

Ahsanullah University of Science and Technology



Department of Computer Science and Engineering

Program: Bachelor of Science in Computer Science and Engineering

Course No: CSE 4108

Course Title: Artificial Intelligence Lab

Project Report On: Laptop Price Prediction

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Introduction:

Based on many practical characteristics of laptops from different companies, we will provide pricing predictions. Customers will find it easier to choose the right laptop for them and the best laptop configuration for their needs while keeping their budget in mind.

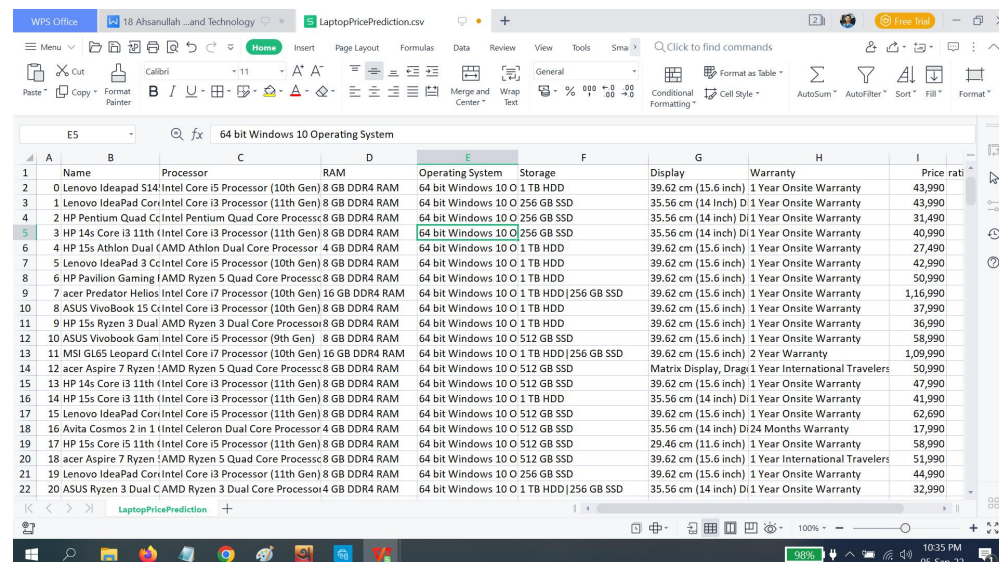
We created a dataset mergeing ours and an existing dataset and then split it into 67/33 train-test and subsequently tested the accuracy of our findings after applying various machine learning methods.

Dataset:

We have collected data from startech, ryanscomputers and some online shops. And Also from Kaggle.

Number of rows: 550

Number of attributes: 10



The screenshot shows a WPS Office spreadsheet titled "LaptopPricePrediction.csv". The spreadsheet contains a list of 22 laptops with their specifications and prices. The columns are labeled A through I, representing Name, Processor, RAM, Operating System, Storage, Display, Warranty, and Price ratio. The data is as follows:

