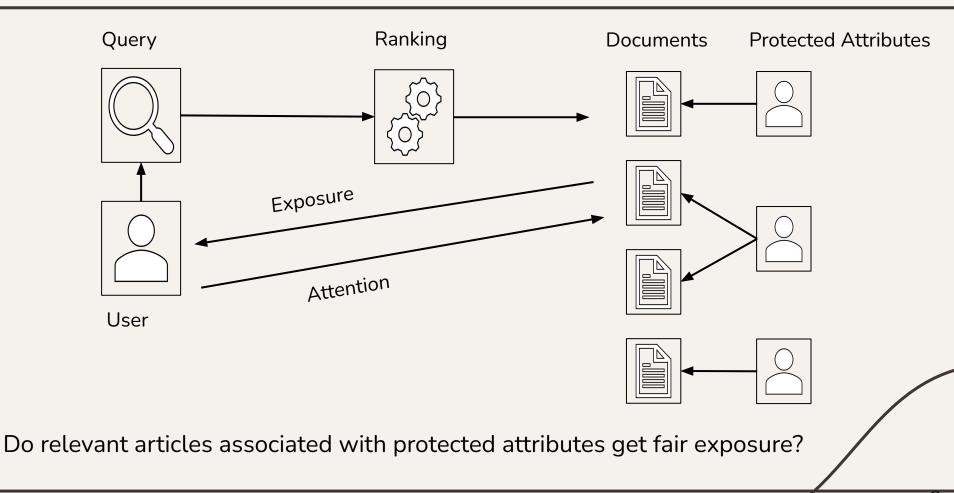
Michael Ekstrand Boise State University

Graham McDonald University of Glasgow

Amifa Raj Boise State University

Isaac Johnson Wikimedia Foundation

## TREC 2022 FAIR RANKING TRACK OVERVIEW



## Fair Ranking Track 2022 vs Previous Years

- 2019-2020
  - Domain: Scholarly articles
  - Tasks:
    - Task 1: Ad-hoc retrieval
    - Task 2: Re-ranking
- 2021
  - Domain: Wikimedia
  - Tasks: Ad-hoc retrieval
    - Task 1: Single ranking
    - Task 2: Stochastic ranking
- 2022
  - Same tasks & domain
  - New: many more dimensions! And intersectionality evaluation

## **Equal Expected Exposure**

"given a fixed information need, no item should have an expected exposure more or less than any other item of the same relevance."

4

### WikiProject



WIKIPEDIA The Free Encyclopedia

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Ø.

Languages

#### Search results

Special page

Only searching in pages whose title starts with "Wikipedia:WikiProject" (Search all pages)

Q Agriculture	•	Search
Advanced search: Sort by relevance X		~
Search in: ((Article) X)		~

#### There is a page named "Agriculture" on Wikipedia

#### Wikipedia:WikiProject Agriculture

WikiProject **Agriculture**. Wikipedians have formed this collaboration resource and group dedicated to improving Wikipedia's coverage of **agriculture** and the 14 KB (0 words) - 16:11, 23 September 2021

#### Wikipedia:WikiProject Agriculture/Participants

Cattle, other stock, agricultural biodiversity, traditional pasture systems, sustainable agriculture, semi-natural agricultural habitats etc.]] IvoShandor 25 KB (2,480 words) - 06:30, 28 October 2021

#### Wikipedia:WikiProject Agriculture/Assessment

the Agriculture WikiProject! This department focuses on assessing the quality of Wikipedia's articles about Agriculture or the people of Agriculture. While 10 KB (1,855 words) - 06:30, 28 October 2021

#### Wikipedia:WikiProject Agriculture

#### From Wikipedia, the free encyclopedia

"WP:AG" redirects here. For the guide for administrators, see Wikipedia:Administrators' guide.

