Mini Project Report

On

Laptop Price Predictor Using Machine Learning

2022-2023

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Session :- 2022-23

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Certificate

Certified that Ashish Joshi(Class Roll No : 17) has Developed a Mini Project on “Laptop Price Prediction Using Machine Learning” for the CS 5th Semester Mini Project in Graphic Era Hill University , Dehradun. The Project Carried out by students is their own work as best of my knowledge.

Class Co-Ordinator

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Introduction

1.1-Introduction

As the country have been evolved into high end technology, the peoples are getting more attracted towards the tech appliances. Everything is being done by the use of laptops. As many people utilize laptop as an investment. On the other hand, other people all over the world are purchasing laptop as their primary means of working. We are aware that, along with other necessities like mobile phones, a laptop is also a most important need for a person. Support vector regression, artificial neural networks, and other machine learning models, among others, can all be used to predict **Laptop Prices**.

Every year, Laptop prices rise indirectly because of rising demand of laptops. The main problem comes out when there are many variables such as the Screen Size, RAM, Processor and Secondary Storage that may impact the price of laptop that's why most Peoples including buyers, sellers and the developers, would like to know the exact features or the accurate factors manipulate the laptop price to help buyers to make the decision to buy their laptops on the basis of their budgets.
The Price prediction of the Laptop is done using different Machine Learning algorithms like Linear Regression, Decision Tree Regression, K- Means Regression, and Random Forest Regression.

1.2-What is Laptop Price Prediction?

The Laptop Price Prediction of the laptop is done to predict laptop prices. This work applies various techniques such as features, labels, reduction techniques, and transformation techniques such as attribute combinations set missing attributes as well as looking for new correlations.

The use of linear regression was supported by the investigation's findings. utilizing machine learning techniques such as linear regression, decision tree regression, K-Means regression, and random forest regression. This will make it easier for people to fund a bequest without turning to a broker.

1.3-About project

The Price Prediction of laptop is done using different Machine Learning algorithms like Linear Regression, Decision Tree Regression, K- Means

Regression, and Random Forest Regression. 80% of data from the known dataset is used for training purposes and the remaining 20% of data is used for testing purposes.

Regression is a machine learning technique that encourages you to generate predictions by incorporating connections between your goal parameter and numerous independent parameters into the existing quantifiable assessable facts. This definition states that factors like the Brand of a laptop, Screen Size of laptop, and other factors like Primary Memory etc. We determine the value of each laptop in each configuration if we use forged, knowing how to this parameter. Not only is this regression model created to forecast the price of a laptop that is already on the market, but it also does so for laptop that are still being built.

Attribute: The two types of laptop price predictions are those that emphasize the laptop's attributes in the first and the model's performance in the second. Three groups of variables can be used to categorize laptop price influences: Brand Name, Primary Memory, and Processor.

1. Brand Name- Brand Name is considered the most important characteristic in determining laptop prices. In his study, he also observed the importance of Brand Name attributes in deciding laptop prices. Secondary Memory is another important feature that influences the price of laptop.

2. Primary Memory- The Primary Memory is a characteristic that plays a very important role deciding the price of a laptop. Increase in the values of Primary Memory in the specification will increase the price of a laptop if other attributes are taken as same. Screen Size is also the deciding factor for the price of a laptop.

3. Processor- The Processor also plays an important role in the prediction of the price of a laptop. The processor along with the generation of the system together makes impact in the price of a laptop.

Requirements of project

2.1-Hardware requirements

Device specifications-

Processor- 11th Gen Intel(R) Core(TM) i5-1135G7 @ 2.40GHz 2.42 GHz

Installed RAM- 8.00 GB

System type: 64-bit operating system, x64-based processor

Windows specifications

Edition-Windows 11 Home Single Language

Installed on- 9/30/2022

OS build- 22621.1105

2.2-Software requirements

These are the libraries/framework which should be installed in your system.

- You should have python (the latest version) installed.
- You should have a code editor (like vs code, eclipse, pycharm).

2.3-Jupyter Notebook

The Jupyter Notebook is the original web application for creating and sharing computational documents. It offers a simple, streamlined, document-centric experience.

