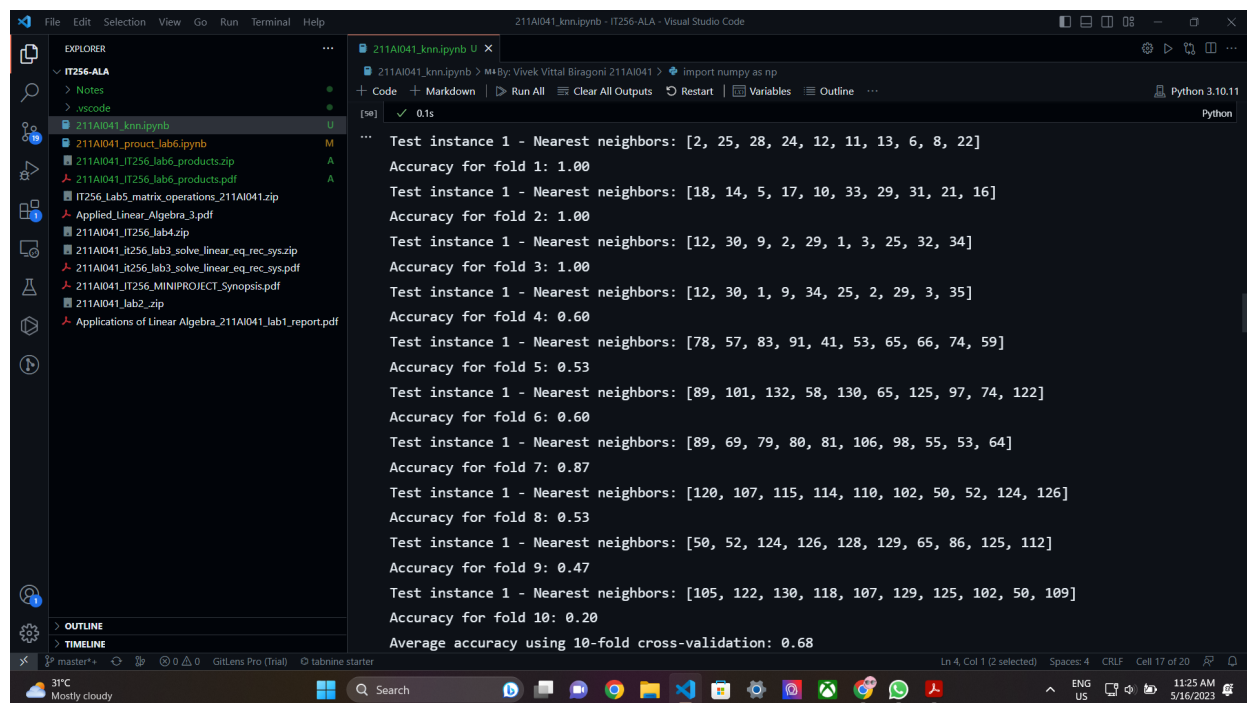


Screen shots and output of Knn lab

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NOTES FOR THE CODE ARE ALL AVAILABLE IN THE JUPYTER NOTEBOOK



```
import numpy as np

...

Test instance 1 - Nearest neighbors: [2, 25, 28, 24, 12, 11, 13, 6, 8, 22]
Accuracy for fold 1: 1.00
Test instance 1 - Nearest neighbors: [18, 14, 5, 17, 10, 33, 29, 31, 21, 16]
Accuracy for fold 2: 1.00
Test instance 1 - Nearest neighbors: [12, 30, 9, 2, 29, 1, 3, 25, 32, 34]
Accuracy for fold 3: 1.00
Test instance 1 - Nearest neighbors: [12, 30, 1, 9, 34, 25, 2, 29, 3, 35]
Accuracy for fold 4: 0.60
Test instance 1 - Nearest neighbors: [78, 57, 83, 91, 41, 53, 65, 66, 74, 59]
Accuracy for fold 5: 0.53
Test instance 1 - Nearest neighbors: [89, 101, 132, 58, 130, 65, 125, 97, 74, 122]
Accuracy for fold 6: 0.60
Test instance 1 - Nearest neighbors: [89, 69, 79, 80, 81, 106, 98, 55, 53, 64]
Accuracy for fold 7: 0.87
Test instance 1 - Nearest neighbors: [120, 107, 115, 114, 110, 102, 50, 52, 124, 126]
Accuracy for fold 8: 0.53
Test instance 1 - Nearest neighbors: [50, 52, 124, 126, 128, 129, 65, 86, 125, 112]
Accuracy for fold 9: 0.47
Test instance 1 - Nearest neighbors: [105, 122, 130, 118, 107, 129, 125, 102, 50, 109]
Accuracy for fold 10: 0.20
Average accuracy using 10-fold cross-validation: 0.68
```

