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Lab 1: Classification

1. KNN

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| --- |
| model = neighbors.KNeighborsClassifier(n\_neighbors = 51, p = 2)  model.fit(X\_train, y\_train)  y\_pred = model.predict(X\_test)  print("Accuracy of 1NN: %.2f %%" %(100\*accuracy\_score(y\_test, y\_pred)))  print("Precision Score: %.2f %%" % (100\*precision\_score(y\_test,y\_pred, average='macro')))  print("Recall Score: %.2f %%" % (100\*recall\_score(y\_test,y\_pred, average='macro'))) |

1. Iris dataset

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| K | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
| Accuracy (%) | 94.00 | 94.00 | 92.00 | 94.00 | 94.00 | 92.00 | 94.00 | 92.00 | 92.00 | 88.00 | 88.00 | 88.00 | 88.00 |
| Precision (%) | 94.53 | 94.53 | 92.92 | 94.53 | 94.53 | 92.59 | 94.53 | 92.59 | 92.59 | 89.89 | 89.17 | 89.89 | 89.17 |
| Recall (%) | 94.44 | 94.44 | 92.59 | 94.44 | 94.44 | 92.59 | 94.44 | 92.59 | 92.59 | 88.89 | 88.89 | 88.89 | 88.89 |

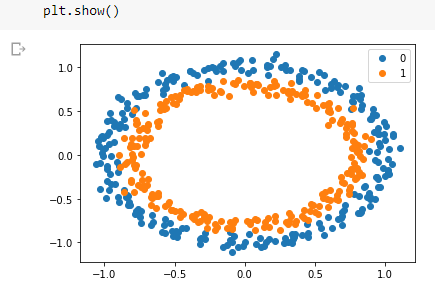
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| K | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 |
| Accuracy (%) | 88.00 | 90.00 | 88.00 | 88.00 | 90.00 | 88.00 | 88.00 | 86.00 | 86.00 | 84.00 | 82.00 | 84.00 | 84.00 |
| Precision (%) | 89.17 | 90.82 | 89.17 | 89.17 | 90.82 | 89.17 | 89.17 | 87.62 | 87.62 | 85.42 | 83.81 | 86.15 | 86.15 |
| Recall (%) | 88.89 | 90.74 | 88.89 | 88.89 | 90.74 | 88.89 | 88.89 | 87.04 | 87.04 | 85.19 | 83.33 | 85.19 | 85.19 |

1. Breast Cancer dataset

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| K | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
| Accuracy (%) | 86.00 | 86.00 | 86.00 | 90.00 | 90.00 | 90.00 | 90.00 | 88.00 | 86.00 | 86.00 | 86.00 | 86.00 | 86.00 |
| Precision (%) | 88.10 | 86.40 | 86.40 | 90.99 | 90.99 | 90.99 | 90.99 | 89.52 | 88.10 | 88.10 | 88.10 | 88.10 | 88.10 |
| Recall (%) | 82.60 | 83.62 | 83.62 | 87.86 | 87.86 | 87.86 | 87.86 | 58.23 | 82.60 | 82.60 | 82.60 | 82.60 | 82.60 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| K | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 |
| Accuracy (%) | 88.00 | 90.00 | 88.00 | 88.00 | 90.00 | 88.00 | 88.00 | 86.00 | 86.00 | 84.00 | 82.00 | 84.00 | 86.00 |
| Precision (%) | 89.17 | 90.82 | 89.17 | 89.17 | 90.82 | 89.17 | 89.17 | 87.62 | 87.62 | 85.42 | 83.81 | 86.5 | 88.10 |
| Recall (%) | 88.89 | 90.47 | 88.89 | 88.89 | 90.47 | 88.89 | 88.89 | 87.04 | 87.04 | 85.19 | 83.83 | 85.19 | 82.60 |

This is my data



1. Working with liner kernel

models = svm.SVC(kernel='linear', C=C)

|  |  |
| --- | --- |
| With C = 1.0 | With C = 1e10 |

1. Working with polynomial kernel

models = svm.SVC(kernel='poly', degree=d, C=C, gamma='auto')

|  |  |
| --- | --- |
| With C = 1.0, degree=3, gamma='auto' | With C = 1.0, degree=5, gamma='auto' |

1. Working with radial basis function kernel

models = svm.SVC(kernel='rbf', gamma=g, C=C)

|  |  |
| --- | --- |
| With C = 1.0, gamma = 0.7 | With C = 1.0, gamma = 1000.0 |