2.4-Libraries Used

Libraries includes Pandas, Numpy, Matplotlib, Seaborn etc. used for the prediction.

Streamlit, Pickle libraries are used in making the GUI(Graphical User Interface).

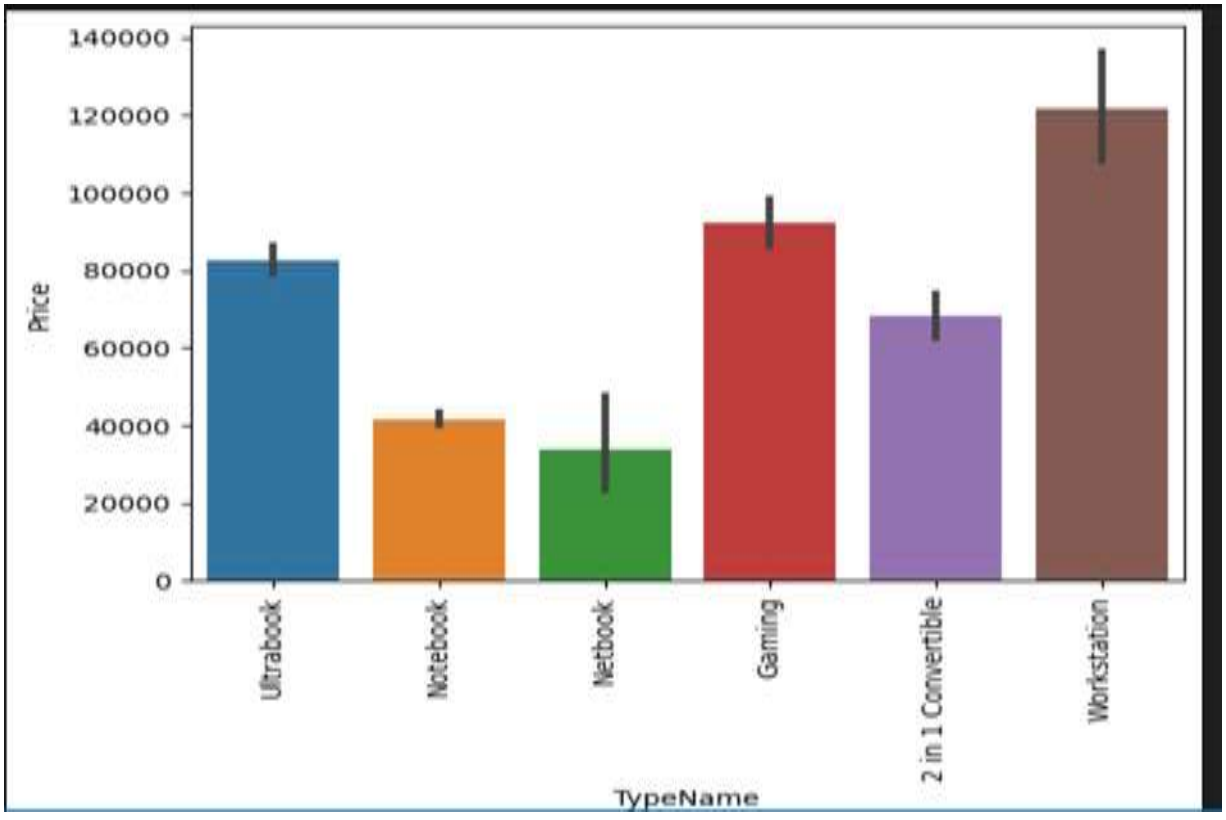
Tools used for project

3.1-Tools

JupyterLab is the latest web-based interactive development environment for notebooks, code, and data. Its flexible interface allows users to configure and arrange workflows in data science, scientific computing, computational journalism, and machine learning. A modular design invites extensions to expand and enrich functionality.

Linear regression analysis is used to predict the value of a variable based on the value of another variable. The variable you want to predict is called the dependent variable. The variable you are using to predict the other variable's value is called the independent variable.