Here a test instance from each of the fold is displayed, along with accuracy of fold and finally the average accuracy is displayed.

Total output including all the test cases is:

Test instance 1 - Nearest neighbors: [2, 25, 28, 24, 12, 11, 13, 6, 8, 22]

Test instance 2 - Nearest neighbors: [10, 19, 30, 15, 20, 14, 34, 8, 32, 11]

Test instance 3 - Nearest neighbors: [14, 32, 15, 9, 30, 19, 20, 27, 34, 11]

Test instance 4 - Nearest neighbors: [32, 14, 15, 23, 27, 30, 19, 9, 10, 20]

Test instance 5 - Nearest neighbors: [22, 25, 28, 2, 6, 11, 4, 29, 31, 24]

Test instance 6 - Nearest neighbors: [1, 33, 17, 3, 18, 4, 29, 31, 6, 21]

Test instance 7 - Nearest neighbors: [32, 7, 9, 14, 27, 15, 22, 11, 25, 28]

Test instance 8 - Nearest neighbors: [11, 24, 25, 28, 34, 2, 8, 20, 9, 13]

Test instance 9 - Nearest neighbors: [23, 27, 32, 30, 14, 15, 19, 10, 26, 9]

Test instance 10 - Nearest neighbors: [19, 15, 10, 20, 30, 34, 14, 8, 11, 9]

Test instance 11 - Nearest neighbors: [33, 1, 21, 12, 5, 16, 6, 3, 4, 29]

Test instance 12 - Nearest neighbors: [9, 11, 14, 25, 28, 34, 22, 20, 32, 7]

Test instance 13 - Nearest neighbors: [30, 15, 19, 10, 14, 20, 32, 34, 23, 9]

Test instance 14 - Nearest neighbors: [23, 27, 32, 14, 30, 15, 19, 9, 7, 10]

Test instance 15 - Nearest neighbors: [3, 18, 1, 0, 21, 33, 17, 70, 5, 16]

Accuracy for fold 1: 1.00

Test instance 1 - Nearest neighbors: [18, 14, 5, 17, 10, 33, 29, 31, 21, 16]

Test instance 2 - Nearest neighbors: [5, 10, 33, 17, 18, 29, 31, 14, 21, 16]

Test instance 3 - Nearest neighbors: [0, 25, 28, 24, 4, 7, 22, 34, 33, 29]

Test instance 4 - Nearest neighbors: [14, 10, 5, 21, 33, 18, 16, 70, 17, 29]

Test instance 5 - Nearest neighbors: [29, 31, 4, 33, 22, 0, 25, 28, 17, 10]

Test instance 6 - Nearest neighbors: [16, 21, 10, 24, 33, 0, 69, 7, 25, 28]

Test instance 7 - Nearest neighbors: [29, 31, 4, 0, 33, 22, 25, 28, 24, 10]

Test instance 8 - Nearest neighbors: [6, 11, 22, 32, 4, 2, 25, 28, 27, 7]

Test instance 9 - Nearest neighbors: [34, 24, 20, 7, 0, 25, 28, 9, 19, 11]

