NLP-Text Clustering

Sarang Mete · Following

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Grouping similar sentences/text together.

Methods to check closeness/similarity:

- Euclidean distance: ||a-b||2 = √(Σ(ai-bi))
- Squared Euclidean distance: ||a-b||22 = Σ((ai-bi)2)
- Manhattan distance: ||a-b||1 = Σ|ai-bi|
- Maximum distance:||a-b||INFINITY = maxi|ai-bi|
- Mahalanobis distance: √((a-b)T S-1 (-b)) {where, s : covariance matrix}

There are hundreds of clustering algorithms but commonly used are Centroid models(like K-means) and Hierarchical clustering(like DBSCAN).

Hierarchical (bottom-up) :

1.Assign each data point as a cluster

2.Merge 2 nearest clusters until we've only 1 big cluster

3. Then decide, number of clusters to keep.

We can't predict new data point cluster with DBSCAN because it works on whole text unlike k-means. So if prediction is needed then go with k means else go with DBSCAN.

Great article on DBSCAN.

KNN vs K means

KNN:

Check k nearest neighbors of new data point and assign label on majority label of neighbors.

K-means:

1. Randomly initialize centroids from data points.
2. Assign each data point to cluster using min distance
3. Move centroids to mean of newly assigned data points
4. Repeat steps-2 and 3 until convergence or given number of iterations are over.

K means++: Instead of randomly initializing centroids,use distribution

How do you decide the number of clusters?

1. **The Elbow Method**

Find error/distance of a data point from centroid for each value of k,

choose k where error stops reducing.

1. **The Silhouette Method**

measure of how similar a data point is within-cluster (cohesion) compared to other clusters (separation)

I've created a complete end to end project . You can refer it here.

If you liked the article or have any suggestions/comments, please share them below!

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Resources:

How to Utilize Machine Learning to Automatically Detect Patterns in Text

In the last post, we talked about Topic Modeling, or a way to identify several topics from a corpus of documents. The...

www.dataknowsall.com

https://ruffinisilvia.medium.com/textual-clustering-summarization-and-visualization-e0dcc5c2d3b

https://www.analyticsvidhya.com/blog/2016/11/an-introduction-to-clustering-and-different-methods-of-clustering/

Breaking it Down: K-Means Clustering

Exploring and visualizing the fundamentals of K-means clustering with NumPy and scikit-learn.

towardsdatascience.com

https://medium.com/analytics-vidhya/how-to-determine-the-optimal-k-for-k-means-708505d204eb

https://www.analyticsvidhya.com/blog/2019/05/beginners-guide-hierarchical-clustering/

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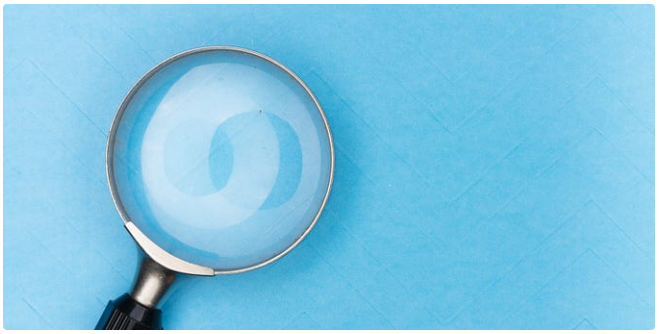

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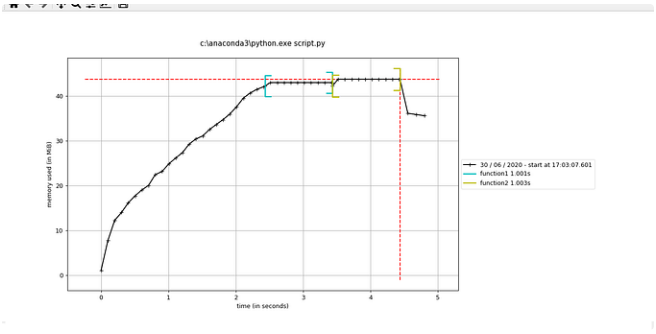

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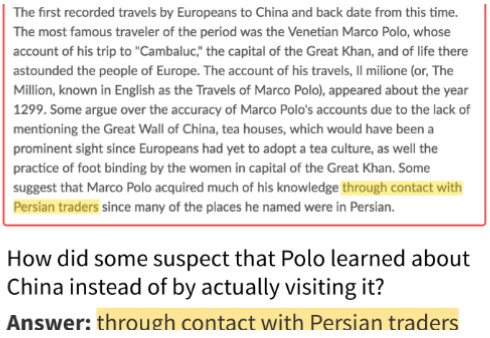

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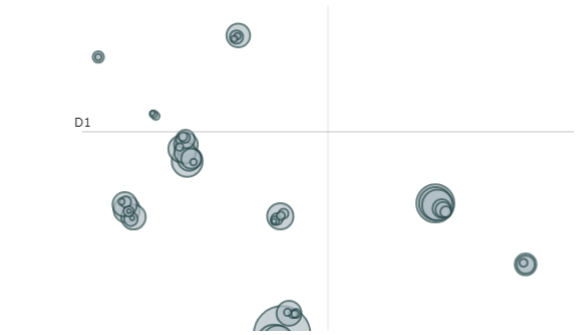

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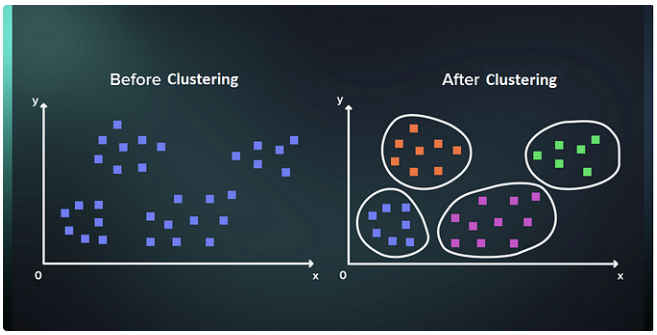

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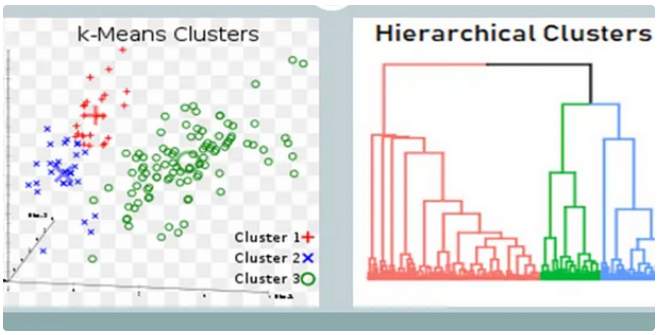

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