ASSIGNMENT 7
K Means Clustering

K-means only can be used under the situation that the average value has been defined. This may not suit some applications, such as mobile objects clustering, data concerned about classified attributes. 1) In k-mean algorithm user need to specify the number of cluster that is k.
2) It's sensitive to the initial centroids and change in initial centroids can lead to different clustering results with different initial value.
3) k-means is not fit to non-convex cluster, or big difference on size. Besides, it's sensitive to noisy data and isolated points data, a little data like this can make huge effects on average values. In the other way we can say k-mean algorithm is unable to handle noisy data and outliers.

The performance of K-means clustering is affected by choosing the initial cluster centres.
The performance of K-means clustering degrades when we choose some random value for initial cluster centre and the performance is also degraded when we choose random value for K.

……………………………………………..OUTPUT…………………………………………………..

The Number of elements predicted in class Setosa is 39
 and elements are: [[7.0, 3.2, 4.7, 1.4], [6.9, 3.1, 4.9, 1.5], [6.7, 3.0, 5.0, 1.7], [6.3, 3.3, 6.0, 2.5], [7.1, 3.0, 5.9, 2.1], [6.3, 2.9, 5.6, 1.8], [6.5, 3.0, 5.8, 2.2], [7.6, 3.0, 6.6, 2.1], [7.3, 2.9, 6.3, 1.8], [6.7, 2.5, 5.8, 1.8], [7.2, 3.6, 6.1, 2.5], [6.5, 3.2, 5.1, 2.0], [6.4, 2.7, 5.3, 1.9], [6.8, 3.0, 5.5, 2.1], [6.4, 3.2, 5.3, 2.3], [6.5, 3.0, 5.5, 1.8], [7.7, 3.8, 6.7, 2.2], [7.7, 2.6, 6.9, 2.3], [6.9, 3.2, 5.7, 2.3], [7.7, 2.8, 6.7, 2.0], [6.7, 3.3, 5.7, 2.1], [7.2, 3.2, 6.0, 1.8], [6.4, 2.8, 5.6, 2.1], [7.2, 3.0, 5.8, 1.6], [7.4, 2.8, 6.1, 1.9], [7.9, 3.8, 6.4, 2.0], [6.4, 2.8, 5.6, 2.2], [6.1, 2.6, 5.6, 1.4], [7.7, 3.0, 6.1, 2.3], [6.3, 3.4, 5.6, 2.4], [6.4, 3.1, 5.5, 1.8], [6.9, 3.1, 5.4, 2.1], [6.7, 3.1, 5.6, 2.4], [6.9, 3.1, 5.1, 2.3], [6.8, 3.2, 5.9, 2.3], [6.7, 3.3, 5.7, 2.5], [6.7, 3.0, 5.2, 2.3], [6.5, 3.0, 5.2, 2.0], [6.2, 3.4, 5.4, 2.3]]

The Number of elements predicted in class Versicolor is 61
 and elements are: [[6.4, 3.2, 4.5, 1.5], [5.5, 2.3, 4.0, 1.3], [6.5, 2.8, 4.6, 1.5], [5.7, 2.8, 4.5, 1.3], [6.3, 3.3, 4.7, 1.6], [4.9, 2.4, 3.3, 1.0], [6.6, 2.9, 4.6, 1.3], [5.2, 2.7, 3.9, 1.4], [5.0, 2.0, 3.5, 1.0], [5.9, 3.0, 4.2, 1.5], [6.0, 2.2, 4.0, 1.0], [6.1, 2.9, 4.7, 1.4], [5.6, 2.9, 3.6, 1.3], [6.7, 3.1, 4.4, 1.4], [5.6, 3.0, 4.5, 1.5], [5.8, 2.7, 4.1, 1.0], [6.2, 2.2, 4.5, 1.5], [5.6, 2.5, 3.9, 1.1], [5.9, 3.2, 4.8, 1.8], [6.1, 2.8, 4.0, 1.3], [6.3, 2.5, 4.9, 1.5], [6.1, 2.8, 4.7, 1.2], [6.4, 2.9, 4.3, 1.3], [6.6, 3.0, 4.4, 1.4], [6.8, 2.8, 4.8, 1.4], [6.0, 2.9, 4.5, 1.5], [5.7, 2.6, 3.5, 1.0], [5.5, 2.4, 3.8, 1.1], [5.5, 2.4, 3.7, 1.0], [5.8, 2.7, 3.9, 1.2], [6.0, 2.7, 5.1, 1.6], [5.4, 3.0, 4.5, 1.5], [6.0, 3.4, 4.5, 1.6], [6.7, 3.1, 4.7, 1.5], [6.3, 2.3, 4.4, 1.3], [5.6, 3.0, 4.1, 1.3], [5.5, 2.5, 4.0, 1.3], [5.5, 2.6, 4.4, 1.2], [6.1, 3.0, 4.6, 1.4], [5.8, 2.6, 4.0, 1.2], [5.0, 2.3, 3.3, 1.0], [5.6, 2.7, 4.2, 1.3], [5.7, 3.0, 4.2, 1.2], [5.7, 2.9, 4.2, 1.3], [6.2, 2.9, 4.3, 1.3], [5.1, 2.5, 3.0, 1.1], [5.7, 2.8, 4.1, 1.3], [5.8, 2.7, 5.1, 1.9], [4.9, 2.5, 4.5, 1.7], [5.7, 2.5, 5.0, 2.0], [5.8, 2.8, 5.1, 2.4], [6.0, 2.2, 5.0, 1.5], [5.6, 2.8, 4.9, 2.0], [6.3, 2.7, 4.9, 1.8], [6.2, 2.8, 4.8, 1.8], [6.1, 3.0, 4.9, 1.8], [6.3, 2.8, 5.1, 1.5], [6.0, 3.0, 4.8, 1.8], [5.8, 2.7, 5.1, 1.9], [6.3, 2.5, 5.0, 1.9], [5.9, 3.0, 5.1, 1.8]]