	A	B	C	D	E	F	G	H	I
	Name	Processor	RAM	Operating System	Storage	Display	Warranty	Price ratio	
1	0	Lenovo Ideapad S14	Intel Core i5 Processor (10th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	43,990	
2	1	Lenovo IdeaPad Core	Intel Core i3 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 256 GB SSD	35.56 cm (14 inch) D	1 Year Onsite Warranty	43,990	
3	2	HP Pentium Quad C	Intel Pentium Quad Core Process	8 GB DDR4 RAM	64 bit Windows 10 O 256 GB SSD	35.56 cm (14 inch) D	1 Year Onsite Warranty	31,490	
4	3	HP 14s Core i3 11th	(Intel Core i3 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 256 GB SSD	35.56 cm (14 inch) D	1 Year Onsite Warranty	40,990	
5	4	HP 15s Athlon Dual	(AMD Athlon Dual Core Processor	4 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	27,490	
6	5	Lenovo IdeaPad 3 C	Intel Core i5 Processor (10th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	42,990	
7	6	HP Pavilion Gaming	(AMD Ryzen 5 Quad Core Process	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	50,990	
8	7	acer Predator Helios	Intel Core i7 Processor (10th Gen)	16 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD 256 GB SSD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	1,16,990	
9	8	ASUS VivoBook 15	C Intel Core i3 Processor (10th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	37,990	
10	9	HP 15s Ryzen 3	Dual AMD Ryzen 3 Dual Core Processor	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	36,990	
11	10	ASUS Vivobook Gam	Intel Core i5 Processor (9th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	58,990	
12	11	MSI GL65 Leopard C	Intel Core i7 Processor (10th Gen)	16 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD 256 GB SSD	39.62 cm (15.6 inch)	2 Year Warranty	1,09,990	
13	12	acer Aspire 7	AMD Ryzen 5 Quad Core Process	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	Matrix Display, Drag	1 Year International Travelers	50,990	
14	13	HP 14s Core i3 11th	(Intel Core i3 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	47,990	
15	14	HP 15s Core i3 11th	(Intel Core i3 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD	35.56 cm (14 inch) D	1 Year Onsite Warranty	41,990	
16	15	Lenovo IdeaPad Core	Intel Core i5 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	62,690	
17	16	Avita Cosmos 2 in 1	(Intel Celeron Dual Core Processor	4 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	35.56 cm (14 inch) D	24 Months Warranty	17,990	
18	17	HP 15s Core i5 11th	(AMD Ryzen 5 Quad Core Process	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	29.46 cm (11.6 inch)	1 Year Onsite Warranty	58,990	
19	18	acer Aspire 7	AMD Ryzen 5 Quad Core Process	8 GB DDR4 RAM	64 bit Windows 10 O 512 GB SSD	39.62 cm (15.6 inch)	1 Year International Travelers	51,990	
20	19	Lenovo IdeaPad Core	Intel Core i3 Processor (11th Gen)	8 GB DDR4 RAM	64 bit Windows 10 O 256 GB SSD	39.62 cm (15.6 inch)	1 Year Onsite Warranty	44,990	
21	20	ASUS Ryzen 3 Dual	C AMD Ryzen 3 Dual Core Process	4 GB DDR4 RAM	64 bit Windows 10 O 1 TB HDD 256 GB SSD	35.56 cm (14 inch) D	1 Year Onsite Warranty	32,990	

ML Model:

- **Linear Regression**

Linear Regression is a machine learning algorithm based on supervised learning. It performs a regression task. Regression models a target prediction value based on independent variables. It is mostly used for finding out the relationship between variables and forecasting.

- **KNearestNeighbours**

KNN regression is a non-parametric method that, in an intuitive manner, approximates the association between independent variables and the continuous outcome by averaging the observations in the same neighborhood. The size of the neighborhood needs to be set by the analyst or can be chosen using cross-validation to select the size that minimizes the mean-squared error.

- **Random Forest**

Random Forest is a popular machine learning algorithm that belongs to the supervised learning technique. It can be used for both Classification and Regression problems in ML.

- **Gradient Boosting**

Gradient Boosting is a popular boosting algorithm. In gradient boosting, each predictor corrects its predecessor's error. In contrast to Adaboost, the weights of the training instances are not tweaked, instead, each predictor is trained using the residual errors of predecessor as labels.

- **Extra Trees**

Extra Trees is an ensemble machine learning algorithm that combines the predictions from many decision trees.

It is related to the widely used random forest algorithm. It can often achieve as-good or better performance than the random forest algorithm, although it uses a simpler algorithm to construct the decision trees used as members of the ensemble.

- **Voting regressor**

A voting regressor is an ensemble meta-estimator that fits several base regressors, each on the whole dataset. Then it averages the individual predictions to form a final prediction.

Comparison of Performance Scores:

Name of Algorithm	Mean Absolute Error	Mean Squared Error(%)	Root Mean Square Error	Root Mean Square Error(%)	R2 Score
Linear Regression	21239.45 64766006	26.10419 891517	30500.47 81749812 9	37.4863 9001967	0.5242991 208967516
K Nearest Neighbor	27520.94 83516483	33.82442 06435879	40623.31 61512092 6	49.9277 9012841	0.1561380 531365369
Random Forest	23801.35 08869701	29.25287 65360767	34109.20 99495002 4	41.9216 7546011	0.4050725 904325450
Gradient Boosting	22402.38 09354683	27.53348 27309391	31848.29 70771922 2	39.1429 1700112	0.4813276 591312762
Extra Tree	26387.48 56593406	32.43134 65969178	37675.23 32169625 44	46.3044 7032176	0.2741739 408374113
Voting Regressor	21567.92 83303520	26.50790 48488855	30996.95 77438005 8	38.0965 8460897	0.5086863 837708089

Linear Regression performed better than other models

Discussion:

If we train our model with a larger datasets, we can achieve even better results.