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IITUH18 at Fairweb-2: Investigating the Effect of the Query Modification on Fairness

Narendra Kumar*, Arjun Mukherjee*, Sukomal Pal*, Thomas Mandl^

* IIT (BHU) Varanasi, Uttar Pradesh, INDIA | ^ University of Hildesheim, Germany

Abstract: As information retrieval systems become Meth

Methodology:

increasingly sophisticated, ensuring fairness and algorithmic neutrality in search results has emerged as a critical challenge. Traditional ranking algorithms often prioritize relevance, which can unintentionally amplify the visibility of majority groups while limiting representation for minority perspectives. This imbalance can lead to biased search results that reinforce existing disparities. To address this issue, fairness-aware retrieval methods aim to ensure equitable representation by balancing relevance with exposure fairness while maintaining algorithmic neutrality. In this study, we investigate the impact of query modifications on group fairness in ranked search results. Specifically, we examine how expanding queries to encompass a broader range of relevant content influences fairness between different groups while considering their protected attributes. Our findings contribute to ongoing efforts to design information retrieval systems that provide more inclusive and bias free access to information.

Task Description:

• Objective of Fairweb task is to develop and devise strategies to

Dataset Preprocessing:

- Extracted text content from webpages.
- Used the extracted text for sparse retrieval techniques.

Index Creation:

• Indexing is done by creation of 20 unique sub-indexes based on the corpus data.

Query Modification for Fairness:

- Manually revised queries to diversify retrieval results.
- Aimed to explore the trade-off between relevance and fairness.
- Example: Changed "Top researcher in IR" to "Researcher in IR" to reduce bias.



- retrieve the information that follows criteria of fairness.
- Fairweb-2 has two subtasks namely, websearch task and **Results:** conversational task.
- Gold Distribution for fairness criteria is shown below.



Dataset:

• **Target Corpus:** Used Chuweb21D, a web archive dataset for Fairweb-2 task.





Fig 2: Methodology

- **Temporal Coverage:** Pages collected across multiple time intervals to capture temporal diversity.
- **Deduplicated versions:** Two main deduped collections available Chuweb21D-60 and Chuweb21D-70.
- **Chuweb21D-60:** Contains 49.8 million files in .warc format.
- **Corpus Used:** We have used smaller dataset Chuweb21D-60 (17 million files approx.).

Contact:

Narendra Kumar narendra.kumar.cse20@itbhu.ac.in





Fig 3.3: Fairness score for M topics

IITUH18-WS-O-RG-1
BM25FinalDescTrec*
BM25FinalQueryTrec*
QLDFinalDescTrec*
QLDFinalQueryTrec*
QLMFinalDescTrec*

Legend for reference to fig. 3.x

* Represent our post submission entries. #Our official submitted run was performed on subset of the data. Fig 3.4: Fairness score for Y topics

Conclusion:

- We struggled to index the collection and hence our performance was much below our expectations during official submission.
- The results improved post-submission promising scope of further analysis and exploration.

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