Joint User Association and User Scheduling for Load Balancing in Heterogeneous Networks

ABSTRACT

This paper investigates joint user association (UA) and user scheduling (US) for load balancing over the downlink of a wireless heterogeneous network by formulating a network wide utility maximization problem. In order to efficiently solve the problem, we first approximate the non-convex throughput achieved with US to a concave function, and demonstrate that the gap for such an approximation approaches zero when the number of users is sufficiently large. Then, by exploiting a distributed convex optimization technique known as alternating direction method of multipliers, a joint UA and US algorithm, which can be implemented on each user's side and base station (BS)'s side separately, is proposed to obtain the single-BS association and resource allocation solutions. A remarkable feature of the proposed algorithm is that apart from load balancing, multiuser diversity is exploited in the association process to further improve system performance. We also extend the algorithm design to multi-BS association, whereby a user is associated with multiple BSs. The simulation results show the superior performance of the proposed algorithms and underscore the significant benefits of jointly exploiting multiuser diversity and load balancing.

EXISTING SYSTEM

- In Existing system, joint single-BS UA and US algorithm by adopting ADMM to maximize the aggregated logarithmic throughputs of all users and the original problem was decomposed into three subproblems.
- This improves by incorporating a more general utility function in the joint UA and US algorithm, which can be implemented at each user and BS separately to further improve the implementation efficiency.
- The resulting algorithm can be implemented far more efficiently than the subgradient-based methods.

PROPOSED SYSTEM

- Our proposed CUA is the first joint UA and US approach is that efficiently exploits both the load balancing gain and the during each association.
- An efficient implementation of CUA is developed by transforming the original non-convex objective function to a convex function and by utilizing the ADMM technique.
- In addition to load balancing, CUA can achieve multiuser diversity gain by exploiting the property of the channel fluctuations in the association time to further improve the system performance.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

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