MD2201: Data Science

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Div:C **Batch:3**

Date of performance:

Experiment No.5

Title: Classifier.

Aim: To apply Nearest Neighbor algorithm.

Software used: Programming language R.

Code Statement:

Consider 18 points data set referred in theory class. Consider test sample P(3,2). Apply following algorithms to find the class of this test point.

i. NN
ii. KNN with K=5 and K=7.
iii. MKNN with K=5
iv. R-NN Radius based algorithm with radius as 1.45 units.

```
# Nearest Neighbor (NN)
distances <- sqrt((features[, 1] - test_point[1])^2 + (features[, 2] -
test_point[2])^2)
distances
nearest_neighbor <- which.min(distances)
predicted_class_nn <- target_class[nearest_neighbor]

cat("Nearest Neighbor (NN): Class of test point = ", predicted_class_nn, "\n")

# K-Nearest Neighbors (KNN)
# KNN with K=5
knn_prediction_k5 <- knn(train = features, test = test_point, cl = target_class, k
= 5)
cat("KNN (K=5): Class of test point = ", knn_prediction_k5, "\n")

# KNN with K=7
knn_prediction_k7 <- knn(train = features, test = test_point, cl = target_class, k
= 7)
cat("KNN (K=7): Class of test point = ", knn_prediction_k7, "\n")
```

```r
# Radius-based Nearest Neighbor (R-NN)
distances <- sqrt((features[, 1] - test_point[1])^2 + (features[, 2] -
test_point[2])^2)
neighbors <- dataset[distances <= 1.45,]
predicted_class_rnn <- names(sort(table(neighbors[, 3]), decreasing = TRUE)[1])
cat("R-NN (Radius=1.45): Class of test point = ", predicted_class_rnn, "\n")
```

```
> predicted_class_nn <- target_class[nearest_ne
> cat("Nearest Neighbor (NN): Class of test poi
Nearest Neighbor (NN): Class of test point =  3
> cat("KNN (K=5): Class of test point = ", knn_
```

```
KNN (K=5): Class of test point =  3
> # KNN with K=7
> knn_prediction_k7 <- knn(train = fe
= 7)
> cat("KNN (K=7): Class of test point
KNN (K=7): Class of test point =  2
```

```
> cat("R-NN (Radius=1.45): Class of test poin
R-NN (Radius=1.45): Class of test point =  1
> # Find points within radius of 1.45 units (
> neighbors <- dataset[distances <= 1.45,]
> predicted_class_rnn <- names(sort(table(nei
> cat("R-NN (Radius=1.45): Class of test poin
R-NN (Radius=1.45): Class of test point =  1
```