

TEAM DETAILS:

- 1. 19MIA1005
- 2. 19MIA1066
- 3. 19MIA1069

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CSE3505 - Foundations of Data Analytics

Class ID - CH2022231000351

Slot - L37+L38

Type of the Project - C

PROBLEM STATEMENT

- A fast-food restaurant is a growing business and with time evolving the pattern of eating habits is changing. Therefore, many people have started opting for fast food which is an appealing phenomenon for them.
- In this fast-moving world where the expenses are day by day inclining, it is a must for all the members of the family to work for living. Also many times lot of people shift to other region away from the family in order to earn a living.
- This kind of a rush lifestyle gives a scope for consumption of quick meals which are easily prepared and quickly served which we term as fast-food.
- Lack of fast-food fulfillment to the consumer, excesses of fast food over the estimated demand, and business loss profit caused by inaccurate demand prediction are common nowadays in fast food centers and fast food-based businesses.
- Therefore Fast Food Demand Analytics and Prediction will give us an efficient solution to the problem we are facing.

LITERATURE SURVEY

S. no	TITLE	AUTHOR & YEAR OF PUBLICATION	FINDINGS
1	Demand forecasting in restaurants using machine learning and statistical analysis	TakashiTanizaki TomohiroHoshino TakeshiShimmura TakeshiTakenaka 2019	Demand forecasting in restaurants using machine learning was proposed. Forecasting rate for boosted decision tree is low and other algorithms did not have much difference. The forecast rate did not exceed 85%.
2	Food Demand Prediction Using the Nonlinear Autoregressive Exogenous Neural Network	Krzysztof Lutoslawski Marcin Hernes Joanna Radomska Monika Hajdas Ewa Walaszczyk Agata Kozina 2021	Data science methods, including artificial intelligence methods, was used. The aim of this research was to develop models for food demand prediction based on a nonlinear autoregressive exogenous neural network. The architectures of the developed models differed in the number of hidden layers and the number of neurons in the hidden layers, as well as with different sizes of the delay line, were tested for a given product.

S. no	Title	Author & Year of publication	Findings		
3	Predicting food demand in food courts by decision tree approaches	Ahmet SelmanBozkir Ebru AkcapinarSezer 2010	Three decision tree methods CART, CHAID and Microsoft Decision Trees are utilized. As a result, prediction accuracies up to 0.83 in R2 are achieved.		
4	Data mining on time series: an illustration using fast-food restaurant franchise data	Lon-MuLiu SiddharthaBhattacharyya L.Sclove RongChen William J.Lattyak 2001	This shows how data mining can be applied to such time series, and help the franchise reap the benefits of such an effort. Time series data mining at both the store level and corporate level are discussed. Outlier detection also leads to information that can be used not only for better inventory management and planning, but also to identify potential sales opportunitie as a part of results.		

S. no	Title	Author & Year of publication	Findings
5	Predicting consumer preference for fast-food franchises: a data mining approach	Y Hayashi, M-H Hsieh R Setiono 2009	They evaluated the adequacy of two data mining techniques, decision tree and neural network in analysing consumer preference for a fast-food franchise and to examine the sufficiency of the criteria selected in understanding this preference. The generated rules show that while both decision tree and neural network models can achieve predictive accuracy of more than 80% on the training data samples and more that 70% on the cross-validation data samples
6	FOOD DEMAND PREDICTION USING MACHINE LEARNING	K.Aishwarya,Ais hwarya.N.Rao, Nikita Kumari, AkshitMishra, Mrs.Rashmi M R 2020	The demands depend upon many explicit and hidden context such as season, region etc. The number of order is used to forecast stock of items, using machine learning with internal and external data. They used an appropriate algorithm for demand forecasting which is capable of overpowering the wastage of short life items. Algorithms like Bayesian Linear Regression, LASSO, XGBoost algorithm are used that considerably improves the forecasting performance.

OBJECTIVE

The core agenda of this project is to evaluate the factors of customer satisfaction highlighting the fast-food trend. Furthermore, this project will allow us to know which factor leads to customer satisfaction and also to determine the various factors which influence visiting fast-food outlets. In addition, to this we can discover how satisfied customers decide the trend of fast-food restaurants, what factors make customers satisfied and why they prefer a specific fast-food outlet.

To create an app which will predict the fast food prices and the data analysis of overall consumption.

DATASET

4	А	В	С	D	E	F	G	Н
1	id	week	center_id	meal_id	checkout_price	base_price	num_order	S
2	1379560	1	55	1885	136.83	152.29	177	
3	1466964	1	55	1993	136.83	135.83	270	
4	1346989	1	55	2539	134.86	135.86	189	
5	1338232	1	55	2139	339.5	437.53	54	
6	1448490	1	55	2631	243.5	242.5	40	
7	1270037	1	55	1248	251.23	252.23	28	
8	1191377	1	55	1778	183.36	184.36	190	
9	1499955	1	55	1062	182.36	183.36	391	
10	1025244	1	55	2707	193.06	192.06	472	
11	1054194	1	55	1207	325.92	384.18	676	
12	1469367	1	55	1230	323.01	390	823	
13	1029333	1	55	2322	322.07	388	972	
14	1446016	1	55	2290	311.43	310.43	162	
15	1244647	1	55	1727	445.23	446.23	420	
16	1378227	1	55	1109	264.84	297.79	756	
17	1181556	1	55	2640	282.33	281.33	108	

ALGORITHMS

Using a forecasting algorithm known as CatBoost with a data categorization technique. Fast food demand is affected by several independent variables such as seasonality, trend, price fluctuation, and length of historical data.

A combination of these selected variables was used to calculate demand prediction using parameter tuning in the CatBoost algorithm and other algorithms used for the experiment such as Linear Regression, LGBM, and XGBoost.

NOVELTY

- We will discover how satisfied customers decide the trend of fast-food restaurants, what factors make customers satisfied and why they prefer a specific fast-food outlet.
- To create an app which will predict the fast food prices and the data analysis
 of overall consumption and understand how visualization of a data is very
 important.
- To enhance the results with help of demand forecasting and prediction.

TIMELINE CHART

Review - 1

Introduction to project, literature review, Data Extraction.

Review - 2

Basic Data Analytics and Model Planning, Model Building

Review - 3

Model Evaluation, Creating Website , Upload in Github, Project Report Submission

CONCLUSION

This research is conducted to evaluate the pattern of fast food and customer satisfaction encompassing various factors. The analysis of customer satisfaction encompasses independent variables which lead to consumer satisfaction and showcase the fast-food trend.

A computer system which can predict consumer demand for fast food sector would be highly recommended for many applications in food industry. The aim is to understand as much as possible about consumer demand statistics prediction in the fast-food sector.

REFERENCES

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- 3) Bozkir, Ahmet & Sezer, Ebru. (2011). Predicting food demand in food courts by decision tree approaches. Procedia CS. 3. 759-763. 10.1016/j.procs.2010.12.125.
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- 6) K.Aishwarya1, Rao, A. N., Kumari, N., Mishra, A., & R, R. M. (2020). *FOOD DEMAND PREDICTION USING MACHINE LEARNING*, *07*(06). https://doi.org/International Research Journal of Engineering and Technology (IRJET)