66 T	he toils of agriculture will here be rewarded with a greater variety of valuable pro-	ductions 🤊	
	1 The First Map and De	Manasseh Cutler scription of Ohio	
-	This is a WikiProject, an area for focused collaboration among Wikipedians. New participants are welcome; please feel free to participate!	Shortcuts WP:AG	
	Guide to WikiProjects · Directory of WikiProjects	WP:FARM	

#### About WikiProject Agriculture [edit]

Welcome to WikiProject Agriculture. Wikipedians have formed this collaboration resource and group dedicated to improving Wikipedia's coverage of agriculture and the organization of information and articles on this topic. This page and its subpages contain their suggestions and various resources; it is hoped that this project will help to focus the efforts of other Wikipedians interested in the topic. If you would like to help, please join the project, inquire on the talk page and see the to-do list below.

#### Goals [edit]

This Project aims primarily to provide a consistent article structure for agricultural related topics while striving to develop and improve said agriculture articles. The goal is to make Wikipedia a comprehensive source of factually accurate, neutral articles that include relevant, credible facts.

#### Scope [edit]

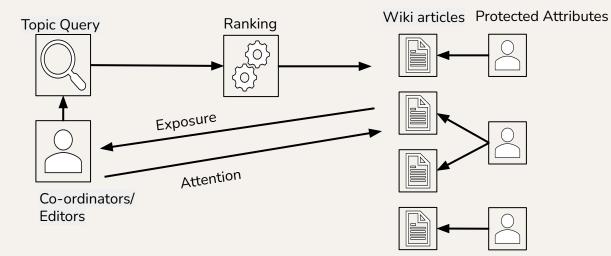
#### See also: List of covered agriculture subjects

This WikiProject strives to develop and improve articles at Wikipedia related to crop production, livestock management, aquaculture, dairy farming and forest management. The project also covers related areas, including both governmental and NGO regulatory agencies, agribusiness, support agencies such as 4H, agricultural products including fertilizers and herbickides, pest management,



F	Project Information
Portal:	Agriculture and Agronomy Porta
Shortcuts:	WP:FARM
	WP:AG
	WP:AGRI
Banner:	{{WPFarm}}
Page templates:	{{Apples}}
	{{Cereals}}
	{{Cherries}}
Userbox:	{{User WP Agriculture}}
Core article:	Agriculture
Open Tasks:	Agriculture tasks
	view
	edit this

## WikiProject



**Documents**: A subset of English language Wikipedia articles

Query: Topic form WikiProject

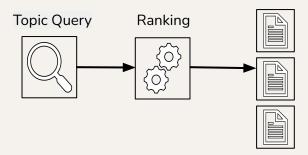
Fairness Objective: Ensure groups of articles associated with protected attributes get fair exposure

Task: ad-hoc retrieval

### Task 1

Use Case: Help Wikiproject coordinators in finding articles for editors.

Single ranking per query



Wiki articles

#### Evaluated based on



Geographic

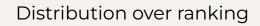
Demographic

Relevance

Fairness

### Task 2

Use Case: Help Wikiproject editors finding articles associated with a project (saved search)



#### Evaluated based on

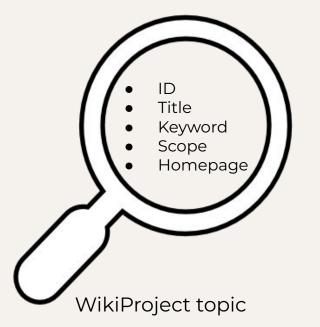


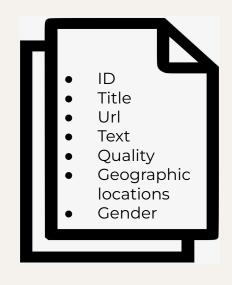
Relevance

Quality

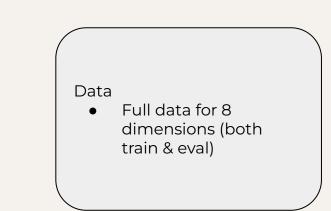
Fairness

### We Provided





#### English Wiki articles



## **Ranking Objectives**

- Relevant documents come before irrelevant documents
- Fairness goal: Group exposure is fairly distributed according to the average of the distribution of relevant documents and the distribution of global population
- Relevant documents are sorted in nonincreasing order of work needed (Task 2)
  - Articles that need more editing will be on top
- For each query participants have to submit:
  - Task 1: single ranking consisting of 500 articles
  - Task 2: 100 rankings each consisting of 20 articles

