

## Fairness in Recommendations Ranking: From Pairwise Approach to Listwise Approach

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**Abstract :** Machine Learning (ML) systems are trained using human generated data that could be biased by implicitly containing racist, sexist, or discriminating data. ML models learn those biases or even amplify them. Recent research in work on has begun to consider issues of fairness. The concept of fairness is extended to recommendation. A recommender system will be considered fair if it doesn't under rank items of protected group (gender, race, demographic...). Several metrics for evaluating fairness concerns in recommendation systems have been proposed, which take pairs of items as 'instances' in fairness evaluation. It doesn't take in account the fact that the fairness should be evaluated across a list of items. The paper explores a probabilistic approach that generalize pairwise metric by using a list k (listwise) of items as 'instances' in fairness evaluation, parametrized by k. We also explore new regularization method based on this metric to improve fairness ranking during model training.

**Keywords :** Fairness, Recommender System, Ranking, Listwise Approach

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