

Laptop price prediction using machine learning

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ABSTRACT

In the current digital era, laptops are now a necessary tool for work, learning, and leisure. Choosing ideal laptop for your requirements might be difficult with so many alternatives on the market. One of the biggest online retailers in India, Flipkart, has a huge assortment of laptops at different price points and brands. The dataset offers comprehensive details about one thousand laptops that are sold on Flipkart, including pricing, consumer ratings and reviews, and technical specs. Selecting the ideal laptop for a consumer's needs can be difficult as laptops become a necessary tool for business, education, and leisure. Using this extensive dataset, the project employs Decision Tree, Random Forest, and SVM and Regression to predict the laptop pricing depending on requirements by putting Regression models into practice and comparing the models.

A laptop's Costs can differ significantly based on a number of criteria, including storage capacity, memory, CPU speed, and brand. Predicting laptop pricing with accuracy is crucial for manufacturers, retailers, and customers alike. If the assistance of the project, an artificial intelligence model that predicts laptop prices According to specifications will be created.

keywords: Decision Tree, Regression Model, Random Forest, SVM

I. INTRODUCTION

Prediction of laptop prices It's critical to comprehend the features that can affect a laptop's expense when utilizing machine learning attribute such as CPU type, Screen size, RAM amount, and storage capacity graphics card, and reputation of the brand. These attributes are analysing together with how they relate to the dataset's laptop pricing for artificial intelligences models to function.

In order to forecast fresh, unseen data, the model uses patterns it has learned from the data. Before supplying the data to the model, it is essential to Pre Process it, deal with missing values, encode categorical variables, and scale numerical characteristics. Regression model are popular method in robotic learning for jobs involving price prediction. A model that predicts laptop pricing can be constructed using algorithms such asselection Tree and Random Forest Regression Analysis, or Linear Regression. The laptop market is dynamic and fiercely competitive, with new models and technology appearing on a regular basis. The need for laptops has grown dramatically as online learning and remote employment have become more popular. But finding a laptop that fits your demands and price range might be difficult. Predictive Model and data-driven decision-making have transformed numerous industries through application of computer learning, a portion of synthetic intelligence. Algorithms for machine learning can be trained on past data to forecast future laptop prices depending on different attributes and specs.

Creating a dataset with laptop specifications (brand, processor, RAM, storage, etc.) and associated costs is the initial action in the procedure. Next, this dataset is divided into training. After that, this dataset is divided into testing and training sets. To determine how well it predicts, the model is tested on a different set after being trained on the training set. After training the model, you can use it to forecast the price by feeding in the specifications of a new laptop. Recall that the quality of the dataset, the characteristics used, and the method employed all have a noteworthy effect on the prediction's accuracy.

II. LITERATURE SURVEY

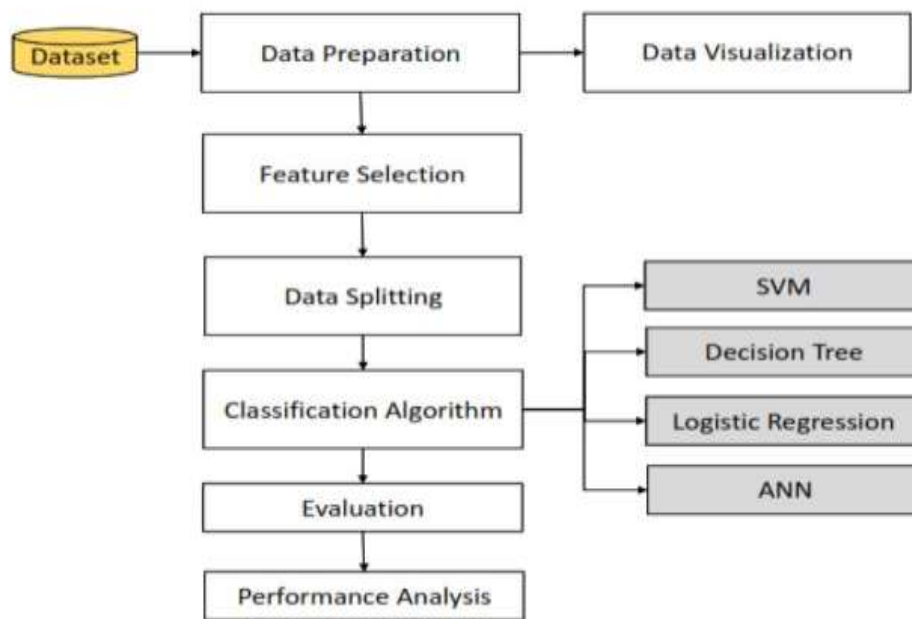
Many studies have looked into the prediction of laptop prices. They have found that a regression model utilizing decision trees and Random Forest Regression can more accurately predict the price of a leased laptop than multivariate or even basic multiple regression. This is because the Random Forest Algorithm is less likely to overfit or underfit datasets and performs better when dealing with datasets with more dimensions. This study's flaw is that fundamental metrics like mean, variance, and standard deviation did not demonstrate a shift from basic regression to more sophisticated Random Forest Algorithm regression.

Studies addressing the significance of feature selection, data pre-processing strategies,

and model evaluation methodologies in precisely forecasting laptop prices may be found in the literature. Researchers frequently evaluate many algorithms to see which one works best in terms of efficiency and prediction accuracy.