### Annotations

NIST assessors annotated the articles with binary relevance score. Annotation were incomplete because:

- Task 2 generates massive data (~700,000 article-topic pairs)
- Incomplete articles and not having enough information

We obtained assessment through tiered-pooling

- The first 20 items of all rankings for Task 1 (all queries)
- The first 5 items of the first 25 rankings from every submission to Task 2 (about 75% of the queries).

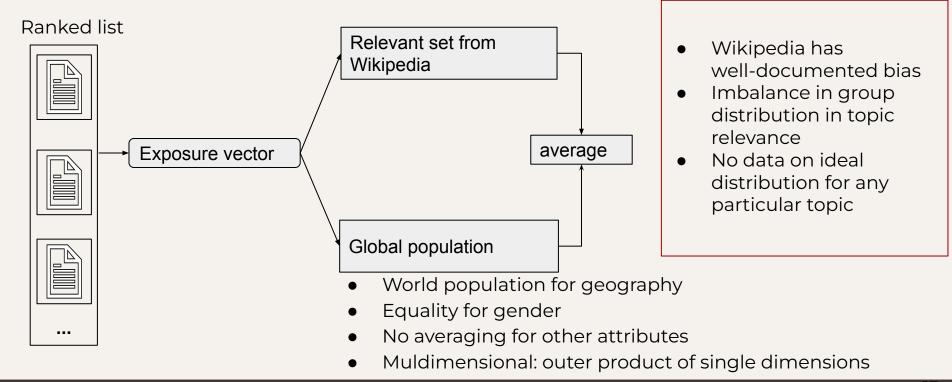
## **Evaluation Strategy**

• Fairness with respect to 8 dimensions simultaneously

$$G^* = G_1 \times \cdots \times G_8$$

- "unknown" as a separate group where needed
- 11M total intersectional dimensions
- Log discounting for attention weight
- Measure exposure of group
- Compare with target exposure

## **Target Exposure**



## **Metrics for Single Ranking**

- **Relevance Metric**: NDCG
- Fair Ranking Metric: Attention Weighted Rank Fairness (AWRF)
  - Jensen -shannon divergence between target and given exposure

• Combine fairness metric and relevance metric  $M_1(L) = AWRF(L) \times NDCG(L)$ 

### **Fairness Metric for Stochastic Rankings**

Expected Exposure Metric

 $\pi(\rho, q) = \mathsf{P}(\rho, q)$ 

π ranking policyq user queryρ document ranking

 $EE(\Pi, q) = \left\|\mathbf{\varepsilon} - \mathbf{\varepsilon}^*\right\|_2^2$ 

- ε expected exposure
- ε<sup>\*</sup> optimal expected exposure

F. Diaz, B. Mitra, M. D. Ekstrand, A. J. Biega, B. Carterette. Evaluating stochastic rankings with expected exposure. CIKM, 2020. <sup>15</sup>

### **Fairness Metric for Stochastic Rankings**

Expected Exposure Metric for Group Fairness

 $\gamma_g = \sum_d y_d a_{dg} \epsilon_d$  aggregate exposure for relevant docs in group

 $a_{dg}$  alignment of document with group  $\gamma$   $|G| \times 1$  group exposure vector

 $EE_G(\pi, q) = \|\gamma - \gamma^*\|_2^2$ 

Expected-Exposure Disparity (EE-D)  $\uparrow$  $EE_{G}(\pi,q) = ||\gamma||_{2}^{2} - 2\gamma^{T}\gamma^{*} + ||\gamma^{*}||_{2}^{2}$  $\downarrow$ Expected-Exposure Relevance (EE-R)

