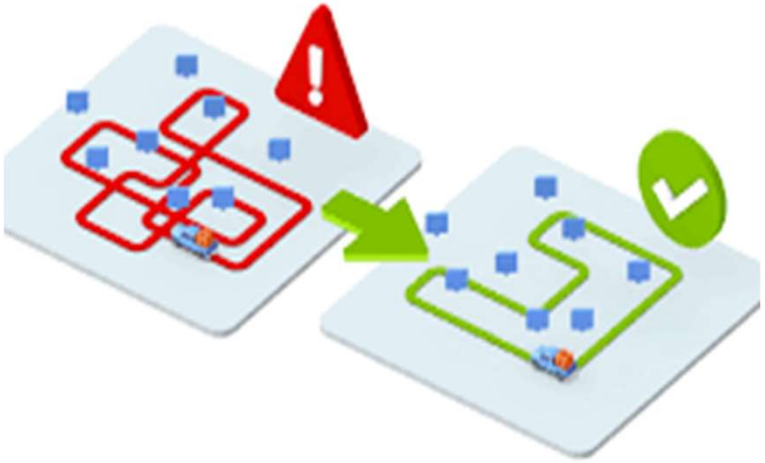
Sales Forecasting using ML

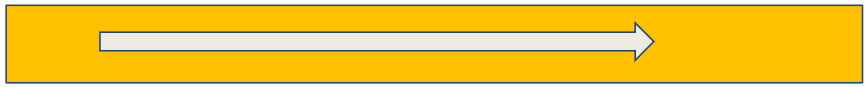
We are using Exponential Smoothing with Trend Adjustment to forecast our sales in order to assure that none of our delivery agents remains vacant or overburdened. However there are possibilities to automate and optimize forecasting using Machine Learning. This could handle multiple traits at the same time without much computational cost.



Food Distribution

- Once the items for the most part are ready, the important step is food distribution in a fairly major way.
- The idea of delivery route optimization will play an important role in reducing the delivery turnaround-time, increasing the number of deliveries in a shift including maximum number of delivery points.





- We are trying to embed route optimization to an extent.

- This doesn't necessarily mean finding the shortest route in a major way. Route planning mostly focuses on minimizing the for all intents and purposes total driving time when making any number of stops, factoring in variables fairly such as: Delivery time windows.

Cost Reduction

For any business to run it's productivity must be greater than 1 (i.e. output/input). One of the best method practiced in every business is reducing costs over expenses & saving money to utilize them for making more products, earning more profit and in other ways like marketing to boost up our business. We have several models which can be used to analyze the data and reduce the cost expensive of our business.

Benefits

- Cost cutting are implemented during financial crisis of business.
- If the whole management team want to earn more profit.
- Although cost reducing may not reduce a large amount of money but still it must be done to save money.

Cost Cutting strategy

Before making any cost-cutting decisions at random, it's crucial to implement a plan. It's critical to categorise expenditures into good(productive), bad(unproductive) and best costs because some costs are necessary.

- Good costs are those that are centred on the company's expansion and are in line with its target for consumer’s needs.
- Bad costs are those that waste resources and do not align with the company's growth goal. When bad costs are reduced, resources that could be used more productively may become available.
- Best costs are those connected to a company's distinctive characteristics, ways it stands out from the competition, and ways it offers genuine value to its clients.