Test instance 10 - Nearest neighbors: [11, 6, 7, 2, 25, 28, 34, 22, 20, 32]

Test instance 11 - Nearest neighbors: [1, 9, 19, 12, 20, 30, 15, 34, 2, 44]

Test instance 12 - Nearest neighbors: [7, 24, 25, 28, 34, 0, 20, 4, 11, 22]

Test instance 13 - Nearest neighbors: [0, 24, 25, 28, 33, 4, 7, 16, 10, 34]

Test instance 14 - Nearest neighbors: [24, 0, 7, 16, 25, 28, 34, 20, 4, 21]

Test instance 15 - Nearest neighbors: [2, 32, 15, 3, 11, 6, 12, 30, 9, 19]

Accuracy for fold 2: 1.00

Test instance 1 - Nearest neighbors: [12, 30, 9, 2, 29, 1, 3, 25, 32, 34]

Test instance 2 - Nearest neighbors: [20, 28, 27, 10, 33, 0, 17, 23, 69, 7]

Test instance 3 - Nearest neighbors: [5, 16, 19, 31, 33, 21, 10, 4, 18, 15]

Test instance 4 - Nearest neighbors: [15, 5, 16, 14, 18, 10, 33, 19, 31, 21]

Test instance 5 - Nearest neighbors: [9, 1, 25, 12, 30, 34, 2, 29, 23, 3]

Test instance 6 - Nearest neighbors: [34, 23, 9, 7, 26, 25, 1, 11, 24, 28]

Test instance 7 - Nearest neighbors: [20, 10, 33, 27, 28, 18, 0, 17, 5, 16]

Test instance 8 - Nearest neighbors: [4, 0, 17, 21, 7, 26, 11, 24, 19, 31]

Test instance 9 - Nearest neighbors: [8, 13, 3, 32, 2, 29, 12, 30, 6, 1]

Test instance 10 - Nearest neighbors: [7, 26, 0, 17, 23, 28, 34, 27, 4, 11]

Test instance 11 - Nearest neighbors: [0, 17, 4, 7, 26, 27, 34, 21, 23, 11]

Test instance 12 - Nearest neighbors: [42, 91, 78, 45, 8, 83, 13, 12, 30, 3]

Test instance 13 - Nearest neighbors: [32, 3, 13, 6, 2, 29, 8, 11, 24, 12]

Test instance 14 - Nearest neighbors: [0, 17, 4, 7, 26, 27, 34, 21, 23, 11]

Test instance 15 - Nearest neighbors: [19, 31, 21, 4, 33, 0, 17, 27, 10, 5]

Accuracy for fold 3: 1.00

Test instance 1 - Nearest neighbors: [12, 30, 1, 9, 34, 25, 2, 29, 3, 35]

Test instance 2 - Nearest neighbors: [19, 44, 21, 4, 37, 0, 17, 40, 43, 27]

Test instance 3 - Nearest neighbors: [3, 2, 29, 42, 6, 30, 38, 11, 24, 12]

Test instance 4 - Nearest neighbors: [10, 21, 5, 16, 19, 27, 44, 0, 17, 36]

Test instance 5 - Nearest neighbors: [23, 35, 7, 26, 39, 40, 43, 9, 34, 0]

Test instance 6 - Nearest neighbors: [105, 124, 126, 110, 128, 87, 97, 114, 109, 129]

Test instance 7 - Nearest neighbors: [100, 95, 122, 85, 89, 101, 121, 132, 60, 133]

Test instance 8 - Nearest neighbors: [124, 126, 105, 97, 128, 50, 71, 125, 87, 62]

Test instance 9 - Nearest neighbors: [65, 66, 74, 54, 98, 75, 64, 79, 77, 83]

Test instance 10 - Nearest neighbors: [113, 117, 96, 59, 89, 101, 118, 132, 60, 108]