#### This is Expected Exposure Loss (EE-L)

## Submissions

5 Teams Participated:

- We received
  - Submissions from 5 teams for Task 1 (27 runs total)
  - Submissions from 2 teams for Task 2 (11 runs total)
- Approaches

#### Task 1

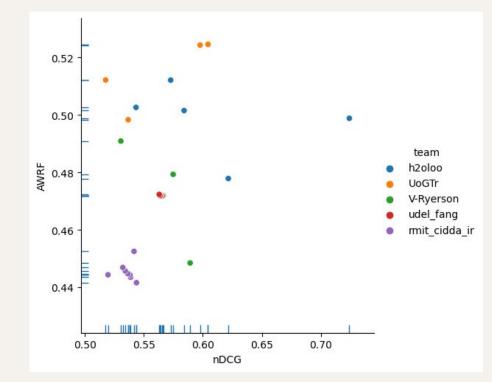
- Explicit Diversification
- Implicit diversification
- Data Fusion
- Constraint-based approaches
- Relevance-only baselines

#### Task 2

- Multi-Armed Bandits
- Colbert-based
- Tailored Diversification
- Relevance-only

### **Result: Task 1**

Construction Construction<		nDCG	AWRF	Score	95% CI
UcsRelvOnyTi0.004400.254700.253910.264.0.371UoGTT4DER0.004000.254700.253000.263.0.300UoGT4EyE20.977400.274000.263.0.3000.263.0.300UoGT4EyE20.271000.271000.271000.263.0.300UoGT4EyE20.271000.271000.271000.261.0.300TAT_ont5p0.574700.727000.271000.27100FR_constrain0.574500.727000.271000.270.0.300UoGT4EyE10.574500.271000.271000.270.0.300UoGT4EyE10.576700.271000.270.0.3000.270.0.300UoGT4EyE10.565400.471400.270.0.3000.270.0.300UDGT6_F19100.565400.471400.261000.231.0.301UDG16_F19100.564800.471400.2609.00.261.0.300UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261000.261.0.301UDG16_F19100.564800.471400.261.0.310.201.0.211UDG16_F19100.541900.414050.261.0.310.201.0.211UDG16_F19100.541900.414050.241.0.30.201.0.21 <th>run_name</th> <th></th> <th></th> <th></th> <th></th>	run_name				
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bm25.p6.54.408.050.610.273.240.24.1.0.31UGTCF0.556.760.498.310.273.240.24.0.0.30UGTCF0.576.760.271.340.270.400.200.01UDIA0.566.760.471.800.270.020.230.03.01UDIA0.566.760.471.800.270.030.230.03.01UDIA0.565.760.471.800.270.030.230.03.01PUIA0.565.760.471.800.270.030.230.03.01UDIA0.565.760.471.800.200.010.230.03.01PUIA0.565.760.471.800.260.020.230.03.01UDIA0.565.760.471.800.260.020.230.03.01UDIA0.565.760.471.800.260.020.230.03.01UDIA0.565.760.471.800.260.020.230.03.01UDIA0.565.760.471.800.260.020.230.03.01UDIA0.565.760.471.800.260.020.230.02UDIA0.565.770.543.700.424.800.240.02UDIA0.541.710.542.700.241.020.201.02Initicidea0.531.700.441.700.240.020.201.02Initicidea0.531.700.441.700.240.020.201.02Initicidea0.531.700.441.700.240.020.201.02Initicidea0.531.700.441.700.240.020.201.02Initicidea0.531.700.441.700.240.020.201.02Initicidea0.531.700.441.700.241.700	tmt5_p	0.572786	0.512117	0.294553	(0.260, 0.327)
