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FRIDAY, NOVEMBER 6TH AT 9:30 AM

ROOM 113, SPEAKMAN HALL

RECOMMENDER SYSTEMS AND CONSUMER WELFARE: RESULTS FROM A RANDOMIZED EXPERIMENT IN VIDEO-ON-DEMAND

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Abstract

The generalization of e-commerce and the increased availability of consumer level data led to the uprising of new recommender systems. Today, recommender systems are pervasive and used across many activities irrespective of the price of the goods and services one wants to purchase (shoes, cars, houses) or the importance of what one wants to find (a college to attend, a doctor, a love partner). Firms design and implement recommender systems and consumers configure them using, for example, search terms and filters, to find the products that better match their preferences. Firms design these systems to maximize profit conditional on the parameters defined by consumers. Does this strategic behavior of firms hurt consumers and if so how much? We use a structural model of consumer behavior to identify conditions under which the order in which firms suggest products to consumers (that is, the recommender system that maximizes profit) is different from the order in which consumers would like to obtain such suggestions (that is, the recommender system that maximizes consumer surplus). We characterize this conflict and measure its magnitude with data from a real-world example. For half a year in 2014 we randomized the price and the order in which 260 movies were suggested to 300 thousand households using the Video-on-Demand (VoD) system of a major European cable provider. Using the data collected from this field-experiment we parameterize a Cobb-Douglas demand function that we use to run several simulations. In this VoD system, we find that using a recommender system that maximizes profit reduces consumer surplus by 13% relative to the maximum consumer surplus that could have been attained. We also show that the recommender system that maximizes profit does not hurt consumers more than simple recommender systems that suggest, for example, the most sold or the highest rated movies. Therefore, consumer trust is unlikely to erode when the firm repeatedly uses a recommender system to maximize profit. Also, the recommender system that maximizes consumer surplus does not hurt profit more than these simpler types of recommender systems and thus there seems to be room to design new recommender systems that improve welfare.