In addition, some research concentrate on managing categorical variables, outliers, and missing data in the dataset to enhance prediction performance. The impact of various characteristics on the final price forecast and the interpretation of machine learning model findings are also covered. In general, a review of the literature on machine learning approaches, difficulties, and developments in this area would provide insights into how machine learning might be used to accurately and consistently estimate laptop costs.

III. METHOLOGIES



3.1 Data collection

Collect information from a range of sources including third-party databases, manufacturer websites, online stores, and user evaluations. Provide details on the laptop's brand, customer reviews, screen size, RAM, CPU, and storage capacity, among other things.

3.2 Data Pre-processing

Handling missing values, eliminating duplicates, and fixing data inconsistencies normalizing and scaling numerical features to

provide a consistent large Categorical data (like brand and operating system) can be encoded. Text data (like processor name) can be converted into numerical representations.

3.3 Exploratory data analysis

Plots and charts are used in visualization to help comprehend data distribution and the relationship between features. Important approaches for features selection are used to find the features that have the biggest influence on

laptop prices through techniques like correlation analysis.

3.4 Model selection

Choose an appropriate machine learning algorithm for regression tasks, such as:

- Linear Regression: One machine learning technique for supervised learning is linear regression. Targets as dependent variables are predicted using linear regression using the provided independent variable(s) as a basis. This regression technique, then, determines if a dependent variable and the other independent variables have a linear connection. Linear Regression is the name given to this algorithm.
- Decision Trees: Decision tree models are applicable to any type of data that includes both category and numerical variables. When it comes to capturing non-linear interactions between characteristics and the target variable, decision trees excel. Decision trees make data interpretation highly intuitive since they roughly correspond to human thought processes
- Random Forest: Decision trees are grouped together to form Random Forests. It is a regression and classification technique based on supervised learning. Multiple decision trees are applied to the input data. It works by building a variable number of decision trees during the training phase and producing a class that is the mean prediction (for regression) or the mode of the classes (for classification) of each individual tree.
- Support vector regression: Similar in concept to SVM, SVR attempts to predict actual

values. To separate the data, this technique makes use of hyperplanes. If this separation is not achievable, a kernel trick is used, in which the dimension is raised and the data points can then be separated using a hyperplane.

3.5 Model training

The information sets must first be split into training and testing, with the response variable going to Y and the predictor variable going to X. Now, the data needs to be split in an 80:20 ratio. Eighty percent of the data between the data will be used as model instructions, and twenty percent of the information within will be used for testing.

3.6 Evaluation

In order to evaluate laptop price prediction using machine learning, one must estimate the effectiveness of algorithms that have been trained on past data in order to anticipate future prices. The Root Mean Squared Percentage Error (RMSPE), Mean Absolute Error (MAPE), Mean Squared Error (MSE), Coefficient of Determination (R-squared), and Mean Absolute Error (MAE) are important metrics model's accuracy and dependability increase with the optimization of these indicators and strategies.

3.7 Deployment

Use the model to implement a system or application in the actual world where it can forecast prices based on fresh data. Maintain accuracy over time by continuously monitoring the model's performance and updating it as necessary.

IV. RESULT AND DISCUSSION

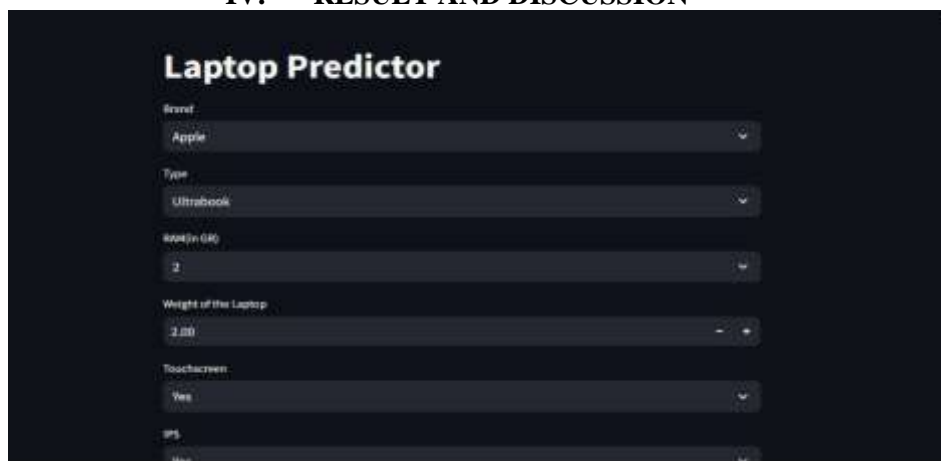


Fig (2)

In the above figure shows the dashboard of laptop price prediction in our system using Stream lit



Fig (3)

In above figure shows the laptop price prediction

V. CONCLUSION

In conclusion, machine learning-based laptop price prediction is a potent use of robotic intelligence could be beneficial both buyers and sellers in the market. The model can anticipate prices depending on the range of features with accuracy thanks to the utilization of sophisticated algorithms and historical data. The accuracy and utility of the model can be further increased by ongoing development and future improvements, such as adding new features and utilizing sophisticated models. The system is a useful tool in the market since it can offer customized recommendations, describe how it makes decisions, and change prices instantly. The model can adjust and improve as the market changes, making it a dependable and trustworthy tool for predicting laptop prices.

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