Vidyavardhini's College of Engineering & Technology

Department of Artificial Intelligence and Data Science

AY: 2025-26

Class:		**Semester:**	
Course Code:		**Course Name:**	

Name of Student:	BARI ANKIT VINOD
Roll No. :	61
Experiment No.:	**10**
Title of the Experiment:	**To implement a Predictive Analytics Technique using R on a sample dataset.**
Date of Performance:	
Date of Submission:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations(BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty :

Signature :

Date :

Experiment No.: 10
AIM:

To implement a Predictive Analytics Technique using R on a sample dataset.

THEORY:

Predictive Analytics is a branch of data analytics that uses statistical techniques and machine learning models to predict future outcomes based on historical data.
It involves three key stages:

Data Collection and Preparation – Cleaning, transforming, and structuring data.

Model Building – Applying statistical or machine learning algorithms.

Prediction and Evaluation – Using the trained model to make predictions and evaluate accuracy.

Common predictive analytics techniques include:

Linear Regression – For continuous numerical predictions.

Logistic Regression – For binary classification.

Decision Trees & Random Forests – For complex non-linear relationships.

Support Vector Machines (SVM) – For high-dimensional classification problems.

R provides strong libraries such as caret, ggplot2, and randomForest for implementing predictive models and visualizing results.

STEPS TO EXECUTE (Linear Regression Example):
1. Install Required Packages:

```
install.packages("ggplot2")
install.packages("caret")
```

2. Load Libraries:

```
library(ggplot2)
library(caret)
```

3. Load Dataset:

For this example, we'll use R's built-in mtcars dataset, which contains data on car models, horsepower, weight, and mileage (mpg).

```
data(mtcars)
head(mtcars)
```

4. Build Predictive Model:

We aim to predict miles per gallon (mpg) based on horsepower (hp) and weight (wt).

```
model <- lm(mpg ~ hp + wt, data = mtcars)
summary(model)

5. Make Predictions:
predictions <- predict(model, mtcars)
results <- data.frame(Actual = mtcars$mpg, Predicted = predictions)
print(results)

6. Visualize the Results:
ggplot(results, aes(x = Actual, y = Predicted)) +
  geom_point(color = "blue") +
  geom_abline(slope = 1, intercept = 0, linetype = "dashed", color = "red") +
  ggtitle("Actual vs Predicted MPG") +
  theme_minimal()

7. Evaluate Model Performance:
MAE <- mean(abs(results$Actual - results$Predicted))
print(paste("Mean Absolute Error:", round(MAE, 2)))
```

OBSERVATION:

The predicted values closely matched the actual mileage (mpg) values for most car entries. The regression summary showed that weight (wt) and horsepower (hp) had significant effects on fuel efficiency.

CONCLUSION:

The Predictive Analytics technique was successfully implemented using R with a Linear Regression model.
This experiment demonstrated how predictive models can forecast future outcomes based on historical data, forming the foundation for data-driven decision-making in fields like finance, healthcare, and business analytics.