EE5327 Optimization

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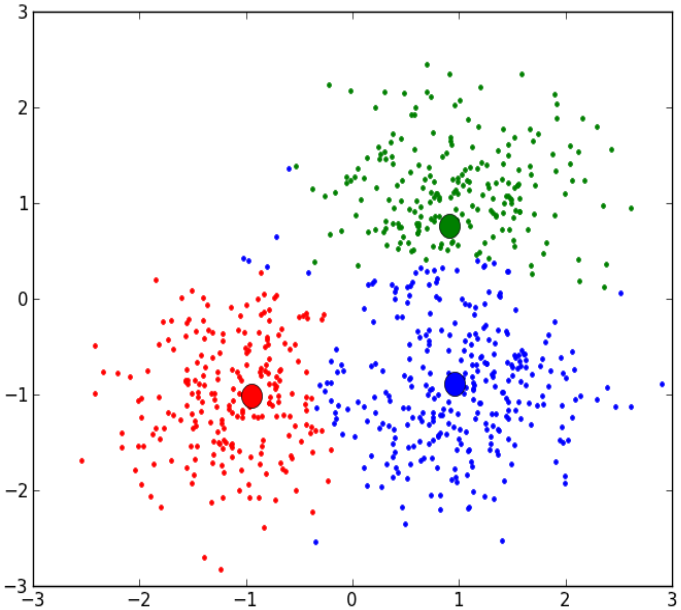
What is K - Means Clustering ?

- Clustering is a technique for finding similarity groups in a data, called clusters.



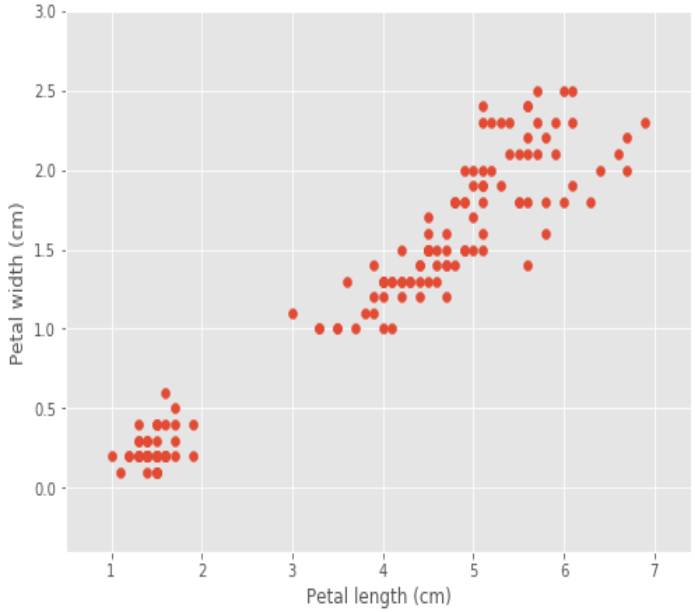
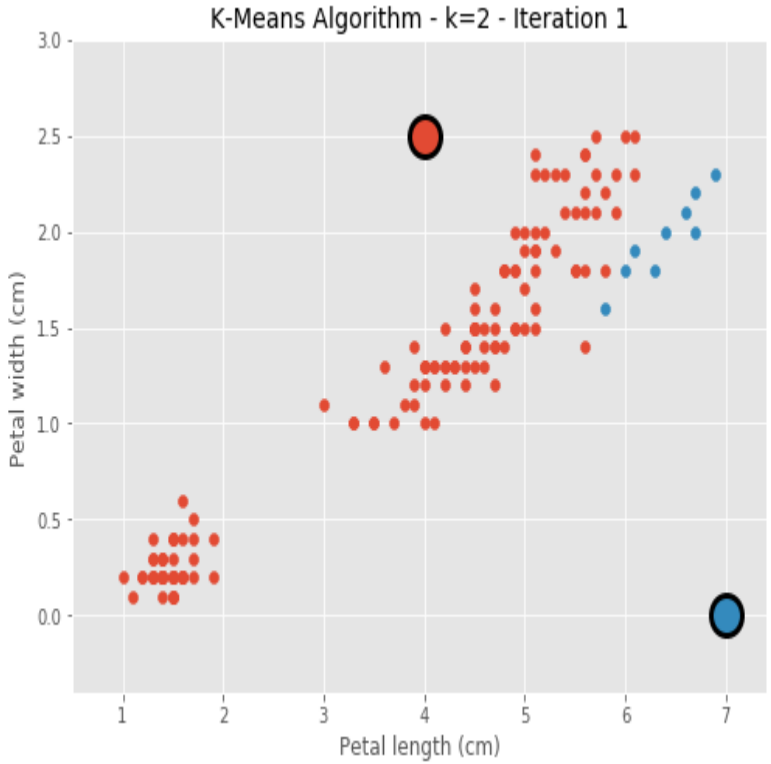


