

ReSmart: Distributed Stable Task Matching in Non-stationary Spatial Crowdsourcing

ABSTRACT

The research of the two-sided matching market problem has been studied for many years and extensively employed in diverse web-based applications. Recent related works focus on the setting where one-side market participants (i.e. players) do not know their preferences prior over the other-side market participants (i.e., arms) and the arms know their preference over players. Most of these works assume that each player's preference is invariant, i.e., the preference value follows a distribution with a definite mean. However, the preference values might be constantly changing and correlated with the state of the arms in the practice of the matching market, which we call the dynamic matching market. First, to fill this gap, we focus

on the algorithm design of restless bandit learning in the dynamic matching market and propose the first Thompson Sampling-type bandit learning algorithm in this setting, called Resmarts. Then, we also propose a new metric, dynamic stability, to measure the stability of the market outcome in the dynamic setting. Moreover, we give the regret analysis and stability analysis of Resmart theoretically. Finally, the significant performance of the Resmart algorithm is demonstrated through extensive simulations.

NOTE:

Plan to submit this paper to VLDB, but specific details are not yet publicly available. The document will be updated once the submission is complete.