This form of analysis estimates the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variable. Linear regression fits a straight line or surface that minimizes the discrepancies between predicted and actual output values. There are simple linear regression calculators that use a “least squares” method to discover the best-fit line for a set of paired data. You then estimate the value of X (dependent variable) from Y (independent variable).



Output

```
df
```

Python

	Company	TypeName	Ram	Weight	Price	Touchscreen	Ips	ppi	Cpu brand	HDD	SSD	Gpu brand	os
0	Apple	Ultrabook	8	1.37	71378.6832	0	1	226.983005	Intel Core i5	0	128	Intel	Mac
1	Apple	Ultrabook	8	1.34	47895.5232	0	0	127.677940	Intel Core i5	0	0	Intel	Mac
2	HP	Notebook	8	1.86	30636.0000	0	0	141.211998	Intel Core i5	0	256	Intel	Others/No OS/Linux
3	Apple	Ultrabook	16	1.83	135195.3360	0	1	220.534624	Intel Core i7	0	512	AMD	Mac
4	Apple	Ultrabook	8	1.37	96095.8080	0	1	226.983005	Intel Core i5	0	256	Intel	Mac
...	...	...	...	...	...	...	...	...	...	...	...	...	...
1298	Lenovo	2 in 1 Convertible	4	1.80	33992.6400	1	1	157.350512	Intel Core i7	0	128	Intel	Windows
1299	Lenovo	2 in 1 Convertible	16	1.30	79866.7200	1	1	276.053530	Intel Core i7	0	512	Intel	Windows
1300	Lenovo	Notebook	2	1.50	12201.1200	0	0	111.935204	Other Intel Processor	0	0	Intel	Windows
1301	HP	Notebook	6	2.19	40705.9200	0	0	100.454670	Intel Core i7	1000	0	AMD	Windows

Prediction of the model-

Linear regression

```
step1 = ColumnTransformer(transformers=[
    ('col_tnf',OneHotEncoder(sparse=False,drop='first'),[0,1,7,10,11])
],remainder='passthrough')

step2 = LinearRegression()

pipe = Pipeline([
    ('step1',step1),
    ('step2',step2)
])

pipe.fit(X_train,y_train)

y_pred = pipe.predict(X_test)

print('R2 score',r2_score(y_test,y_pred))
print('MAE',mean_absolute_error(y_test,y_pred))
```

KNN

```
step1 = ColumnTransformer(transformers=[
    ('col_tnf',OneHotEncoder(sparse=False,drop='first'),[0,1,7,10,11])
],remainder='passthrough')

step2 = KNeighborsRegressor(n_neighbors=3)

pipe = Pipeline([
    ('step1',step1),
    ('step2',step2)
])

pipe.fit(X_train,y_train)

y_pred = pipe.predict(X_test)

print('R2 score',r2_score(y_test,y_pred))
print('MAE',mean_absolute_error(y_test,y_pred))
```

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.15,random_state=2)
```

Python

```
X_train
```

Python

	Company	TypeName	Ram	Weight	Touchscreen	Ips	ppi	Cpu brand	HDD	SSD	Gpu brand	os
183	Toshiba	Notebook	8	2.00	0	0	100.454670	Intel Core i5	0	128	Intel	Windows
1141	MSI	Gaming	8	2.40	0	0	141.211998	Intel Core i7	1000	128	Nvidia	Windows
1049	Asus	Netbook	4	1.20	0	0	135.094211	Other Intel Processor	0	0	Intel	Others/No OS/Linux
1020	Dell	2 in 1 Convertible	4	2.08	1	1	141.211998	Intel Core i3	1000	0	Intel	Windows
878	Dell	Notebook	4	2.18	0	0	141.211998	Intel Core i5	1000	128	Nvidia	Windows
...	...	...	...	...	...	...	...	...	...	...	...	...

Conclusion

We have successfully developed our project on Laptop Price Prediction.

In this, we have taken use of Jupyter Notebook and Python, other machine learning algorithms for the training and testing of the model. In this, we have a linear regression algorithm to predict the prices.

Goals-

- To make it more effective use of the model.