The Number of elements predicted in class Virginica is 50
 and elements are: [[5.1, 3.5, 1.4, 0.2], [4.9, 3.0, 1.4, 0.2], [4.7, 3.2, 1.3, 0.2], [4.6, 3.1, 1.5, 0.2], [5.0, 3.6, 1.4, 0.2], [5.4, 3.9, 1.7, 0.4], [4.6, 3.4, 1.4, 0.3], [5.0, 3.4, 1.5, 0.2], [4.4, 2.9, 1.4, 0.2], [4.9, 3.1, 1.5, 0.1], [5.4, 3.7, 1.5, 0.2], [4.8, 3.4, 1.6, 0.2], [4.8, 3.0, 1.4, 0.1], [4.3, 3.0, 1.1, 0.1], [5.8, 4.0, 1.2, 0.2], [5.7, 4.4, 1.5, 0.4], [5.4, 3.9, 1.3, 0.4], [5.1, 3.5, 1.4, 0.3], [5.7, 3.8, 1.7, 0.3], [5.1, 3.8, 1.5, 0.3], [5.4, 3.4, 1.7, 0.2], [5.1, 3.7, 1.5, 0.4], [4.6, 3.6, 1.0, 0.2], [5.1, 3.3, 1.7, 0.5], [4.8, 3.4, 1.9, 0.2], [5.0, 3.0, 1.6, 0.2], [5.0, 3.4, 1.6, 0.4], [5.2, 3.5, 1.5, 0.2], [5.2, 3.4, 1.4, 0.2], [4.7, 3.2, 1.6, 0.2], [4.8, 3.1, 1.6, 0.2], [5.4, 3.4, 1.5, 0.4], [5.2, 4.1, 1.5, 0.1], [5.5, 4.2, 1.4, 0.2], [4.9, 3.1, 1.5, 0.2], [5.0, 3.2, 1.2, 0.2], [5.5, 3.5, 1.3, 0.2], [4.9, 3.6, 1.4, 0.1], [4.4, 3.0, 1.3, 0.2], [5.1, 3.4, 1.5, 0.2], [5.0, 3.5, 1.3, 0.3], [4.5, 2.3, 1.3, 0.3], [4.4, 3.2, 1.3, 0.2], [5.0, 3.5, 1.6, 0.6], [5.1, 3.8, 1.9, 0.4], [4.8, 3.0, 1.4, 0.3], [5.1, 3.8, 1.6, 0.2], [4.6, 3.2, 1.4, 0.2], [5.3, 3.7, 1.5, 0.2], [5.0, 3.3, 1.4, 0.2]]
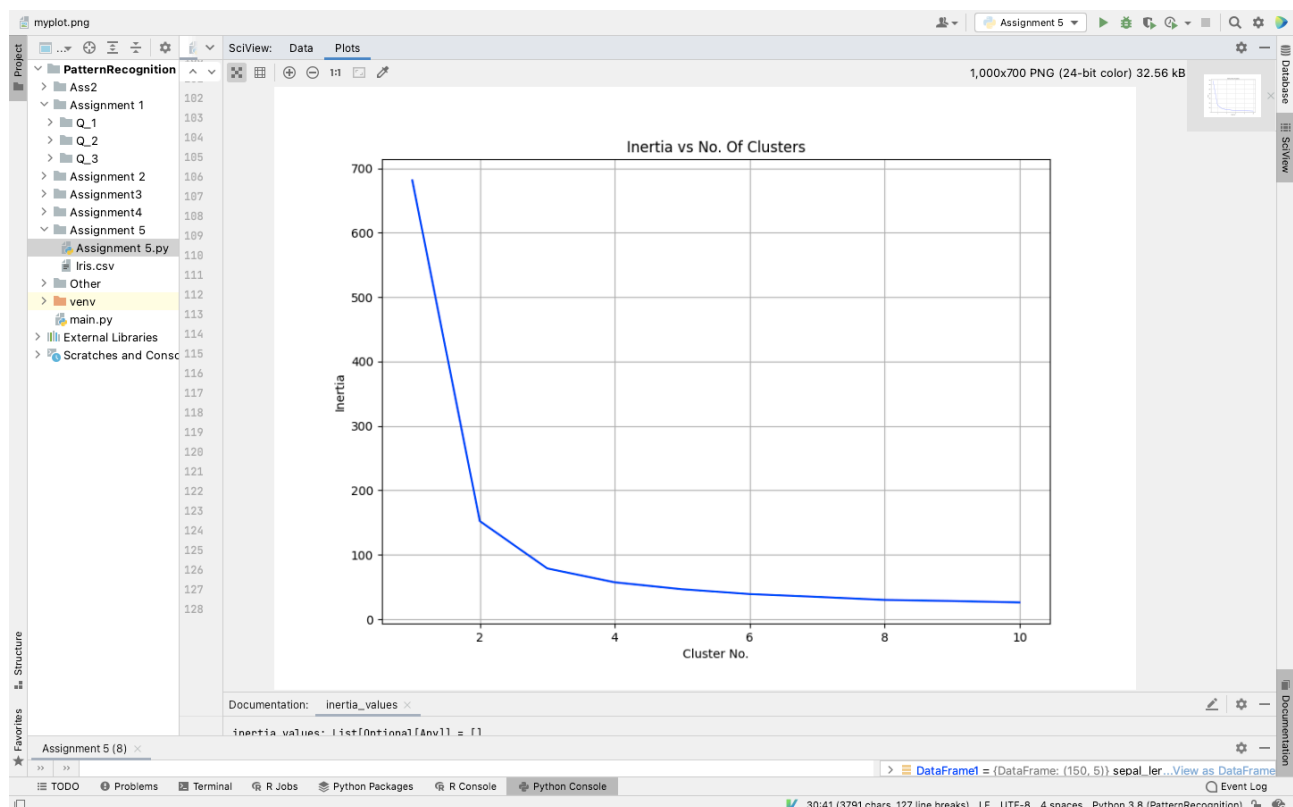
The centroids for class Setosa are [6.85384615 3.07692308 5.71538462 2.05384615]
The centroids for class Versicolor are [5.88360656 2.74098361 4.38852459 1.43442623]
The centroids for class Virginica are [5.006 3.428 1.462 0.246]

