| MAKECLUSTER (Clusters [], Point P1, Point P2)  |
|--|
| Input: A list of ourient Clusters, points p1 and p2  |
| which are used to create or expand on a Cluster.   |
| Output: The list of Clusters   |
| in1= Search Cluster (clusters, P1)   |
| in 2 = Search Cluster (clusters, P2)   |
| if in1# == in12;   |
| elif len(clusters [in/1])>   an 2 len(clusters [in/2]) > 1:  |
| join Clusters (clusters, IN21, in22)   |
| elif len(clusters Cin2])==   and lon(chaters Cir2])>1:   |
| ioin Clusters (clusters, in11, in22)   |
| dif len (clusters Cinl] > and len (clusters Cinl2]) = 1:   |
| join Clusters (clusters, in21, in22)   |
| elf lon (clusters [in] 1) ==   and lon (clusters [in]) == 1;   |
| make auster (clusters, In11, in12)   |
| return Clusters  |
| C 1 14. (1.21 ) (6.21 )  |
| Complexity O(n2 logn) (for the implemental pseulocale)   |
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Lemma: Suppose your algorithm returns a K-clustering X and there exists an optimal K-clustering OPT. If X 11-ffers from OPT by i points, then OPT can be transformed into X without Lelvesing its spacing. front Basis let i= O. Then X = OPT and certainly OPT can be transformed into X. Hypothesis Suppose, for all Osisk, OPT can be transfirmed Inhetive Step · Let i=K+1. Since K=0, i=1. Then those exists a point p in the cluster Egot under OPT but in cluster Cx unler X. Let u be the closest point to p in Cx and v be the closest point to p in Copt. · Since our algorithm greedly choses to maximize Spacing by clustering in increasing order of distance, it must be that the distance between It and p is less than that of v and p. If p were to be clustered with U in Copt, the Listance between Copt at Cy would increase. Thus OPT-1/2 not chister greezely bu Distance as X hel. Thus OPT can be Warsformed into X without Lecreasing its specing.