Assignment 6

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1

1.0/1.0 point (graded)

The K −means algorithm is a/an

○ Supervised learning algorithm

● Unsupervised learning algorithm

○ Reinforcement learning algorithm

○ Deep learning algorithm

✓

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2

1.0/1.0 point (graded)

Unsupervised learning

○ Both data and labels

○ Neither data nor labels

○ Labels but not data

● Requires data, but NO labels

✓

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3

1.0/1.0 point (graded)

The cluster assignment indicator $\alpha_4(5)$

○ Equals 0 when $\overline{x}(5)$ belongs to C_4 and 1 otherwise

○ Equals 1 when $\overline{x}(4)$ belongs to C_5 and 0 otherwise

○ Equals 0 when $\overline{x}(4)$ belongs to C_5 and 1 otherwise

● Equals 1 when $\overline{x}(5)$ belongs to C_4 and 0 otherwise

✓

Submit

4

1.0/1.0 point (graded)

The K-means algorithm is imported in PYTHON as

- ○ from sklearn.algorithms import KMeans
- ○ from sklearn import KMeans
- ● from sklearn.cluster import KMeans
- ○ from sklearn.datasets import KMeans

✓

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5

1.0/1.0 point (graded)

The metric used to determine the number of clusers for K-means is

- ● SSE
- ○ Confusion probability
- ○ R2 score
- ○ Probability of error

✓

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6

1.0/1.0 point (graded)

To generate the clusters in PYTHON we employ

- ○ from sklearn.datasets import make_clusters
- ○ from sklearn import make_blobs
- ● from sklearn.datasets import make_blobs
- ○ from sklearn import make_clusters

✓

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7

1.0/1.0 point (graded)

The K −means cost-function to minimize is given as

- ○ $\sum_{i=1}^{K}\sum_{j=1}^{M}\alpha_i(j)\|\bar{x}(j)-\bar{\mu}_i\|$

● $\sum_{i=1}^{K}\sum_{j=1}^{M}\alpha_i(j)\|\bar{x}(j)-\bar{\mu}_i\|^2$

○ $\sum_{i=1}^{K}\sum_{j=1}^{M}\alpha_i(j)\left(\bar{x}(j)-\bar{\mu}_i\right)\left(\bar{x}(j)-\bar{\mu}_i\right)^T$

○ $\sum_{i=1}^{K}\alpha_i(j)\|\bar{x}(j)-\bar{\mu}_i\|^2$

✓

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8

1.0/1.0 point (graded)

To determine the cluster in iteration *l*,

○ We assign $\bar{x}(j)$ to the farthest centroid $\bar{\mu}_{\tilde{i}}^{(l-1)}$

○ We assign $\bar{x}(j)$ to the centroid $\frac{\sum_{j:\bar{x}(j)\in C_i}\bar{x}(j)}{\sum_{j:\bar{x}(j)\in C_i}1}$

○ We assign $\bar{x}(j)$ to the centroid $\frac{\sum_{j:\bar{x}(j)\in C_i}\bar{x}(j)}{M}$

● We assign $\bar{x}(j)$ to the closest centroid $\bar{\mu}_{\tilde{i}}^{(l-1)}$

✓

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9

1.0/1.0 point (graded)

The centroids for the given clusters can be determined as

○ $\frac{\sum_{j:\bar{x}(j)\in C_i}\bar{x}(j)}{M}$

● $\frac{\sum_{j:\bar{x}(j)\in C_i}\bar{x}(j)}{\sum_{j:\bar{x}(j)\in C_i}1}$

○ $\frac{\sum_{j:\bar{x}(j)\in C_i}\bar{x}(j)}{K}$

○ $\frac{\sum_{j}\bar{x}(j)}{M}$

✓

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10

1.0/1.0 point (graded)

The centroids of the clusters are determined as

● Average of all points assigned to cluster i in iteration l

○ Average of all points assigned to all clusters in iteration l

○ Average of only the new points assigned to cluster i in iteration l

○ Average of outliers assigned to cluster i in iteration l

✓

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