

MISQ Archivist

Reducing Recommender Systems Biases: An Investigation of Rating Display Designs

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Abstract

Prior research has shown that online recommendations have a significant influence on consumers' preference ratings and economic behavior. Specifically, biases induced by observing personalized system recommendations can lead to distortions in users' self-reported preference ratings after consumption of an item, thus contaminating the users' subsequent inputs to the recommender system. This, in turn, provides the system with an inaccurate view of user preferences and opens up possibilities of rating manipulation. As recommender systems continue to become increasingly popular in today's online environments, preventing or reducing such system-induced biases constitutes a highly important and practical research problem. In this paper, we address this problem via the analysis of different rating display designs for the purpose of proactively preventing biases before they occur (i.e., at rating collection time). We use randomized laboratory experimentation to test how the presentation format of personalized recommendations affects the biases generated in post-consumption preference ratings. We demonstrate that graphical rating display designs of recommender systems are more advantageous than numerical designs in reducing the biases, although none are able to remove biases completely. We also show that scale compatibility is a contributing mechanism operating to create these biases, although not the only one. Together, the results have practical implications for the design and implementation of recommender systems as well as theoretical implications for the study of recommendation biases.

Keywords: Recommender systems, decision bias, interface design, preference ratings, scale compatibility, experimental research