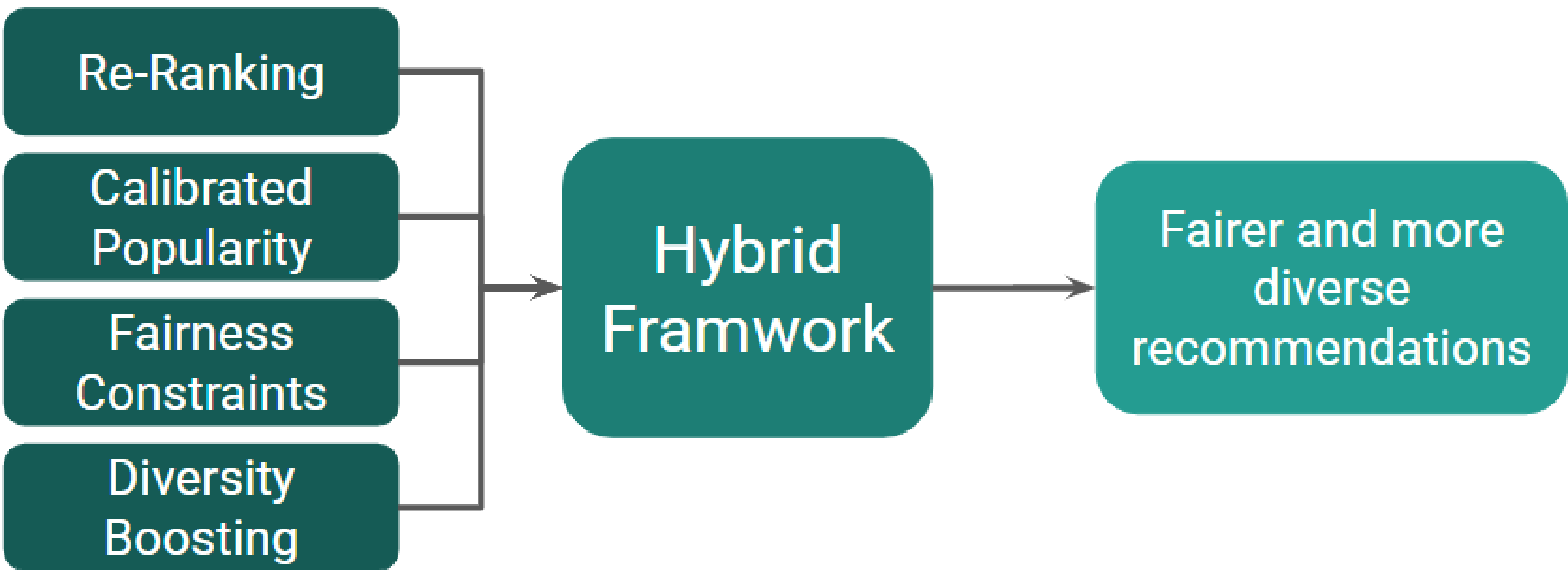
