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| --- | --- | --- | --- | --- |
|  | Nearest Ci After 1 K-Means Iteration (i.e., C1, C2 or C3) | 3 Nearest Neighbors, xi, xj, xk | 3-NN Predicted Class | Cluster Majority-Vote Predicted Class |
| X1 | C1 | X6, X10, X5 | F | T |
| X2 | C3 | X4, X7, X8 | T | T |
| X3 | C3 | X9, X8, X4 | T | T |
| X4 | C3 | X2, X7, X8 | T | T |
| X5 | C1 | X10, X6, X1 | T | T |
| X6 | C1 | X1, X10, X5 | T | T |
| X7 | C3 | X2, X4, X8 | T | T |
| X8 | C3 | X9, X3, X4 | T | T |
| X9 | C1 | X8, X3, X6 | F | T |
| X10 | C1 | X1, X6, X5 | F | T |

Problem 1. Unsupervised Learning

(a)

(i) At the first iteration, C1, C2 and C3 has the following points closed to them:

C1: X1, X5, X6, X9, X10 C2: None C3: X2, X3, X4, X7, X8

(ii) Labeling each point with it’s nearest neighbors. (In the table)

(b) Labeling each point xi with it’s 3 nearest neighbors. (In the table)

(c) Labelling each point xi with majority class label of its 3 nearest neighbors. (In the table)

(d) Labelling each point xi with the class of its nearest cluster center (In the table)

C1 : T C2 : None C3 : T

(e)

3-NN accuracy:

Nearest Cluster Center accuracy:

The Nearest Cluster Center assigned the most correct labels.

The fraction of the number of correctly labeled points to the total number of points is 60%.