RQ1: Why is Strategy A better than Strategy B?

We counted the re-ranking accuracies of RPF and baselines in each interval (from 2022/4/22 to 2022/5/8) on KuaiRand dataset. The variance of user accuracies in each interval is found to be relatively small and varies little from interval to interval. Therefore, we can know that the difference between the accuracy of each user in each interval and the average accuracy is relatively small.

date	Bankruptcy	Prop	Naive	P-MMF	TFROM	FairRec	PCT
2022/4/22	0.000137	0.000113	0.000114	0.000716	0.001707	0.005483	0.003798
2022/4/23	0.000238	0.000214	0.000216	0.000763	0.001733	0.005017	0.004036
2022/4/24	0.000154	0.000153	0.000197	0.000817	0.001989	0.005597	0.004240
2022/4/25	0.000143	0.000180	0.000166	0.000813	0.002128	0.005123	0.004059
2022/4/26	0.000154	0.000127	0.000113	0.000857	0.001925	0.005189	0.004032
2022/4/27	0.000144	0.000129	0.000119	0.000785	0.001913	0.005032	0.003918
2022/4/28	0.000107	0.000093	0.000099	0.000807	0.002057	0.005439	0.003977
2022/4/29	0.000170	0.000155	0.000151	0.000778	0.001771	0.005167	0.003710
2022/4/30	0.000153	0.000154	0.000146	0.000711	0.001676	0.005083	0.003752
2022/5/1	0.000191	0.000184	0.000166	0.000689	0.001618	0.004805	0.003715
2022/5/2	0.000139	0.000117	0.000127	0.000804	0.001618	0.005042	0.003666
2022/5/3	0.000144	0.000121	0.000127	0.000707	0.001739	0.005192	0.003838
2022/5/4	0.000116	0.000127	0.000172	0.000744	0.001800	0.004909	0.003652
2022/5/5	0.000128	0.000148	0.000152	0.000694	0.001869	0.004989	0.003842
2022/5/6	0.000132	0.000125	0.000121	0.000690	0.001684	0.005131	0.003856
2022/5/7	0.000160	0.000152	0.000150	0.000762	0.001622	0.004993	0.003889
2022/5/8	0.000102	0.000083	0.000080	0.000690	0.001509	0.004529	0.004285
Avg	0.000148	0.000140	0.000142	0.000755	0.001786	0.005101	0.003898
Var	1.02557E-09	1.0981E-09	1.22199E-09	2.91651E-09	2.92631E-08	6.37152E-08	3.49603E-08

By the experimental observation above, we can conclude that:
When a user interacts with a recommender system, the system strives to provide recommendations with an accuracy that is around the average accuracy. However, in the example you provided, the variance in accuracy on different days for Strategy A is inconsistent. On the first day, there is a non-zero variance (60 users are 1, 20 users are 0), but on the second day, the variance is zero(all 20 users are 1).

This inconsistency does not align with our setting, where we expect the variance of accuracy to be relatively uniform across different intervals. By controlling the average accuracy, we can ensure that the accuracy received by each user across various intervals is stable and predictable. This predictability is crucial for maintaining a reliable recommendation system that can consistently meet user expectations and

provide a satisfactory experience.
We will revise the paper based on your suggestions.

RQ2: The accuracy metric employed in the paper seems to be inappropriate.

	KuaiRand			Industrial		
model	Top-5	Top-10	Top-20	Top-5	Top-10	Top-20
TFROM	0.9052	0.9426	0.9457	0.8611	0.8876	0.8870
P-MMF	0.9169	0.9503	0.9652	0.9500	0.9697	0.9796
FairRec	0.5236	0.5788	0.5978	0.4030	0.4386	0.4750
PCT	0.8761	0.8084	0.9342	0.9629	0.9060	0.8665
Naive	0.9372	0.9916	0.9918	0.9478	0.9411	0.9558
Prop	0.9618	0.9877	0.9898	0.9513	0.9807	0.9785
RPF	0.9640	0.9920	0.9927	0.9701	0.9851	0.9867

We recalculate the NDCG metric according to your suggestion. It is defined as the average NDCG for all user of all intervals, denoted as *avgNDCG@K*.

$$avgNDCG@K = \frac{1}{\sum_{j=1}^{N} r_j} \sum_{n=1}^{N} \sum_{t=1}^{r_n} \frac{\sum_{i \in L_K(u_t)} s_{u_t,i} / \log\left(rank_i + 1\right)}{\sum_{i \in L_K^A(u_t)} s_{u_t,i} / \log\left(rank_i^A + 1\right)},$$

We also find that the difference between avgNDCG@K and the NDCG@K we used in the paper is insignificant.

We will correct our accuracy metric into avgNDCG@K in the reviced version according to your suggestion.

Reference

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