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Ubic 0.56650 0.471891 0.270826 0.23, 0.303   ans_m25 0.56640 0.47188 0.270820 0.23, 0.303   DDinfo_F.mip2 0.56440 0.47184 0.27030 0.033, 0.303   FRT_attention 0.58925 0.448431 0.27040 0.033, 0.301   DDinfo_F.ghp2 0.56480 0.47186 0.26904 0.033, 0.301   DDinfo_F.ghp4 0.56382 0.47188 0.269050 0.034, 0.301   DDinfo_F.ghp4 0.56382 0.47188 0.269050 0.034, 0.301   DDinfo_F.ghp4 0.56382 0.47188 0.269050 0.034, 0.301   PDinfo_F.ghp4 0.56382 0.47188 0.269050 0.034, 0.301   PDinfo_F.ghp4 0.56382 0.47180 0.26408 0.2019, 0.271   rmt_cid.de_f_1 0.54379 0.49084 0.24104 0.2019, 0.271   rmt_cid.de_f_1 0.58481 0.44487 0.24104 0.2019, 0.271   rmt_cid.de_f_1 0.58492 0.44487 0.24104 0.208, 0.2716   rmt_cid.de	UoGTrQE	0.536764	0.498313	0.273444	(0.240, 0.309)
ans pm25 0.56810 0.47188 0.270301 0.237, 0.3031   JDinfo_F_mipe 0.56449 0.47184 0.270301 0.237, 0.3031   FRT_attention 0.56449 0.47184 0.270100 0.237, 0.3031   JDinfo_F_mipe 0.56448 0.471845 0.269040 0.233, 0.301   JDinfo_F_mipe 0.56348 0.471845 0.269040 0.233, 0.301   JDinfo_F_mipe 0.56348 0.471845 0.269040 0.233, 0.301   JDinfo_F_lgipm 0.56348 0.472340 0.269043 0.239, 0.301   JDinfo_F_lgipm 0.50357 0.490840 0.269040 0.239, 0.301   JDinfo_F_lgipm 0.50357 0.490840 0.269040 0.209, 0.271   rmit_cidd_if 0.53471 0.54281 0.241840 0.209, 0.271   rmit_cidd_if 0.53814 0.444840 0.24184 0.209, 0.271   rmit_cidd_if 0.53814 0.44427 0.24164 0.208, 0.2715   rmit_cidd_if 0.53814 0.44474 0.24164 0.208, 0.2715	UoGTrExpE1	0.517629	0.512153	0.271641	(0.238, 0.308)
Upinfo_F.mip 0.56549 0.47179 0.270307 0.235, 0.302   FRT_attention 0.589254 0.448431 0.270190 0.0331, 0.311   JDinfo_F.glpbm 0.56382 0.471885 0.269807 0.0235, 0.302   JDinfo_F.glpbm 0.56382 0.471885 0.269805 0.0234, 0.301   JDinfo_F.glpbm 0.56382 0.471885 0.269903 0.0235, 0.302   JDinfo_F.glpbm 0.56382 0.471885 0.269933 0.0239, 0.301   JDinfo_F.glpbm 0.503537 0.490886 0.264083 0.0239, 0.301   JDinfo_F.glpbm 0.50357 0.490886 0.248402 0.0215, 0.3021   prmit_cidda_ir_0 0.53479 0.45487 0.24842 0.0210, 0.2717   rmit_cidda_ir_1 0.53810 0.44427 0.24802 0.0209, 0.2761   rmit_cidda_ir_1 0.53826 0.44427 0.24812 0.0209, 0.2761   rmit_cidda_ir_1 0.53827 0.44427 0.24175 0.0208, 0.2761   rmit_cidda_ir_1 0.53242 0.444575 0.21175 0.0208,	UDInfo_F_bm25	0.566569	0.471891	0.270826	(0.236, 0.302)
