Aggregation-based Dual Heterogeneous Task Allocationin Spatial Crowdsourcing

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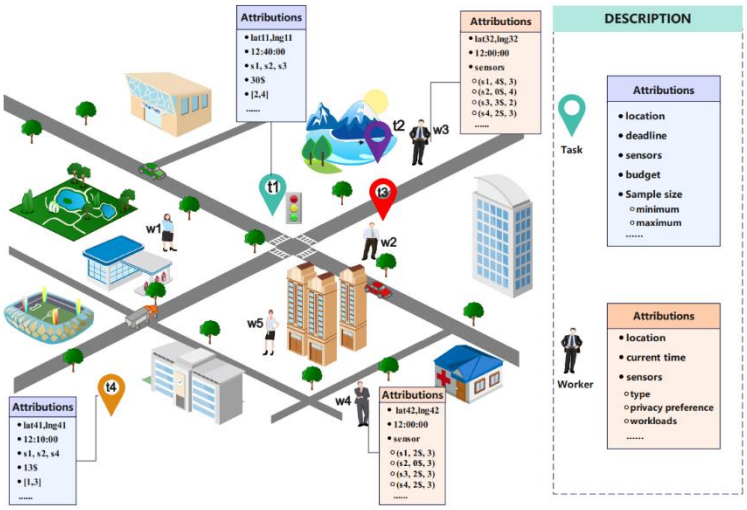
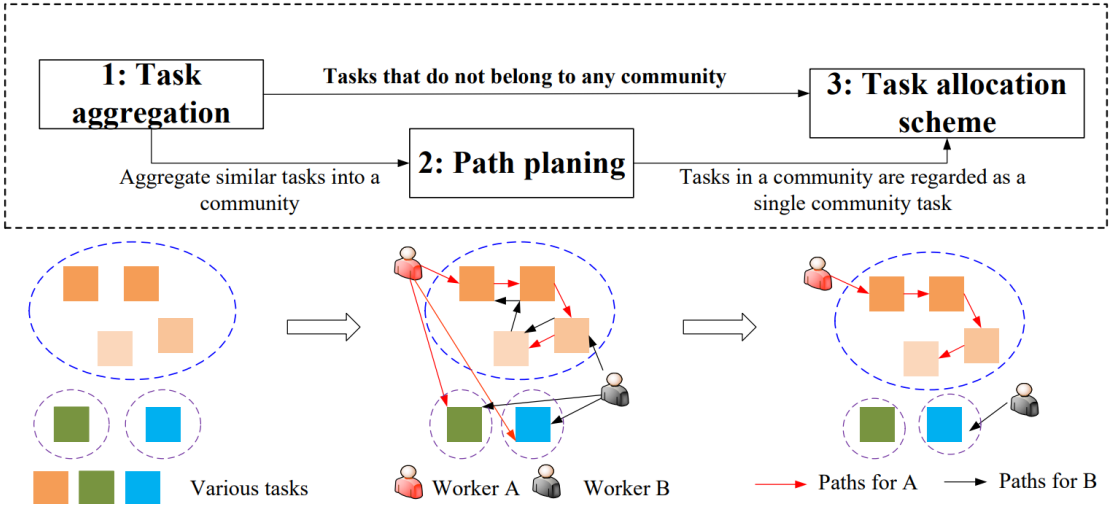
Frontiers of Computer Science, DOI: 10.1007/s11704-023-3133-6

Problems & Ideas

- Problems of heterogeneous task allocation in Spatial Crowdsourcing:
  - In real spatial crowdsourcing, heterogeneous tasks and workers with different privacy preferences coexist, posing great challenges to task assignment.
  - Existing studies only focus on the heterogeneous characteristics of tasks or workers.
  - The dual heterogeneous increases the search space of task allocation and makes the conflict between budget and cost more intense.
- Ideas: A dual heterogeneous task allocation algorithm based on



