**PROJECT TITLE:**

PRODUCTION DEMAND PRDICTION USING MACHINE LEARNING

**PROBLEM DEFINITION:**

* 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.

**DESIGN THINKING:**

Data Collection:

The Dataset contain the 5 columns. The columns are ID, STORE ID, TOTAL PRICE, BASE PRICE, UNITS SOLD

Data Preprocessing:

Data Cleaning: Clean the data to remove duplicates, missing values, and outliers.

Feature Engineering:

The feature engineering means, how to select the features for the build the model like chi-square, f-test ,etc..

Model Selection:

The product demand prediction project build by the ML models like supervised and unsupervised algorithms. The algorithms are LOGISTIC REGRESSION, LINEAR REGRESSION, XGBoost ,SVM, RANDOM FOREST , and, etc…

Model Training:

The dataset is split into training and testing set for the model evaluation . the training set size is 80% and testing size 20%.

Model Evaluation:

The all models measure the accuracy score, f1- score, pression and recall and etc.. the high accurate model select the testing data.

**LITERATURE SURVEY:**

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| Title | Methodology | Outcome |
| Forecasting new product demand using machine learning To cite this article | 1. Machine learning 2. Data set description, feature engineering, validation and metric 3. Gradient Boosting | The proposed model satisfies initial conditions because it meets all the requirements – forecasting demand without any marketing research and to work independent of the type of goods and historical data, so the goal of the paper has been achieved. |
| Demand Prediction using Machine Learning Methods and Stacked Generalization | 1. Stacked Generalization 2. Linear Regression 3. Decision Tree Regression 4. Random Forest 5. Gradient Boosted Trees | In this paper, we examine the problem of demand  forecasting on an e-commerce web site. We proposed  stacked generalization method consists of sub-level  regressors. We have also tested results of single classifiers separately together with the general model. |
| AN EFFECTIVE AND REAL TIME PRODUCT DEMAND FORECASTING MODEL USING ML | 1. Machine learning 2. Unsupervised Learning Technique 3. Supervised Learning Technique 4. Random Forest Algorithm 5. Random Forest Algorithm Steps | The contemporary era is characterized by technical growth. Business intelligence (BI) practices are also in great demand. When business intelligence (BI) techniques are integrated throughout an organization,accurate and effective decision support is achieved. |
| Machine Learning in Predicting Demand for Fast-Moving Consumer Goods: An Exploratory Research | 1. Machine learning 2. SVM 3. Extreme Learning Machine (ELM) | The results of this research show that Machine Learning techniques, including the latest methods such as Deep Learning, as well as utilizing a combination of various techniques applied in demand forecasting models, can provide benefits to manufacturers and retailers of fast-moving consumer goods. |

**REFERENCES:**

* Forecasting new product demand using machine learning To cite this article: P S Smirnov and V A Sudakov 2021 J. Phys.: Conf. Ser. 1925 012033 <https://www.researchgate.net/publication/352614910_Forecasting_new_product_demand_using_machine_learning>
* Demand Prediction using Machine Learning Methods and Stacked Generalization Resul Tugay and S¸ule Gund ¨ uz¨ Og¸ ¨ ud¨ uc¨ u¨ Department of Computer Engineering, Istanbul Technical University, Istanbul, Turkey <https://www.scitepress.org/papers/2017/64316/64316.pdf>
* AN EFFECTIVE AND REAL TIME PRODUCT DEMAND FORECASTING MODEL USING ML Niveditha M Shaini S, Shwetha T, Sneha H K, Dr. Natesh M Student, Department Of Computer Science And Engineering, Vidyavardhaka College OfEngineering, Mysore, Karnataka, India. Associate Professor, Department Of Computer Science And Engineering, Vidyavardhaka College Of Engineering, Mysore, Karnataka, India. <https://www.irjmets.com/uploadedfiles/paper/issue_4_april_2022/21003/final/fin_irjmets1650120394.pdf>
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