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8. The K-Means Algorithm: The Specifics

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Exercises due Apr 19, 2023 08:59 -03 Completed


The K-Means Algorithm: The Specifics**Video** [Download video file](#)**Transcripts** [Download SubRip \(.srt\) file](#) [Download Text \(.txt\) file](#)**Finding the Representative z**

2/3 points (graded)

In this problem, we will find the “best” representative z_j for the cluster $\{\mathbf{x}^{(i)}\}_{i \in \mathbb{C}_j}$.

First, compute the following gradient:

$$\nabla_{z_j} \left(\sum_{i \in \mathbb{C}_j} \|\mathbf{x}^{(i)} - z_j\|^2 \right).$$


$$\sum_{i \in \mathbb{C}_j} -2(\mathbf{x}^{(i)} - z_j)$$



Regarding the update of μ , which of the following statements is true?
(Select all that apply.)



The value of μ is affected by points



The value of μ is only affected by points



The obtained μ is the centroid (center of mass assuming each point has equal mass)



Submit

You have used 3 of 3 attempts

Impact of Initialization

0/1 point (graded)

Remember that the K-Means algorithm is given by

1. Randomly select

2. Iterate

1. Given μ , assign each data point x_i to the closest μ , so that

2. Given μ , find the best representatives μ , i.e. find

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You have used 3 of 3 attempts

What if K is 1?

1/1 point (graded)

Now, assume that we are given with _____ as the number of clusters. Now, does initial

☒ No, because cluster assignment does not change in step 2.1

☐ Yes, because representative selection changes in step 2.2

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You have used 1 of 1 attempt

K-Means Drawbacks

1/1 point (graded)

Which of the following are drawbacks of the K-means algorithm with Euclidean distance (as discussed in this lecture)? Select all those apply.

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☐ Does not scale well to large datasets

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So if $K=1$ and we just want one cluster and we randomly initiate z_1 , does z_1 change around to reduce the cost?



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