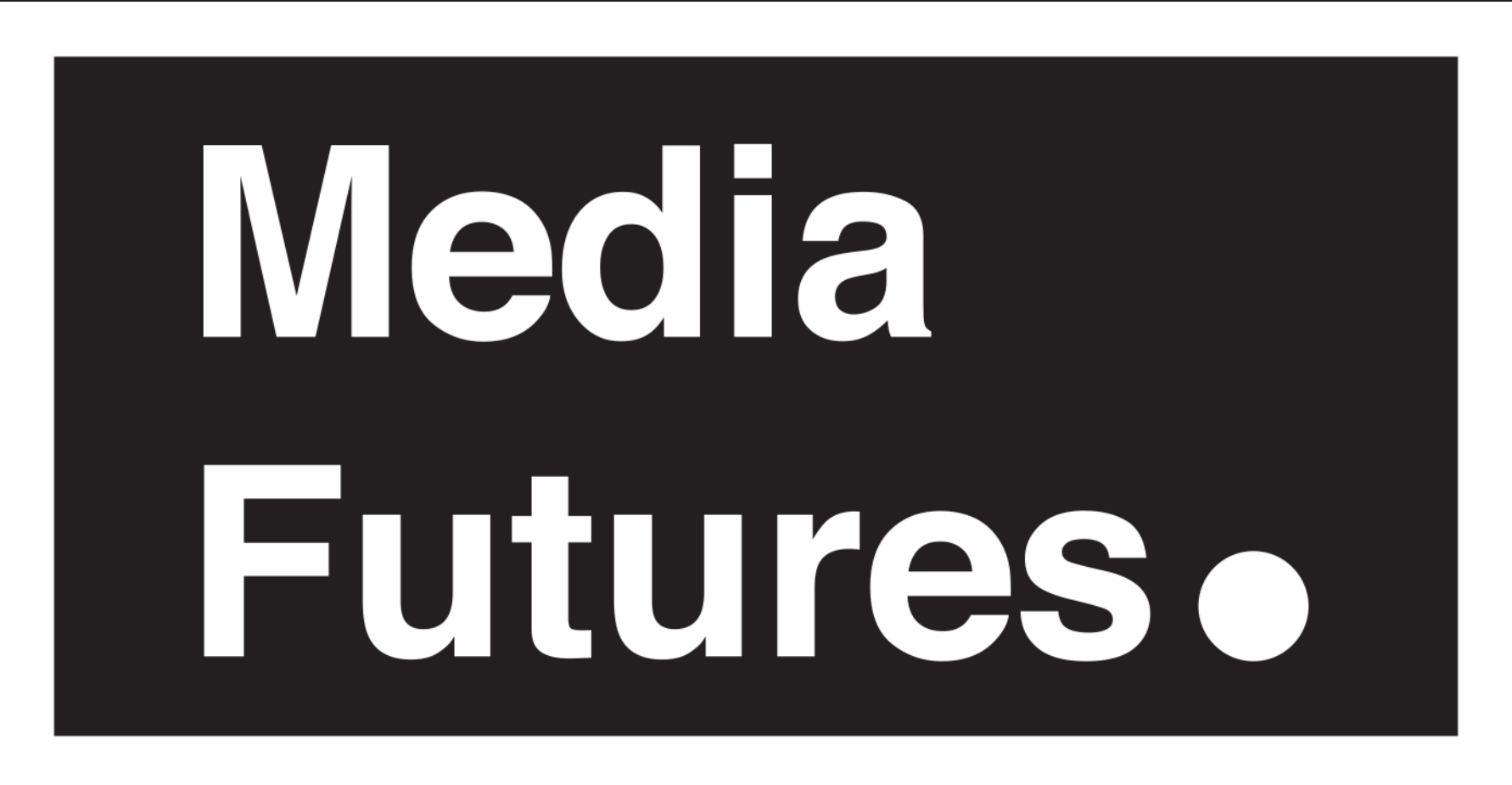