fig : Clusters

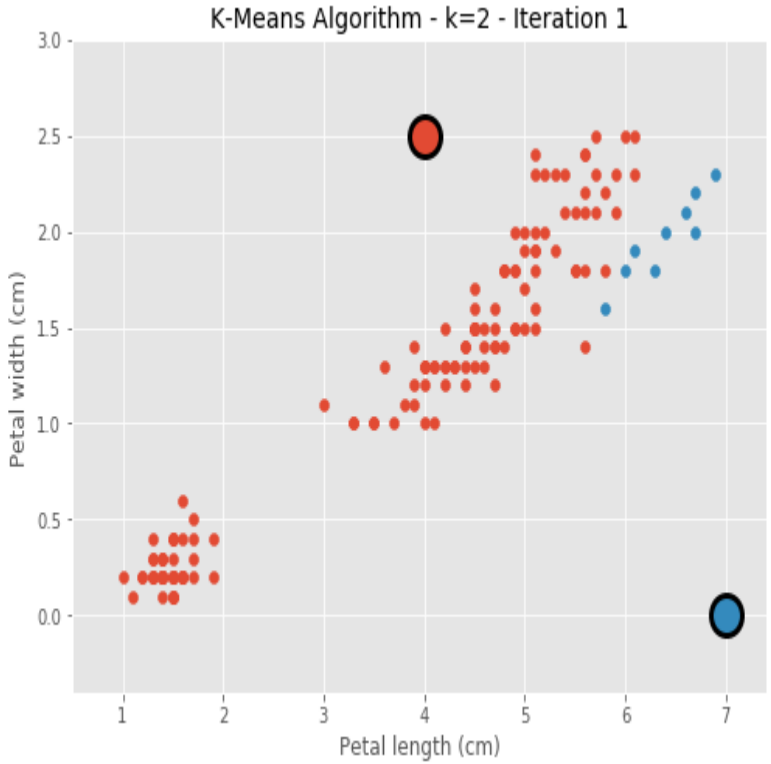
Algorithm

- First we initialize k points (for k clusters), called means, randomly (In this example k = 2).



