Dr. Eick

Group Homework Credit Task Group G

**DBSCAN**

*To present on Tuesday, October 8, 2024*

A dataset consisting of object A, B, C, D, E, F, G, H and I with the following distance matrix is given:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** |
| **A** |  | **2** | **8** | **8** | **9** | **10** | **9** | **4** | **10** |
| **B** |  |  | **8** | **8** | **6** | **9** | **8** | **8** | **9** |
| **C** |  |  |  | **4** | **6** | **9** | **8** | **8** | **11** |
| **D** |  |  |  |  | **6** | **11** | **11** | **9** | **12** |
| **E** |  |  |  |  |  | **3** | **2** | **10** | **12** |
| **F** |  |  |  |  |  |  | **4** | **11** | **6** |
| **G** |  |  |  |  |  |  |  | **12** | **10** |
| **H** |  |  |  |  |  |  |  |  | **9** |
| **I** |  |  |  |  |  |  |  |  |  |

a) Assume DBSCAN is run for this dataset with MINPOINTS[[1]](#footnote-1)=3 and epsilon=ε=5

How many clusters will DBSCAN return and how do they look like? Which objects are core points which objects are outliers/noise points and which objects are border points?

b) How does the result change if we increase the parameter epsilon to 7?

c) When does DBSCAN terminate?

Group Homework Credit Task Group I

**Hierarchical Clustering**

*To present on Thursday, October 26*

**Hierarchical Clustering**

A dataset consisting of object A, B, C, D, E and F with the following distance matrix is given:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| distance | A | B | C | D | E | F |
| A | 0 | 9 | 8 | 15 | 2 | 11 |
| B |  | 0 | 1 | 6 | 5 | 12 |
| C |  |  | 0 | 7 | 10 | 4 |
| D |  |  |  | 0 | 3 | 13 |
| E |  |  |  |  | 0 | 14 |
| F |  |  |  |  |  | 0 |

a) Assume single[[2]](#footnote-2) link hierarchical clustering is applied to the dataset! What dendrogram will be returned?

b) Does the clustering result change of we use Max/Complete Link[[3]](#footnote-3) instead?

c) How does hierarchical clustering differ from more classical clustering algorithms, such as K-Means and DBSCAN?

1. The object itself counts towards the number of objects in its ε-radius when determining core points! [↑](#footnote-ref-1)
2. When assessing the distance between clusters the minimum distance is used. [↑](#footnote-ref-2)
3. When assessing the distance between clusters the maximum distance is used; that is, the distance of the pair of objects one in one cluster and one in the other cluster that are furthest apart is used. [↑](#footnote-ref-3)