Jaccard Distance
The Number of Samples classified correctly in Class[0] = 33
The Jaccard Distance of Class[0] = 33/50

The Number of Samples classified correctly in Class[1] = 43
The Jaccard Distance of Class[1] = 43/50

The Number of Samples classified correctly in Class[2] = 41
The Jaccard Distance of Class[2] = 41/50

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The Number of elements predicted in class  Setosa  is  39
 and elements are:  [[7.0, 3.2, 4.7, 1.4], [6.9, 3.1, 4.9, 1.5], [6.7, 3.0, 5.0, 1.7], [6.3, 3.3, 6.0, 2.5], [7.1, 3.0, 5.9,


The Number of elements predicted in class  Versicolor  is  61
 and elements are:  [[6.4, 3.2, 4.5, 1.5], [5.5, 2.3, 4.0, 1.3], [6.5, 2.8, 4.6, 1.5], [5.7, 2.8, 4.5, 1.3], [6.3, 3.3, 4.7,


The Number of elements predicted in class  Virginica  is  50
 and elements are:  [[5.1, 3.5, 1.4, 0.2], [4.9, 3.0, 1.4, 0.2], [4.7, 3.2, 1.3, 0.2], [4.6, 3.1, 1.5, 0.2], [5.0, 3.6, 1.4,

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