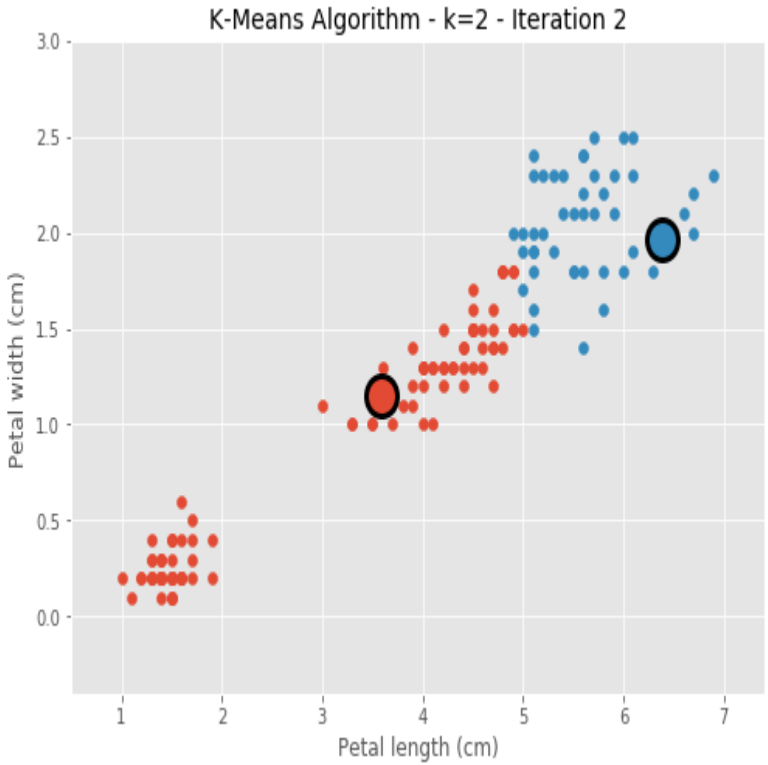
Algorithm

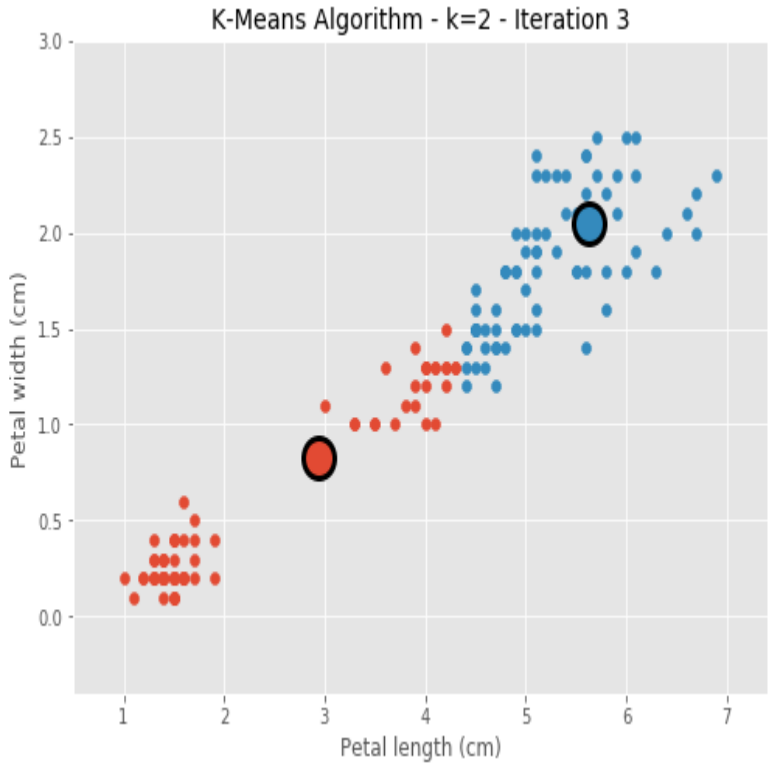
- We categorize each item to its closest mean and we update the mean's coordinates, which are the averages of the items categorized in that mean so far.



