3. Introduction to the K-Medoids Algorithm

Introduction to the K-Medoids Algorithm

Video
Download video file

Transcripts
Download SubRip (.srt) file
Download Text (.txt) file

K-Medoids Algorithm as a Variation of K-Means

1/1 point (graded)

As explained in the lecture video, the K-Medoids algorithm is a variation of the K-Means algorithm that addresses some of the K-Means algorithm's limitations. The K-Medoids algorithm is given by

1. Randomly select $\{z_1, \ldots, z_K\} \subseteq \{x_1, \ldots, x_n\}$
2. Iterate
    1. Given $z_1, \ldots, z_K$, assign each $x^{(i)}$ to the closest z_j, so that

$$\text{Cost}\,(z_1, \ldots z_K) = \sum_{i=1}^{n} \min_{j=1,\ldots,k} \text{dist}\,(x^{(i)}, z_j)$$

2. Given $C_j \in \{C_1, \ldots, C_K\}$ find the best representative $z_j \in \{x_1, \ldots, x_n\}$ such that

$$\sum_{x^{(i)} \in C_j} \text{dist}\left(x^{(i)}, z_j\right)$$

is minimal.

Which part of the K-Medoids algorithm is **different** from its equivalent counterpart in the K-Means algorithm?

- Part 2.1
- Part 2.2 ✔

Solution:

As mentioned in the lecture, the k-medoids algorithm is another version of the k-means algorithm with line 2.2 changed so that

1. It is guaranteed that the K representatives $z_1, \ldots, z_K \in \{x_1, \ldots, x_n\}$
2. Line 2.2 finds cost-minimizing representatives $z_1, \ldots, z_K$ with any kind of cost measure

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Concept Check: K-Medoids Algorithm

1/1 point (graded)

Which of the following is true about the K-Medoids algorithm? Choose all those apply.

- [x] It is always guaranteed that the K representatives $z_1, \ldots, z_K \in \{x_1, \ldots, x_n\}$
- [x] Line 2.2 of the algorithm(Given $C_j \in \{C_1, \ldots, C_K\}$ find the best representative $z_j \in \{x_1, \ldots, x_n\}$ such that...) finds the cost-minimizing representatives $z_1, \ldots z_K$ for any distance measure

✔

Solution:

The K-Medoids algorithm is designed so that the two limitations of the K-Means algorithm are resolved.

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

Discussion

Hide Discussion

Topic: Unit 4 Unsupervised Learning (2 weeks) :Lecture 14. Clustering 2 / 3. Introduction to the K-Medoids Algorithm

Add a Post

Show all posts by recent activity

[Staff] Question 2 has an issue/ambiguity. 4

Community TA

[edited] Question 1 3

Community TA

☑	Is it correct to say that, the in-sample representatives from K-Medoids may not minimize the cost function as much as the representatives from K-Means? Assuming both are using Euclidean distance here	2
?	K-means with different distance measure? Can we use k-means with distance measure other than euclidean distance?	3