FRT_attention 0.58925 0.44843 0.269049 0.0231, 0.311   DInfo_F_Igbm2 0.564489 0.471885 0.269047 0.0231, 0.311   DInfo_F_Igbm2 0.56382 0.471885 0.269050 0.0231, 0.311   DInfo_F_Igbm4 0.56382 0.471880 0.269050 0.0231, 0.311   DInfo_F_Igbm4 0.56382 0.471880 0.269032 0.0231, 0.311   JDInfo_F_Igbm4 0.56382 0.490880 0.269032 0.0231, 0.312   FRT_diversity 0.53057 0.490880 0.264082 0.021, 0.271   rmit_cida1_r 0.54379 0.441763 0.24312 0.201, 0.271   rmit_cida1_r 0.53820 0.44427 0.24620 0.20, 0.2716   rmit_cida1_r 0.53820 0.44427 0.24620 0.20, 0.2716   rmit_cida1_r 0.53820 0.44427 0.24620 0.20, 0.2716   rmit_cida1_r 0.53820 0.44472 0.21610 0.20, 0.2716   rmit_cida1_r 0.53820 0.44478 0.21161 0.20, 0.2716	ans_bm25	0.566126	0.471885	0.270617	(0.237, 0.303)
Dinfo_F.jgbm 0.56448 0.471885 0.269847 (0.235, 0.301)   UDinfo_F.mip4 0.563832 0.471885 0.269934 (0.235, 0.301)   JDinfo_F.jgbm 0.563832 0.471385 0.269934 (0.235, 0.302)   FRT_diversity 0.53053 0.490886 0.264083 (0.239, 0.290)   mit_cidda_ir_0 0.541712 0.452475 0.248425 (0.215, 0.282)   rmit_cidda_ir_1 0.53816 0.441563 0.24313 (0.209, 0.276)   rmit_cidda_ir_1 0.53826 0.444274 0.24620 (0.209, 0.276)   rmit_cidda_ir_3 0.536510 0.444274 0.24620 (0.209, 0.276)   rmit_cidda_ir_3 0.536520 0.444274 0.24620 (0.209, 0.276)   rmit_cidda_ir_4 0.534297 0.444723 0.24170 (0.208, 0.276)   rmit_cidda_ir_4 0.534297 0.444575 0.24170 (0.208, 0.276)   rmit_cidda_ir_4 0.53212 0.446876 0.24150 (0.208, 0.276)	UDInfo_F_mlp2	0.565497	0.471797	0.270307	(0.235, 0.302)
Unifo_F_mipe 0.56383 0.471889 0.269055 0.034, 0.031   Dinfo_F_jope 0.563080 0.472303 0.269033 0.0234, 0.031   FR_diversity 0.530537 0.490880 0.264033 0.0229, 0.290   mit_cidda_ir_0 0.543770 0.452475 0.248425 0.0215, 0.283   mit_cidda_ir_1 0.538810 0.443430 0.243131 0.0209, 0.270   mit_cidda_ir_1 0.538240 0.443420 0.243020 0.029, 0.270   mit_cidda_ir_1 0.538240 0.444274 0.24620 0.029, 0.270   mit_cidda_ir_1 0.538240 0.444274 0.24620 0.029, 0.270   mit_cidda_ir_3 0.536500 0.444274 0.24105 0.028, 0.270   mit_cidda_ir_3 0.534297 0.444575 0.21105 0.028, 0.2705   mit_cidda_ir_4 0.53212 0.446876 0.24150 0.208, 0.2705   mit_cidda_ir_5 0.52212 0.446876 0.24150 0.208, 0.2705	FRT_attention	0.589254	0.448431	0.270190	(0.231, 0.311)
Dhnfo_F_Jgbm 0.56308 0.472303 0.269334 (0.235, 0.302)   FRT_diversity 0.530537 0.490888 0.264003 (0.229, 0.29)   mit_cidda_ir_0 0.530537 0.490888 0.248402 (0.215, 0.28)   mit_cidda_ir_1 0.53377 0.441563 0.24337 (0.210, 0.27)   mit_cidda_ir_1 0.53881 0.444343 0.24313 (0.209, 0.27)   mit_cidda_ir_2 0.53824 0.444274 0.24620 (0.209, 0.27)   mit_cidda_ir_3 0.53650 0.44427 0.24620 (0.209, 0.27)   mit_cidda_ir_3 0.53621 0.44427 0.24105 (0.208, 0.27)   mit_cidda_ir_4 0.53429 0.44472 0.21105 (0.208, 0.27)   mit_cidda_ir_5 0.53212 0.44687 0.21105 (0.208, 0.27)   mit_cidda_ir_6 0.53212 0.44687 0.24154 (0.208, 0.27)	UDInfo_F_lgbm2	0.564489	0.471885	0.269847	(0.235, 0.302)