Test instance 11 - Nearest neighbors: [84, 99, 81, 106, 52, 67, 86, 127, 79, 49]

Test instance 12 - Nearest neighbors: [85, 121, 133, 100, 95, 122, 70, 76, 89, 101]

Test instance 13 - Nearest neighbors: [91, 78, 83, 45, 41, 65, 66, 1, 74, 25]

Test instance 14 - Nearest neighbors: [60, 89, 101, 132, 62, 130, 59, 113, 117, 61]

Test instance 15 - Nearest neighbors: [83, 75, 25, 69, 74, 91, 79, 106, 1, 65]

Accuracy for fold 4: 0.60

Test instance 1 - Nearest neighbors: [78, 57, 83, 91, 41, 53, 65, 66, 74, 59]

Test instance 2 - Nearest neighbors: [134, 123, 63, 76, 112, 80, 81, 99, 55, 84]

Test instance 3 - Nearest neighbors: [104, 72, 119, 98, 131, 77, 64, 68, 53, 65]

Test instance 4 - Nearest neighbors: [63, 76, 112, 82, 123, 111, 88, 134, 68, 118]

Test instance 5 - Nearest neighbors: [73, 106, 81, 55, 80, 84, 79, 69, 99, 67]

Test instance 6 - Nearest neighbors: [71, 125, 62, 130, 97, 128, 60, 109, 129, 52]

Test instance 7 - Nearest neighbors: [73, 80, 81, 69, 106, 55, 84, 99, 79, 134]

Test instance 8 - Nearest neighbors: [67, 86, 127, 99, 77, 55, 84, 64, 68, 79]

Test instance 9 - Nearest neighbors: [72, 104, 131, 119, 108, 68, 96, 77, 93, 98]

Test instance 10 - Nearest neighbors: [74, 98, 65, 66, 75, 64, 79, 53, 77, 67]

Test instance 11 - Nearest neighbors: [134, 70, 123, 76, 112, 80, 63, 133, 81, 73]

Test instance 12 - Nearest neighbors: [111, 68, 63, 82, 119, 76, 112, 118, 108, 123]

Test instance 13 - Nearest neighbors: [131, 72, 108, 119, 96, 118, 111, 113, 117, 54]

Test instance 14 - Nearest neighbors: [111, 68, 63, 82, 119, 76, 112, 118, 108, 123]

Test instance 15 - Nearest neighbors: [113, 117, 88, 54, 89, 101, 132, 118, 58, 96]

Accuracy for fold 5: 0.53

Test instance 1 - Nearest neighbors: [89, 101, 132, 58, 130, 65, 125, 97, 74, 122]

Test instance 2 - Nearest neighbors: [97, 130, 58, 54, 93, 65, 125, 52, 124, 126]

Test instance 3 - Nearest neighbors: [130, 97, 65, 125, 58, 89, 101, 132, 128, 52]

Test instance 4 - Nearest neighbors: [63, 123, 61, 71, 73, 76, 112, 134, 82, 99]

Test instance 5 - Nearest neighbors: [77, 98, 67, 86, 127, 69, 79, 55, 84, 75]

Test instance 6 - Nearest neighbors: [53, 69, 75, 98, 79, 77, 106, 83, 59, 67]

Test instance 7 - Nearest neighbors: [53, 69, 75, 98, 79, 77, 106, 83, 59, 67]

Test instance 8 - Nearest neighbors: [67, 86, 127, 99, 77, 55, 84, 79, 81, 98]

Test instance 9 - Nearest neighbors: [71, 73, 119, 67, 86, 127, 63, 99, 111, 77]

Test instance 10 - Nearest neighbors: [66, 64, 106, 80, 81, 79, 55, 59, 84, 20]

Test instance 11 - Nearest neighbors: [133, 70, 121, 56, 85, 123, 61, 76, 112, 134]

Test instance 12 - Nearest neighbors: [65, 125, 130, 97, 128, 109, 129, 52, 124, 126]

