

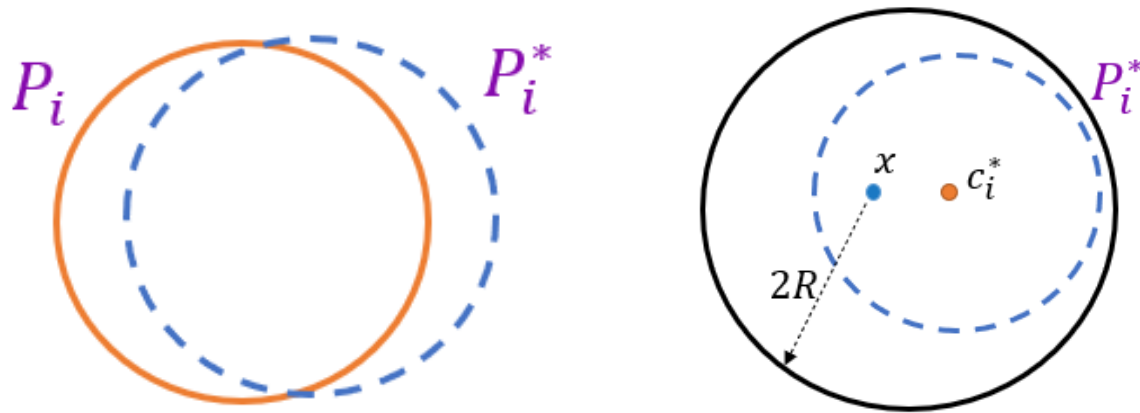
Learning-augmented approximation algorithms for group fair k -center clustering

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Problems & Ideas

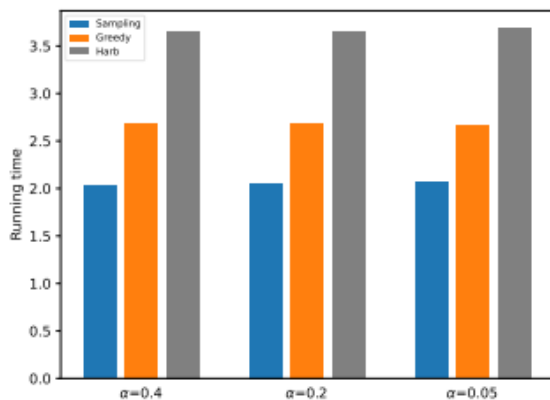
- Problems of approximating group fair k -center clustering:
 - The previous algorithms are hard to overcome the computational barriers and achieve the lower bound approximation ratio.
 - Existing algorithm for the special case relied on a tree-structure to adjust the assignment of point with a large approximation.
- Ideas: A sampling algorithm that can bound the approximation loss in the process of obtaining final solution and ensure the existence of a 2-approximate solution for given instance.



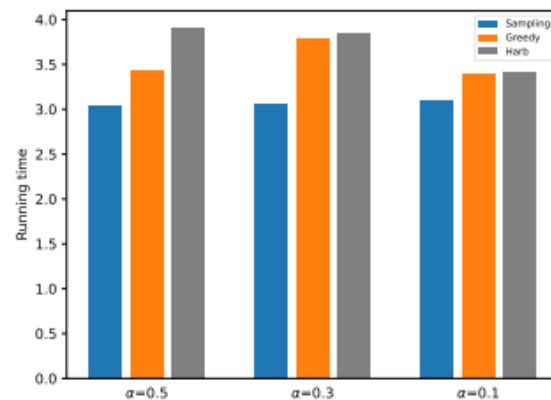
Left: An example of the learning-augmented setting, where P_i^* is the optimal cluster and P_i is the auxiliary cluster; Right: Our sampling-based method can ensure that the selected point x is close to the optimal center c_i^* with a small approximation loss.

Main Contributions

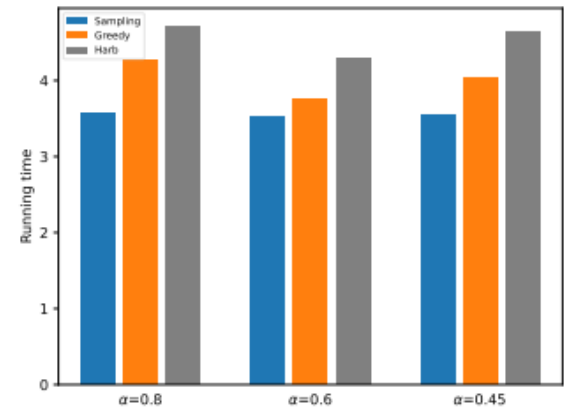
- Contributions:
 - We break the previous computational barrier, and obtain a 2-approximation with 1, which is almost near optimal compared with the lower bound approximation ratio 2 for the k -center problem;
 - The sampling-based algorithm can work for the special case to obtain desired approximate solution without fairness violation;
 - We also propose a deterministic heuristic algorithm. Experiments on real world datasets show that our proposed algorithms perform better than the state-of-the-art algorithms.



(a) Reuters



(b) Victorian



(c) 4area

Comparison of average time in seconds returned by algorithms for the group fair k -center problem on three real datasets.