OM Review - XVIII

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https://forms.gle/2tsHQa5xVvupV4Pq5

Question 1

MDS objective function is:

$$\min_{Y} \|D(X) - D(Y)\|^2$$

where D(X) and D(Y) are *nxn* distance matrices in the original (say d) and compressed space respectively (say p).
If the distance function chosen is Euclidean, MDS reduces to PCA.

(A) Always

(B) Only if data lies on a linear subspace

(C) Never

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Context

Ali's lecture discusses obtaining LLE as the following algorithm:

(i) Construct K nearest neighbor graph

(ii) Something with $\varepsilon(w) = \sum_{i=1}^{n} \|x_i - \sum_{j=1}^{K} w_{ij} x_{v_i(j)}\|^2$

(iii) Something with $\Phi(y) = \sum_{i=1}^{t} \|y_i - \sum_{j=1}^{t} w_{ij} y_j\|^2$

Question 2

In step 2 which variable are we optimizing over (what do we want to find)?

(A) X

(B) W

(C) Y

(D) All of the others

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Question 3

In step 3 which variable are we optimizing over (what do we want to find)?

(A) X

(B) W

(C) Y

(D) All of the others

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Question 4

In step 2, for any example x_i, consider w_i to be a vector of all weights in R^K space. How do we enforce that?

(A) $w_i^T w_i = 1$

(B) $e^T w_i = 1$ where $e \in R^K$ has all ones.

(C) Both of the others

(D) None of the others

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Question 5

What is K in step 2 of the algorithm

(A) The dimensionality of original data

(B) The dimensionality of reduced data

(C) The number of examples

(D) The choice for the number of nearest neighbors.

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Question 6

What happens when we choose to do LLE with very large number of neighbors?

(A) LLE approaches to PCA

(B) LLE keeps getting better and better

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