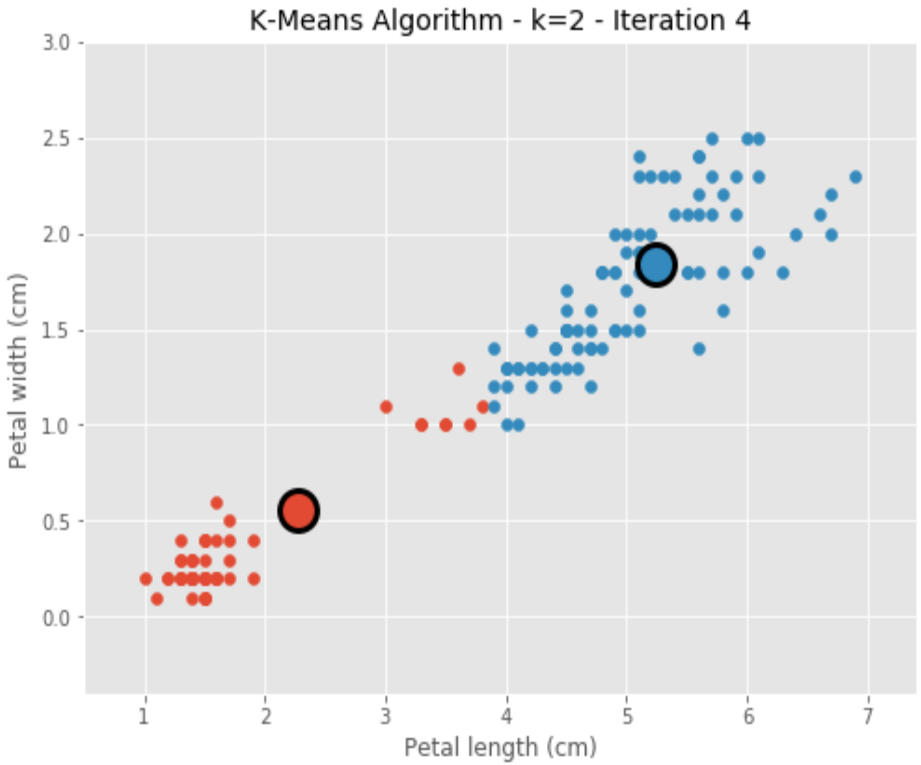
Algorithm

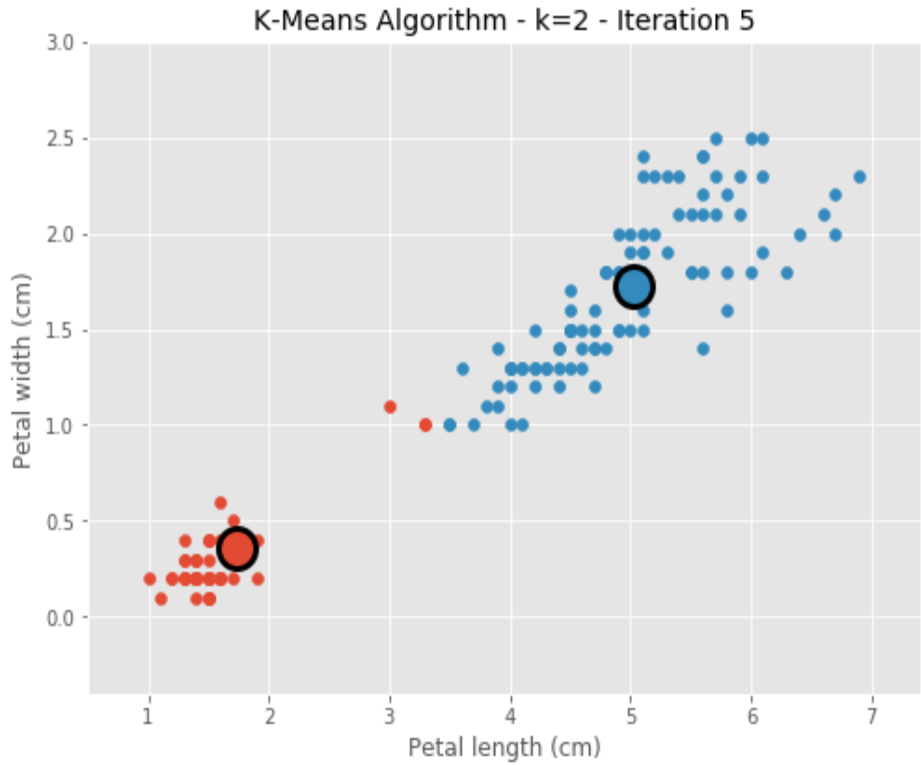
- We repeat the process for a given number of iterations and at the end, we have our clusters.





Algorithm


K-Means Algorithm - k=2 - Iteration 4
Petal width (cm)
Petal length (cm)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7


K-Means Algorithm - k=2 - Iteration 5
Petal width (cm)
Petal length (cm)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7

Problem Implementation

- We used the K - means clustering algorithms to implement the Bonus Grade Program.
- Here K = No. of Grades to be awarded.
- With respect to the assignment of Bonus grade problem, following are the grading policy assumptions :

maximum total marks : A
100 - 90 : A-
81 - 90 : B
71 - 80 : B-
61 – 70 : C
51 – 60 : C-
41 – 50 : D
11 – 40 : FS
10 and Below : FR