Abstract

This proposal addresses the problem of spatial and temporal coverage for crowdsensing (CS). In particular, the approach focuses on the coverage of isolated sub-regions from the target area where participants' density is very low. We tackle this problem by persuading participants to modify their ongoing trajectories and visiting those regions before reaching their final destinations. We model a sensing market as a non-cooperative game, where participants are the players and trajectories are the strategies. Thereby, a crowdsoucer announces a task per sub-region and the corresponding compensation. The interested participants who decide to visit that region and work on its posted task, submit their current location and final destination as well as the amount of data they are willing to collect on the sensing task. Similar to any other market, the members of a CS market want to maximize their utilities. The contributors maximize their utilities by strategizing their sensing plans, namely visiting the crowdsources sub-regions and sampling on the way to their destinations, i.e., choosing the trajectory that maximizes their utilities. On the other hand, crowdsources maximize their utilities by predicting the contributors’ contribution.

Our preliminary solution maps a set of sub-regions of the area of interest into a graph representation or grid. Thus, our approach consists of a greedy algorithm in which contributors are able to compute the expected utility of moving to any of their adjacent location (cell) in the next time step. By following this rule the contributors deviate from the original trajectories in order to increase the utility. In addition, we add an extra term called capacity which summarizes all the costs from moving from one cell to another and sensing there. The purpose of this term is to avoid the contributors to going around forever sensing and increasing their utility, and guaranteed that contributors will eventually arrive at their destination. Thus, we study the effect of rewards and capacity on the increase of area coverage and contributors utility.