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Rating Systems under Customer Disconfirmation Bias: Asymptotic Behavior and Granularity

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Abstract

Customers and platforms increasingly rely on online ratings to assess the quality of products and services. However, customer ratings are susceptible to various biases. Disconfirmation bias is a specific form where customers incorporate the discrepancy between their prior expectations and post-purchase experiences into their ratings. We study the asymptotic behavior of ratings in the presence of disconfirmation bias in three rating systems: (i) complete system, where customers observe the entire rating history; (ii) aggregate system, where only the frequency of each rating option is available; and (iii) average ratings, where customers solely use the average of past ratings. Customers are Bayesian and update their quality beliefs upon observing the ratings. After experiencing the product, they rate it according to their heterogeneous ex-post utility and disconfirmation bias. In complete and aggregate systems, we show that customer beliefs converge to the intrinsic quality when disconfirmation bias is small. When this bias is large, there will be a discrepancy between converged beliefs and the intrinsic quality, although this discrepancy could be arbitrarily small. When the disconfirmation bias is intermediate, beliefs may diverge significantly from the intrinsic quality or not converge. However, we establish that the platform can guarantee correct learning by designing a sufficiently granular rating system, i.e., a system with more rating options. We confirm all these results in the system with average ratings, albeit with a bias-correcting rule. Finally, we characterize the learning speed in the aggregate system.

Conference Track

Modeling and Simulation