

Product Demand Prediction with Machine Learning

Product Demand Prediction

A product company plans to offer discounts on its product during the upcoming holiday season. The company wants to find the price at which its product can be a better deal compared to its competitors. For this task, the company provided a dataset of past changes in sales based on price changes. You need to train a model that can predict the demand for the product in the market with different price segments.

DATASET :

Dataset Link:

<https://www.kaggle.com/datasets/chakradharmattapalli/product-demand-prediction-with-machine-learning>

ID	Store ID	Total Price	Base Price	Units Sold
1	8091	99.0375	111.8625	20
2	8091	99.0375	99.0375	28
3	8091	133.95	133.95	19
4	8091	133.95	133.95	44
5	8091	141.075	141.075	52
9	8091	227.2875	227.2875	18
10	8091	327.0375	327.0375	47
13	8091	210.9	210.9	50
14	8091	190.2375	234.4125	82
17	8095	99.0375	99.0375	99
18	8095	97.6125	97.6125	120
19	8095	98.325	98.325	40
22	8095	133.2375	133.2375	68
23	8095	133.95	133.95	87
24	8095	139.65	139.65	186
27	8095	236.55	280.0125	54
28	8095	214.4625	214.4625	74
29	8095	266.475	296.4	102
30	8095	173.85	192.375	214

COLUMNS USED

the product id;

store id;

total price at which product was sold;

base price at which product was sold;

Units sold (quantity demanded);

LIBRARIES USED :

The Python 3 environment comes with many helpful analytics libraries installed and several helpful packages to load.

The essential libraries used in this project are :

- Importing OS (for kaggle inputs)
- Numpy and Pandas libraries
- Matplotlib
- Seaborn
- Plotly

TRAIN AND TEST

Training the dataset by describe(), isnull().sum(), drop(), show(), and by using k-means algorithm we train the data

Testing the data by importing sklearn.cluster from k-means with ensuring the plot range and axis labels producing the k value, scattering the data by kmeans.cluster_centers and producing 3D plot.

REST OF THE EXPLANATIONS

Data Collection

The process involves gathering customer data, which includes information about their purchase history, demographics, and interaction patterns.

Data Preprocessing

The task involves preparing and cleaning data, handling missing values, and converting categorical features into numerical representations.

Feature Engineering

Data preparation and cleaning, handling missing values, and the transformation of categorical features into numerical representations are all part of the task.

ALGORITHMS USED

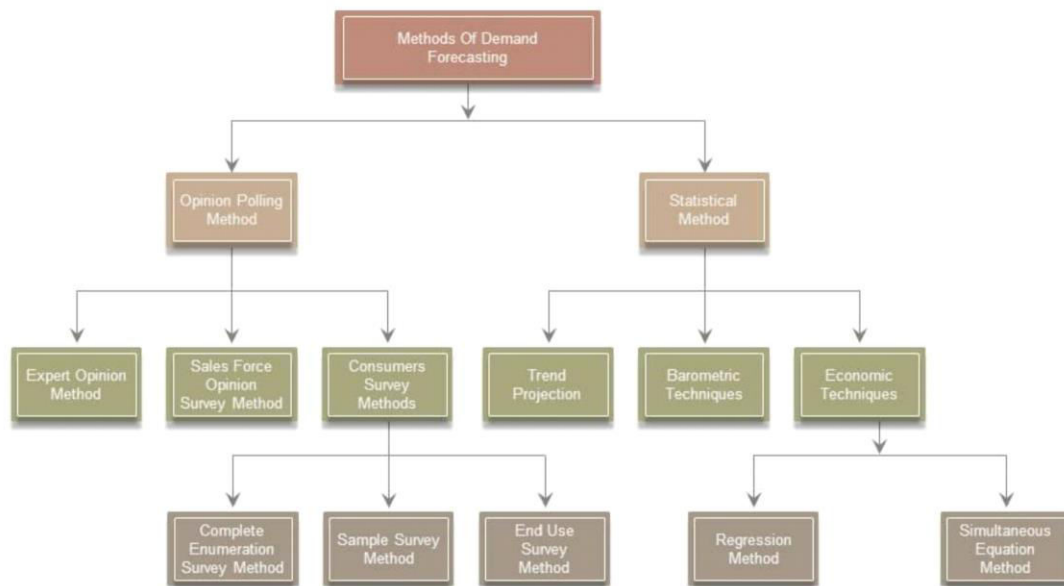
Alorithms like

- ARIMA/SARIMA.
- Regression models.
- XGBoost.
- K-Nearest Neighbors Regression.
- Random Forest.
- Long Short-Term Memory (LSTM), were used

Visualization: Visualize the customer segments using techniques like scatter plots, bar charts, and heatmaps. Interpretation: Analyze and interpret the characteristics of each customer segment to derive actionable insights for marketing strategies.

DESIGN AND DATAFLOW :

Methods of Demand forecasting



Product Demand design