Test instance 13 - Nearest neighbors: [68, 72, 131, 62, 104, 119, 108, 96, 93, 118]

Test instance 14 - Nearest neighbors: [66, 64, 80, 81, 106, 55, 84, 99, 79, 61]

Test instance 15 - Nearest neighbors: [69, 75, 53, 98, 79, 106, 77, 55, 59, 67]

Accuracy for fold 6: 0.60

Test instance 1 - Nearest neighbors: [89, 69, 79, 80, 81, 106, 98, 55, 53, 64]

Test instance 2 - Nearest neighbors: [112, 123, 63, 78, 61, 134, 71, 73, 111, 70]

Test instance 3 - Nearest neighbors: [79, 67, 82, 127, 98, 99, 55, 69, 83, 106]

Test instance 4 - Nearest neighbors: [57, 91, 60, 59, 41, 53, 80, 81, 89, 69]

Test instance 5 - Nearest neighbors: [106, 55, 79, 64, 67, 69, 82, 127, 89, 99]

Test instance 6 - Nearest neighbors: [66, 88, 64, 55, 61, 134, 99, 106, 70, 84]

Test instance 7 - Nearest neighbors: [55, 64, 99, 66, 88, 106, 67, 82, 127, 61]

Test instance 8 - Nearest neighbors: [111, 63, 118, 71, 73, 112, 74, 78, 108, 113]

Test instance 9 - Nearest neighbors: [91, 57, 59, 89, 80, 81, 53, 69, 25, 60]

Test instance 10 - Nearest neighbors: [55, 99, 106, 67, 82, 127, 64, 79, 66, 88]

Test instance 11 - Nearest neighbors: [56, 121, 133, 51, 100, 95, 122, 85, 101, 112]

Test instance 12 - Nearest neighbors: [67, 82, 127, 99, 55, 79, 83, 98, 106, 64]

Test instance 13 - Nearest neighbors: [114, 52, 124, 126, 50, 92, 110, 105, 97, 76]

Test instance 14 - Nearest neighbors: [118, 74, 111, 113, 117, 108, 63, 96, 54, 71]

Test instance 15 - Nearest neighbors: [101, 132, 75, 58, 74, 122, 54, 77, 95, 130]

Accuracy for fold 7: 0.87

Test instance 1 - Nearest neighbors: [120, 107, 115, 114, 110, 102, 50, 52, 124, 126]

Test instance 2 - Nearest neighbors: [57, 98, 93, 59, 41, 1, 25, 60, 12, 45]

Test instance 3 - Nearest neighbors: [114, 115, 102, 110, 107, 120, 50, 52, 124, 126]

Test instance 4 - Nearest neighbors: [76, 54, 72, 131, 58, 113, 117, 87, 108, 74]

Test instance 5 - Nearest neighbors: [110, 50, 105, 128, 52, 124, 126, 109, 129, 114]

Test instance 6 - Nearest neighbors: [51, 122, 104, 132, 56, 75, 100, 109, 129, 65]

Test instance 7 - Nearest neighbors: [113, 117, 108, 54, 118, 74, 103, 111, 72, 131]

Test instance 8 - Nearest neighbors: [77, 130, 65, 86, 125, 52, 124, 126, 75, 76]

Test instance 9 - Nearest neighbors: [79, 69, 92, 89, 67, 82, 101, 127, 80, 81]

Test instance 10 - Nearest neighbors: [55, 67, 82, 99, 101, 127, 96, 92, 106, 79]

Test instance 11 - Nearest neighbors: [51, 122, 56, 100, 104, 121, 132, 75, 133, 74]

Test instance 12 - Nearest neighbors: [104, 132, 75, 58, 74, 122, 54, 77, 130, 51]

Test instance 13 - Nearest neighbors: [116, 110, 120, 50, 114, 105, 107, 102, 115, 52]

Test instance 14 - Nearest neighbors: [107, 115, 120, 114, 102, 110, 50, 76, 52, 124]