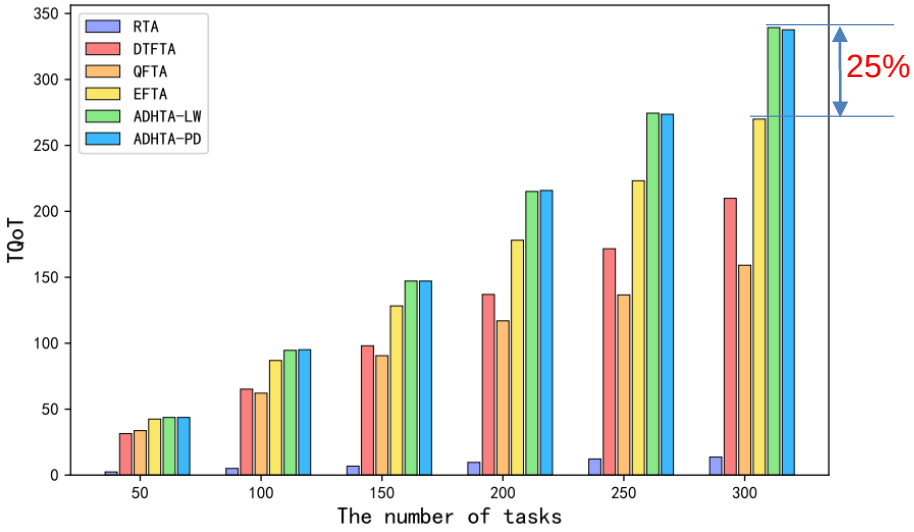
Left:Dual heterogeneous task allocation scenario.

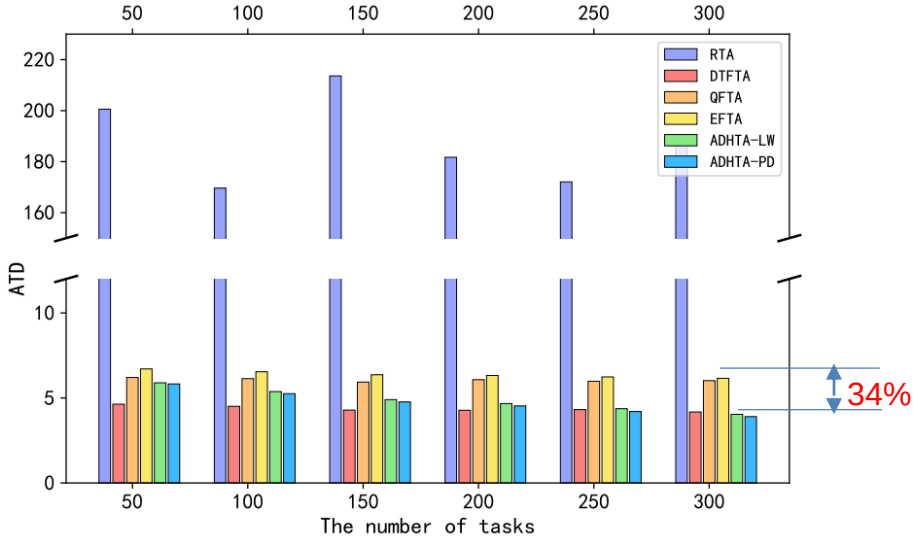


Right: overview of the aggregation-based dual heterogeneous multi-task allocation algorithm

Main Contributions

- Contributions:
  - The dual heterogeneous task allocation problem is proven to be NP-hard;
  - An aggregation-based dual heterogeneous task allocation algorithm is developed to maximize the quality of task completion while minimizing the total travel distance;
  - We demonstrated that the proposed algorithm improved task completion quality by 25% and reduced average travel distance by 34% compared to the baseline algorithm. The advantage of the algorithm becomes more significant as the number of tasks(workers) increases.





The total quality of task completion and average travel distance of each method change trend with the number of tasks.
Left:the total quality of task completion(TQoT). Right: the average travel distance(ATD).