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7. The K-Means Algorithm: The Big Picture

The K-Means Algorithm: The Big Picture

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The K-Means Algorithm: Step-by-Step

2/2 points (graded)
In the above lecture, given a set of feature vectors

$$S_n = \left\{ x^{(i)} | i = 1, \ldots, n \right\}$$

and the number of clusters K, we saw that we can use the K-Means algorithm to find reasonably good cluster assignments $C_1, \ldots, C_K$ and the representatives of each of the K clusters $z_1, \ldots, z_K$. The algorithm was given like the following:

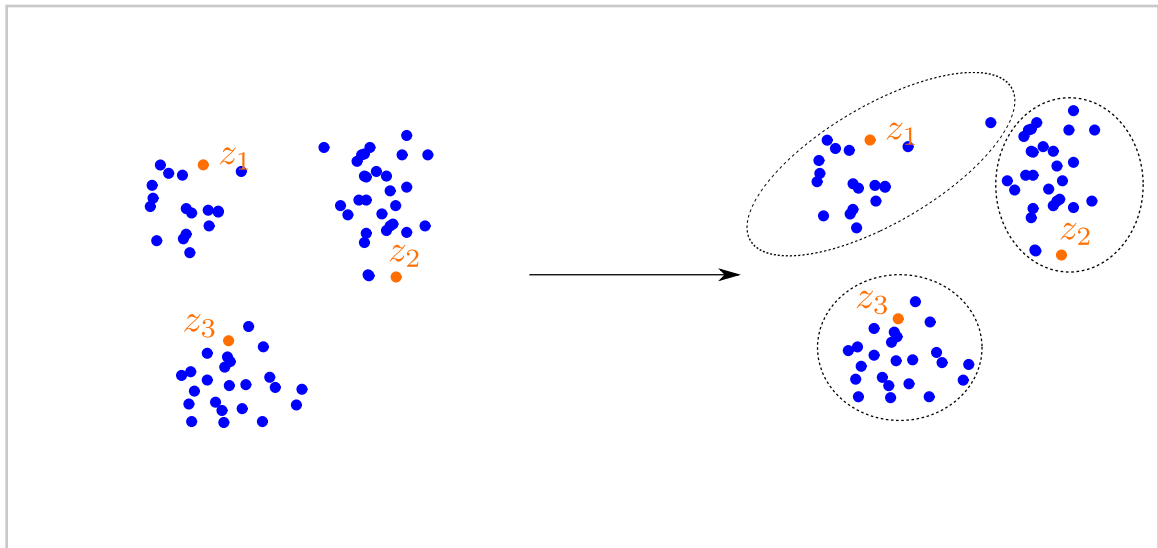   1. Randomly select $z_1, \ldots, z_K$

    2. Iterate

1. Given $z_1, \ldots, z_K$, assign each data point $x^{(i)}$ to the closest z_j, so that

$$\text{Cost}\,(z_1, \ldots z_K) = \sum_{i=1}^{n} \min_{j=1,\ldots,K} \left\| x^{(i)} - z_j \right\|^2$$

2. Given $C_1, \ldots, C_K$ find the best representatives $z_1, \ldots, z_K$, i.e. find $z_1, \ldots, z_K$ such that

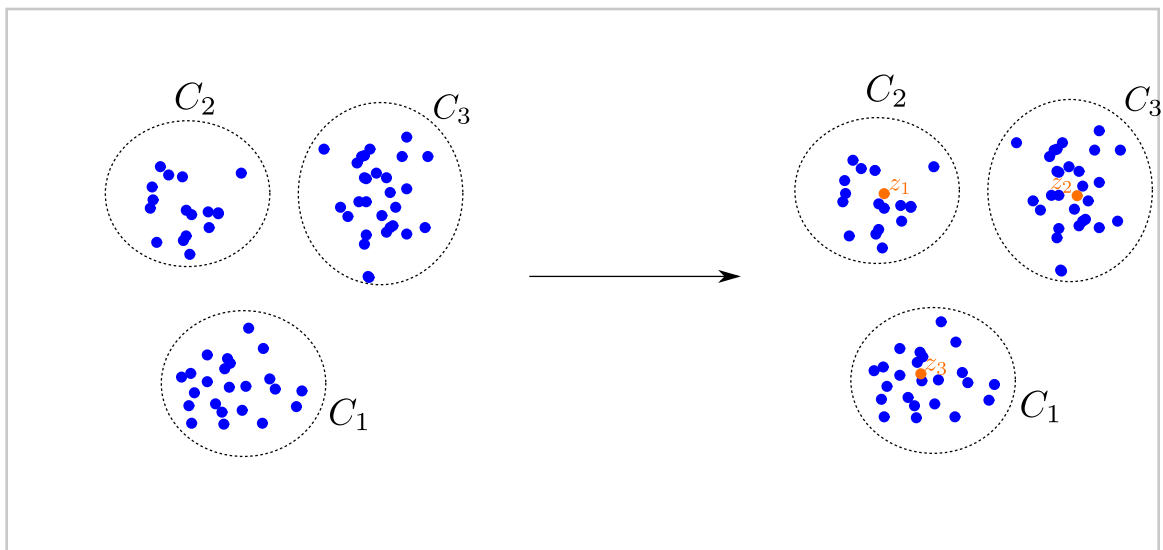$$z_j = \operatorname{argmin}_z \sum_{i \in C_j} \left\| x^{(i)} - z \right\|^2.$$

1. The following figure depicts an example of one of the steps of K-means algorithm:

Which is it?

○ Step 1

◉ Step 2.1

○ Step 2.2

✔

2. The following figure depicts an example of one of the steps of K-means algorithm:

Which step is it?

○ Step 2.1

◉ Step 2.2

✔

Solution:

Step 2.1 assigns each points to the best cluster, while step 2.2 selects out the representative of each cluster. Note that step 1 is random initialization of cluster assignments.

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ⓘ   Answers are displayed within the problem

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Clustering 1 / 7. The K-Means Algorithm: The Big Picture

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