

# Abstract

**Ehab Farouk Badran**

## **Maximizing Clearance Rate of Budget-Constrained Auctions in Participatory Mobile CrowdSensing**

Mobile devices equipped with diverse sensors have emerged as ubiquitous data collection systems within the rising paradigm of Mobile CrowdSensing (MCS). In MCS, auctions are adopted as effective incentive mechanisms in order to secure an acceptable level of contribution from users in participatory MCS. Recent techniques in the literature have addressed several challenges in auctions-based task assignments in centralized MCS. In this research, towards effective task-participant matching, we focus on maximizing the number of completed tasks, the Clearance Rate (CR), which has not been addressed in the literature to date despite the impact it exercises on the satisfaction of service demanders. We propose new bidding procedures for the task allocation strategy. The proposed procedures generalize well to reputation-aware auctioning while handling practical scenarios experienced during campaigns with budget constraints. Particularly, we show that for campaigns that are held consecutively in time, the adoption of an intuitive look-back strategy, for budget transfer from previous campaigns, would remarkably influence the CR. Moreover, observing that tasks with a few bidders should be assigned a higher priority in order to get accomplished, we introduce a new factor for task redundancy. In addition to promoting the accomplishment of unpopular tasks, this factor spares the budget to accomplish more tasks by penalizing redundant task assignment. Extensive performance evaluation of the proposed methods is carried out under various system parameters, namely the number of tasks, auctions, and participants. We demonstrate the effectiveness of the suggested procedures through a significant-and-consistent increase, that ranges from 50% – 500%, in the attained CR compared to the most recent techniques in the literature.