Test instance 15 - Nearest neighbors: [62, 68, 87, 119, 72, 131, 92, 79, 83, 69]

Accuracy for fold 8: 0.53

Test instance 1 - Nearest neighbors: [50, 52, 124, 126, 128, 129, 65, 86, 125, 112]

Test instance 2 - Nearest neighbors: [94, 64, 55, 99, 96, 66, 88, 114, 90, 67]

Test instance 3 - Nearest neighbors: [118, 120, 105, 107, 102, 50, 52, 124, 126, 76]

Test instance 4 - Nearest neighbors: [111, 103, 72, 131, 97, 54, 71, 73, 74, 63]

Test instance 5 - Nearest neighbors: [129, 128, 65, 86, 125, 110, 52, 124, 126, 77]

Test instance 6 - Nearest neighbors: [50, 102, 52, 124, 126, 107, 109, 128, 105, 112]

Test instance 7 - Nearest neighbors: [97, 71, 73, 103, 63, 83, 111, 74, 78, 91]

Test instance 8 - Nearest neighbors: [91, 123, 63, 78, 97, 61, 134, 71, 73, 103]

Test instance 9 - Nearest neighbors: [54, 111, 74, 103, 58, 104, 116, 132, 97, 75]

Test instance 10 - Nearest neighbors: [102, 107, 50, 52, 124, 126, 105, 112, 76, 128]

Test instance 11 - Nearest neighbors: [107, 105, 118, 120, 102, 50, 52, 124, 126, 76]

Test instance 12 - Nearest neighbors: [117, 109, 120, 105, 50, 107, 102, 118, 52, 124]

Test instance 13 - Nearest neighbors: [54, 111, 74, 103, 58, 104, 116, 132, 97, 75]

Test instance 14 - Nearest neighbors: [103, 97, 111, 74, 54, 71, 73, 63, 91, 104]

Test instance 15 - Nearest neighbors: [83, 71, 73, 72, 131, 63, 92, 78, 67, 82]

Accuracy for fold 9: 0.47

Test instance 1 - Nearest neighbors: [105, 122, 130, 118, 107, 129, 125, 102, 50, 109]

Test instance 2 - Nearest neighbors: [56, 100, 51, 115, 110, 85, 124, 70, 91, 104]

Test instance 3 - Nearest neighbors: [51, 115, 104, 110, 116, 74, 75, 56, 100, 103]

Test instance 4 - Nearest neighbors: [61, 91, 127, 78, 63, 70, 71, 73, 97, 114]

Test instance 5 - Nearest neighbors: [52, 120, 50, 112, 65, 86, 102, 77, 124, 125]

Test instance 6 - Nearest neighbors: [65, 86, 77, 112, 75, 124, 52, 104, 110, 116]

Test instance 7 - Nearest neighbors: [52, 120, 50, 112, 65, 86, 102, 77, 124, 125]

Test instance 8 - Nearest neighbors: [67, 82, 101, 114, 92, 55, 99, 79, 83, 94]

Test instance 9 - Nearest neighbors: [120, 124, 65, 86, 52, 50, 112, 77, 75, 110]

Test instance 10 - Nearest neighbors: [124, 65, 86, 110, 120, 52, 77, 50, 51, 112]

Test instance 11 - Nearest neighbors: [77, 112, 65, 86, 75, 58, 104, 116, 76, 52]

Test instance 12 - Nearest neighbors: [72, 87, 123, 134, 111, 133, 68, 126, 128, 132]

Test instance 13 - Nearest neighbors: [104, 116, 75, 58, 74, 54, 77, 110, 51, 115]

Test instance 14 - Nearest neighbors: [56, 100, 85, 51, 115, 70, 110, 91, 127, 61]

Test instance 15 - Nearest neighbors: [61, 78, 91, 127, 70, 95, 63, 96, 114, 71]

Accuracy for fold 10: 0.20

Average accuracy using 10-fold cross-validation: 0.68