Valentina E. Balas · G. R. Sinha ·
Basant Agarwal · Tarun Kumar Sharma ·
Pankaj Dadheech · Mehul Mahrishi (Eds.)

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Popularity Bias in Recommender Systems - A Review

Abdul Basit Ahanger, Syed Wajid Aalam, Muzafar Rasool Bhat(✉), and Assif Assad

Islamic University of Science and Technology, Awantipora, India
muzafar.rasool@islamicuniversity.edu.in

Abstract. With the advancement in recommendation techniques, focus is diverted from just making them more accurate to making them fairer and diverse, thus catering to the set of less-popular items (the long tail) that often get neglected due to inherent biases in recommender systems. Popularity bias has been recently acknowledged as a major bias of critical concern in the field of recommender systems. Although research on popularity bias has gained pace from the last couple of years, this field is believed to be still in its infancy. To advance research in this area, this paper thoroughly investigates current state of the art and could have a very positive impact on further research in popularity bias. Besides the mitigation techniques discussed in this paper, allied evaluation metrics that were used in measuring popularity bias have also been discussed.

Keywords: Popularity bias · Algorithmic bias · Recommender systems

1 Introduction

1.1 Recommender Systems

Recommender Systems (RS) have evolved, since their development in these three decades, from information filtering systems designed to tackle with the information overload of humongous data available online to accurate online prediction systems. The main goal of recommendation systems is to suggest the most relevant items to the users as accurately as possible to the best satisfaction of the user through analysis of their preferences by observing their interactions (clicks, ratings, likes etc.) with the system in question. The evaluation of the accuracy of the recommender system has improved from error based metrics like Mean Absolute Error to accuracy based metrics like precision, recall and nDCG [10].

As the prediction accuracy of recommender systems rose, research focus shifted to making recommendations more fair, diverse, novel and serendipitous by removing biases inherent in the data and the bias amplification that arose from the algorithms themselves.

Popularity bias is one of the biases found in recommender systems. Research has found that user satisfaction in popular trend suggestions is of the same

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