Metadata for Section 7

Section Description (from the outline): In this section I describe and demonstrate dimensionality reduction techniques.

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| **Metadata**: Spot the problem, highlight it, and design the solution in 3 core steps  (To be covered in the video) |

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| **Video Number** | **Video Title** | **Problem / Solution (Not more than 50 words)** | **Step 1 (Not more than 10 words)** | **Step 2(Not more than 10 words)** | **Step 3(Not more than 10 words)** |
| 5.1 | Objective of dimensionality reduction | How do we take data with lots of dimensions and crunch it to a handful? With dimensionality reduction techniques | Decide why data needs to be in fewer dimensions | Decide on a dimensionality reduction technique | Reduce the dimensions of the data |
| 5.2 | Principal component analysis (PCA) | How do we find the directions in which the data varies the most? We use PCA | Get a data set | Decide on the number of principal components to use | Perform PCA and use those many principal components |
| 5.3 | SVD | What is SVD? It is a matrix decomposition technique that reveals a lot about a matrix | Load a NumPy 2D array | Decompose the array using SVD | Work with the decomposition |
| 5.4 | Low-Dimensional Representation | How can we transform distances into points? We use multidimensional scaling | Get a dataset | Compute a distance matrix from the dataset | Use MDS to turn the distance matrix into coordinates |