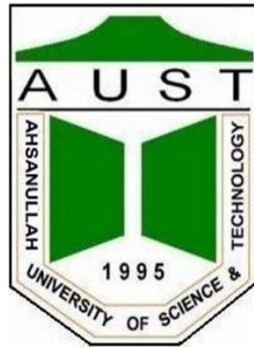


# Ahsanullah University of Science and Technology



Department of Computer Science and Engineering  
Program: Bachelor of Science in Computer Science and Engineering

## Monitor Price Prediction in Bangladesh

Course No: CSE 4108

Course Title: Artificial Intelligence Lab

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## Description Of The Topic:

In this project, we are predicting the Monitor price based on Different features of monitors. For Monitor price analysis, we have collected necessary data of Monitor from Different websites. We have pre-processed the data and extracted selected features. Further from there, we used various Machine learning algorithms to provide efficient prediction of Monitor price from selected features of our dataset. We have also shown differences in the result of evaluation metrics of multiple machine learning algorithms to provide a clear idea about which model suits the scenario best.

## Brief Description Of The Dataset:

The dataset contains 10 attributes such as: Brand Name, Display Type, Display Resolution, Display size, Response Time, Refresh Rate, Brightness , Power-Consumption ,Warranty ,Price .We have collected proper data for these columns from popular websites of Ryans-Computer, Techland etc . We have collected 5 different brands of Monitors information .They are Asus, HP, Dell, Samsung and LG.The dataset contains 294 samples.

## Description Of The Used ML Models:

- 1) **Linear Regression** is a linear approach to modeling the relationship between a scalar response (or dependent variable) and one or more explanatory variables (or independent variables). The case of one explanatory variable is called simple linear regression.
- 2) **Support Vector Regression** or SVR is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning. Linear SVM is used for linearly separable data, which means if a dataset can be classified into two classes by using a single straight line, then such data is termed as linearly separable data, and classifier is used called as Linear SVM classifier. In SVR ,the objective is to consider the points that are within the decision boundary line. The best fit line is the hyperplane that has a maximum number of points.
- 3) **DecisionTreeRegressor** Decision tree builds regression or classification models in the form of a tree structure. It breaks down a dataset into smaller and smaller subsets while at the same time an associated decision tree is incrementally developed. The final result is a tree with **decision nodes** and **leaf nodes**. In case of regression ,the core algorithm for building decision trees called ID3 which employs a top down,greedy approach through the space of possible branches with no backtracking . This algorithm has low bias and high variance.
- 4) **Lasso Regression** It is a regularization technique. It is used over regression methods for a more accurate prediction. This model uses shrinkage. Shrinkage is where data values are shrunk towards central point as the mean. The lasso procedure encourages simple, sparse models (i.e. models with fewer parameters). This particular type of regression is well-suited for models showing high levels of multicollinearity or when you want to automate certain parts of model selection, like variable selection/parameter elimination. Lasso Regression uses L1 regularization technique. It is used when we have more number of features because it automatically performs feature selection.

- 5) **Random Forest** is one of the most popular model. Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks, that operate by constructing a multiple of decision trees at training time and outputting the class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. In case of Random forest regression model the average value of multiple decision tree is taken as output.
- 6) **K-Nearest Neighbor** K-nearest neighbors (KNN) is a type of supervised learning algorithm used for both regression and classification. KNN tries to predict the correct class for the test data by calculating the distance between the test data and all the training points.

#### Comparison of the performance scores of the models:

##### Training Data:

No.	ML Models	RMSE Score	MAE Score	MSE Score	R2 Score
1	Linear Regression	0.524	0.119	0.026	0.524
2	Lasso Regression	0.034	0.132	0.034	0.527
3	Decision Tree Regressor	0.00032	0.0033	0.00032	0.994
4	Random Forest	0.0031	0.0382	0.0031	0.943
5	SVR	0.018	0.098	0.018	0.671
6	KNN	0.022	0.114	0.022	0.586

##### Testing Data:

No.	ML Models	RMSE Score	MAE Score	MSE Score	R2 Score
1	Linear Regression	0.034	0.132	0.034	0.527
2	Lasso Regression	0.052	0.123	0.045	0.534
3	Decision Tree Regressor	0.047	0.1605	0.047	0.363
4	Random Forest	0.039	0.155	0.039	0.471
5	SVR	0.039	0.155	0.039	0.471
6	KNN	0.041	0.154	0.041	0.432

#### Discussion:

Here we successfully predict the Monitor price using different machine learning algorithms. The project uses a total of 6 machine learning algorithms where each has different performance values. In the end the model's performance value are compared for better understanding of the models.

#### Contribution:

Md.Asifur Rahim

Dataset Collection, Data Pre Processing, Showing Co Relation, Applying ML algorithms (SVM Regressor,KNN),

Providing visual differences in evaluation metrics (RMSE Score, R2 Score, MAE Error) for different ML Algorithms

Ashif Reza

Dataset Collection, Data Pre Processing, Applying ML algorithms (Linear Regression, Lasso Regression)

Rumana Akter

Dataset Collection, Data Pre Processing, Applying ML algorithms (Decision Tree Regressor, Random Forest)

