Abstract

Recommendation system can recommend content on a particular user based on rating predictions, user preferences, or other methods. However, many recommendation system methods are experiencing popularity bias, where popular content will be often recommended, while less popular content is never recommended. Controlling popularity bias by making the recommendations proportion balanced between popular and non-popular content is required on the recommendation system, with the aim of providing access to new content and making more diverse recommendations. The fairness aware regularization method of the learning-to-rank recommendation system can control the popularity bias by increasing the recommendation proportion of non-popular content to make recommendation between popular and non-popular content are balanced. Such methods may increase the recommendations proportion of mid-level non-popular content without compromising rank performance on the recommendation system. Based on the results of the test using the amazon review dataset, the method can increase the recommendations proportion of mid-level non-popular content up to 54.1% in Average Percentage of Tail (APT) measurement and introduce 173 different non-popular content to each user, with performance which remains good with a value of 0.281 in Normalized Discounted Cumulative Gain (NDCG) measurement and validated by comparing with other popular method.

Keywords: Recommendation system, Learning to Rank, Popularity Bias, Fairness Aware Regularization