Libras 属性个数特别多的数据集上效率提升较少,仍需进一步加以改进.

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附录

定理 3.2 的简要证明.

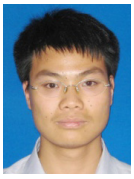
需要分 4 种情形.

1) $P\in C_i,O_i\in O\cap O'$,若 $dist(P,O_i)<\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$,此时说明在所有的新交换中心点中,点 P 与新中心点的距离均大于 $dist(P,Q_i)$,因此,$P\in C_i$;

2) $P\in C_i,O_i\in O\cap O'$,若 $dist(P,O_i)<\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$ 不成立,此时说明在所有的新交换中心点中,存在新中心点,使得点 P 与该新中心点的距离小于 $dist(P,Q_i)$,因此,P 需要重新分配到该新中心点(最小距离)所代表的簇中,即,满足 $dist(P,O'_l)=\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$;

3) 当 $P\in C_i,O_i\notin O'$,说明点 P 所在的簇 i 的中心点已经更换,若 $dist(P,O_i)>\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$,则说明存在新中心点,使得点 P 到该新中心点的距离要小于原始簇的距离 $dist(P,Q_i)$,此时需要 P 重新分配到该新中心点(最小距离)所代表的簇中,即,满足 $dist(P,O'_l)=\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$;

4) 当 $P\in C_i,O_i\notin O'$,说明点 P 所在的簇 i 的中心点已经更换,若 $dist(P,O_i)>\min_j\{dist(P,O'_j)\mid O'_j\in O'-O\}$ 不成立,则说明所有新更换的中心点到 P 的距离均大于原始簇的距离 $dist(P,Q_i)$,此时需要比较所有中心点,以确定 P 所属的簇,即,满足 $dist(P,O'_l)=\min_j\{dist(P,O'_j)\mid O'_j\in O'\}$.



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