

December 27, 2024

Editorial Board
IEEE Transactions on Knowledge and Data Engineering

Dear members of the editorial committee:

The preliminary version of this paper titled “Double-Anonymous Sketch: Achieving Fairness for Finding Global Top-K Frequent Items” was published in ACM Special Interest Group on Management of Data (SIGMOD), Seattle, WA, USA, June 18 - 23, 2023.

We fully recognize the necessary new contributions made in the extension of previous conference paper. Of the numerous revisions that we made in the journal version, we highlight the following additions.

1. We added a new subsection (Section III-E) titled “Probability Guarantees for Finding Local Top-K”. In this subsection, we discussed how to define the probability guarantees for a top- K sketch algorithm in finding local top- K items; we also derived the probability guarantees for the DA sketch when employing different replacement strategies for finding local top- K items; furthermore, we examined the probability guarantees under the Zipfian distribution and provided a method for setting the parameters of the DA sketch.
2. We added a new subsection (Section V-A) titled “Top-K-fairness for General Data Streams”. In this subsection, we discussed how to adjust the DA sketch algorithm to achieve top- K -fairness when searching for global top- K in general distributed data streams rather than in disjoint data streams; we also analyzed the reasons why existing top- K sketch algorithms could not achieve top- K -fairness in this scenario.
3. We added a new subsection (Section V-B) titled “Top-K-fairness for Rankings”. In this subsection, we discussed a stricter version of ranking fairness, which requires top- K sketch algorithms to achieve fairness when comparing two items; we formally defined ranking fairness, demonstrating that it is a stricter version of top- K -fairness; we presented a sufficient condition for achieving ranking fairness, along with a variant of the DA sketch designed to implement ranking fairness.
4. We added a new subsection (Section VI-F) titled “Experiments on Ranking Fairness”. In this subsection, through experiments, we demonstrated that the variant of the DA sketch we proposed indeed achieves better ranking fairness than the original DA sketch, as measured by two common rank correlation coefficients. Furthermore, we expanded the comparison between the DA algorithm and sampling algorithms in Section VI-D-4, showing the trends in F1 scores and ARE of various algorithms at a greater range of sampling rates.

This submission is in compliance with the exclusive submission policy of TKDE.

Please do not hesitate to email or call me should you have any questions or comments regarding this submission. Thank you very much for your consideration of our work.

Respectfully,

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