A Hybrid Approach to Mitigate Popularity Bias in Recommender Systems

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Abstract

Media recommendation has become an essential part of the user experience on media streaming platform. As a result, users discover new and interesting items in the vastness of the digital world. However, recommender systems often unintentionally favor popular items, leading to *Popularity Bias*. This skewness towards already popular items can lead to a lack of diversity and fairness for niche items.

This master's thesis explores how hybrid approaches, combining multiple mitigation strategies, can reduce such bias while balancing accuracy and user satisfaction. The goal is to guide the design of fairer recommender systems, evaluate their effectiveness and highlight trade-offs between accuracy, diversity, and long-tail exposure.

Research questions

- RQ1: How can a hybrid approach, integrating multiple individual strategies, be systematically and evaluated to effectively mitigate popularity bias in media recommender systems?
- RQ2: What is the effectiveness of hybrid approaches in mitigating popularity bias in recommender systems?
- RQ3: What trade-offs do hybrid approaches introduce when mitigating popularity bias, particularly in terms of accuracy, diversity, and user satisfaction?

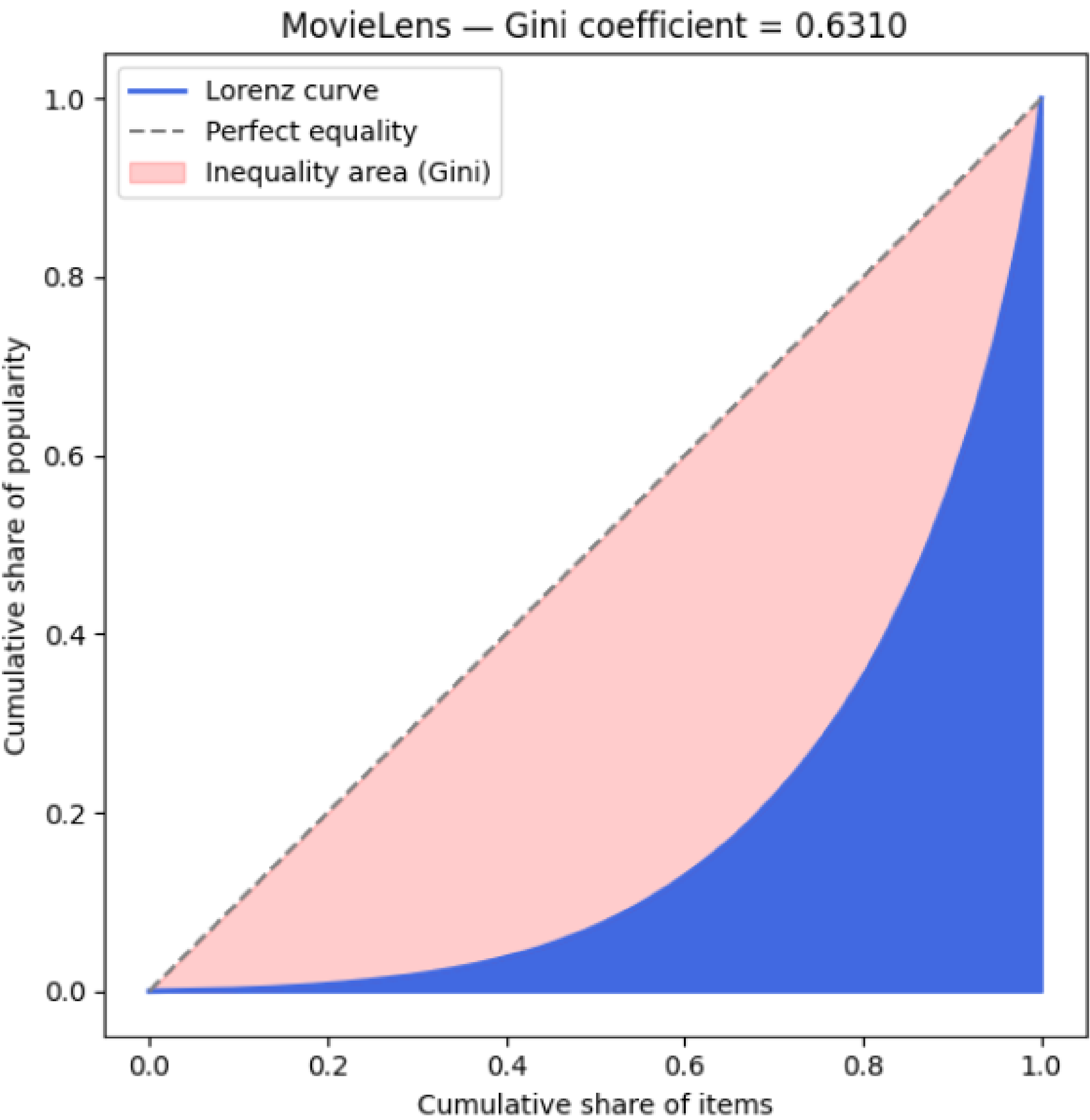
Method

In my thesis project, I plan to use multiple datasets, including the well-known MovieLens and LastFM, to evaluate the effectiveness of the mitigation strategies on both explicit (ratings) and implicit (interaction history) feedback. The datasets enables a robust evaluation across multiple domains and datatypes.

The thesis will build on previous work where the Calibrated Popularity re-ranking technique was applied to categorize users into groups depending on whether they prefer popular items, niche items, or a balance of both.

Beyond calibrated popularity, additional strategies such as *diversity boosting*, *fairness constraint*, and *long-tail promotion* can be integrated into the thesis project to test their combined effect.

Both accuracy metrics, such as Precision and Recall, and beyond accuracy metrics, such as the Gini index, Average Recommendation Popularity (ARP) Average Percentage of Long Tail Items (APLT) and Average Coverage of Long Tail items (ACLT), can be used to evaluate the effectiveness of the hybrid approaches.



PARTNERS



HOST



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