

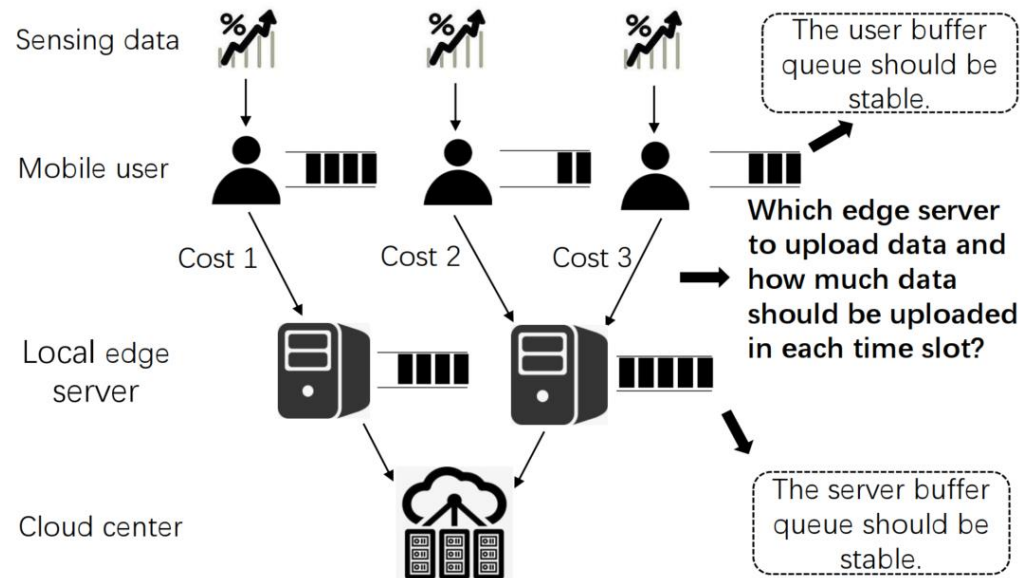
# Stability-Aware Data Offloading Optimization in Edge-Based Mobile Crowdsensing

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# Problems & Ideas

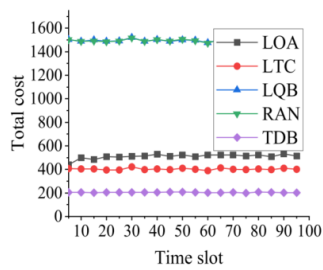
- Problems of conventional MCS frameworks:
  - Traditional frameworks utilize cloud-based centralized architectures, which suffer from network delays and significant transmission costs.
- Ideas: local edge servers (e.g., micro data centers and smart gateways) can be deployed between the cloud center and mobile devices to store, filter, aggregate and transmit data in parallel. This is called edge-based MCS.



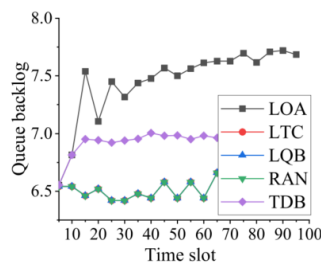
Problem description in the edge-based MCS

# Main Contributions

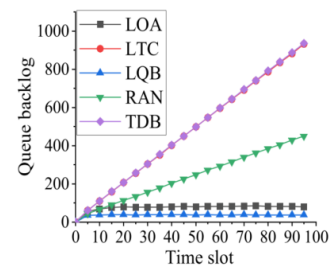
- Contributions:
  - We investigate the data offloading in the edge-based MCS scenario and formulate the data offloading problem as a double-queue Lyapunov optimization problem. Furthermore, we propose a data offloading;
  - We analyze the performance of the proposed Lyapunov optimization based approach and provide the bounds of the total cost and the queue backlog of the proposed approach;
  - We further consider a multiple data type scenario and formulate the problem as a minimum weight bipartite graph complete matching problem. Subsequently, we introduce a data offloading strategy based on the Kuhn-Munkres algorithm.



(a) Totalcost



(b) User queue



(c) Server queue

Total cost, user queue backlog, and server queue backlog with time slot