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Peer Review

Review of: "A “Breathing” Mobile Communication Network"

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This paper proposes a real-time dynamic optimization framework to balance antennas' busy degrees using CPICH transmit power adjustments in mobile communication networks. The framework is named a “breathing” mobile communication network, where antennas dynamically adjust their coverage areas. Besides, Algorithms BDBA and BFDBA are introduced for balancing busy degrees without relying on long-term predictions. Below is a detailed review of the abstract.

I would recommend the following changes before accepting it for publication:

- While the abstract introduces the two algorithms, there is little explanation of how they specifically work or what distinguishes them from existing solutions. Providing a hint of their unique characteristics or how they improve upon prior methods would be beneficial.
- The theoretical analysis mentions certain assumptions under which consensus is reached, but the abstract does not specify what these assumptions are.
- While the abstract mentions that simulations on three large datasets were performed, it does not provide any specific results or performance metrics. Mentioning a few key performance indicators or a general summary of the simulation outcomes would be helpful.
- The authors mention that the dataset corresponds to a "static optimization" state. Does this imply that the simulations are based on static network conditions, or do they account for dynamic network changes over time?

Answer the following questions:

- Can the proposed algorithms handle large-scale networks with thousands of antennas in real time, or is there a practical limit to their scalability in terms of computational resources?

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- How does the system perform under sudden traffic spikes or large fluctuations in network demand? Are the proposed algorithms robust enough to handle such dynamic changes?
- How quickly do BDBA and BFDBA converge to the optimal or near-optimal state? Are there any guarantees regarding the time required for convergence, and how does this vary with network size or complexity?
- Have the proposed algorithms been tested in a real-world deployment beyond simulations (e.g., in a live network environment)? What challenges might arise when transitioning from simulated to real-world conditions?
- How adaptable are BDBA and BFDBA to different network architectures or different types of mobile communication technologies (e.g., 5G, Wi-Fi)? Are the algorithms designed to work across multiple network types, or are they tailored for a specific scenario?
- The datasets used (dataset-A, dataset-B, and dataset-C) seem to come from the same geographic region (Beijing) and are sourced from the same mobile network provider (Beijing Mobile Company). While they include different numbers of antennas and pieces of MR data, the similarity in their source could raise concerns about the generalizability of the results.
- The abstract mentions that the coverage rate reaches 99.9% with the algorithms. Does this imply a guarantee for all users, or is it an average? How does the network maintain QoS during periods of extreme congestion or in low-coverage areas?

Declarations

Potential competing interests: No potential competing interests to declare.

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