Dynamic Incentive-aware Learning: Robust Pricing in Contextual Auctions

ABSTRACT - We consider the problem of robust learning of reserve prices against strategic buyers, in repeated contextual second-price auctions. Buyers' valuations for an item depend on the context that describes the item. However, the seller a priori is not aware of the relationship between the context and buyers' valuations. The seller's goal is to design a learning policy to set reserve prices using the past sales data, and her objective is to maximize her total revenue. On the other side, utility-maximizing buyers have the incentive to bid untruthfully to manipulate the seller's learning policy. We propose learning policies that are robust to such strategic behavior. These policies use the outcomes of the auctions, rather than the submitted bids, to estimate the preferences while controlling the long-term effect of the outcome of each auction on the future reserve prices. We propose Contextual Robust Pricing (CORP) policy and its variants that are designed for different settings of the problem and analyze the seller's regret against a clairvoyant policy that knows buyers' heterogeneous preferences.

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SPEAKER BIO – Adel Javanmard is an Assistant Professor in the Department of Data Sciences and Operations, Marshall School of Business at the University of Southern California, where he also holds a courtesy appointment with the Computer Science department. Prior to joining USC in 2015, he was a NSF postdoctoral research fellow at the Center for Science of Information, with worksite at UC Berkeley and Stanford University. He completed his PhD at Stanford University in 2014. His research interests are broadly in the area of high-dimensional statistics, machine learning, optimization, and personalized decision-making. Adel is the recipient of several awards and fellowships, including the IMS Tweedie Researcher award, the NSF CAREER award, Adobe Faculty Research award, Google Faculty Research award, the Thomas Cover dissertation award from the IEEE Society, Douglas Basil Award for Junior Business Faculty, the Zumberge Faculty Research and Innovation award, and the NSF CSoI Postdoctoral Fellowship.

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