FRT_diversity 0.53053 0.49088 0.240803 0.229, 0.299   mit_cidda_ir_0 0.54171 0.452475 0.248452 0.215, 0.283   mit_cidda_ir_0 0.54379 0.441563 0.243313 0.209, 0.270   mit_cidda_ir_0 0.53881 0.443463 0.24313 0.209, 0.270   mit_cidda_ir_0 0.53824 0.444247 0.24362 0.209, 0.270   mit_cidda_ir_0 0.53624 0.44427 0.24362 0.209, 0.270   mit_cidda_ir_0 0.53624 0.44472 0.24175 0.208, 0.275   mit_cidda_ir_0 0.53242 0.44563 0.21163 0.208, 0.276   mit_cidda_ir_8 0.52212 0.44687 0.24154 0.208, 0.276	UDInfo_F_mlp4	0.563832	0.471889	0.269505	(0.234, 0.301)
rnit.cidda_ir_0 0.54171 0.452475 0.248321 0.215, 0.2321   rnit.cidda_ir_0 0.54379 0.41163 0.243314 0.020, 0.2731   rnit.cidda_ir_0 0.53824 0.443463 0.243143 0.020, 0.2731   rnit.cidda_ir_0 0.53824 0.444243 0.24324 0.209, 0.2731   rnit.cidda_ir_0 0.53624 0.44427 0.24105 0.208, 0.2751   rnit.cidda_ir_0 0.53429 0.44452 0.21105 0.208, 0.2751   rnit.cidda_ir_0 0.53212 0.44687 0.24150 0.208, 0.2751   rnit.cidda_ir_0 0.52212 0.44687 0.24150 0.208, 0.2751	UDInfo_F_lgbm4	0.563080	0.472303	0.269334	(0.235, 0.302)
rnit.cidda_ir_1 0.54379 0.44156 0.243317 (0.210, 0.277)   rnit.cidda_ir_4 0.538810 0.443463 0.243134 (0.209, 0.278)   rnit.cidda_ir_3 0.538240 0.444274 0.242620 (0.209, 0.276)   rmit.cidda_ir_3 0.53650 0.444274 0.24167 (0.208, 0.275)   rmit.cidda_ir_3 0.532420 0.241683 0.24170 (0.208, 0.276)   rmit.cidda_ir_3 0.532420 0.444678 0.24163 (0.208, 0.276)   rmit.cidda_ir_3 0.532420 0.444678 0.24163 (0.208, 0.276)	FRT_diversity	0.530537	0.490888	0.264083	(0.229, 0.299)
rmit_cidda_ir_0 0.538810 0.444363 0.243134 (0.209, 0.276)   rmit_cidda_ir_0 0.538240 0.444274 0.242620 (0.209, 0.276)   rmit_cidda_ir_0 0.536500 0.444727 0.241970 (0.208, 0.275)   rmit_cidda_ir_0 0.534297 0.444563 0.241763 (0.208, 0.276)   rmit_cidda_ir_0 0.532121 0.446878 0.241549 (0.208, 0.276)	rmit_cidda_ir_5	0.541712	0.452475	0.248452	(0.215, 0.282)
rmit_cidda_ir_7 0.53820 0.44427 0.242620 (0.209, 0.276)   rmit_cidda_ir_3 0.536504 0.444729 0.241975 (0.208, 0.275)   rmit_cidda_ir_6 0.534297 0.444563 0.241963 (0.208, 0.276)   rmit_cidda_ir_8 0.532212 0.446878 0.241545 (0.208, 0.276)	rmit_cidda_ir_1	0.543797	0.441563	0.243317	(0.210, 0.277)
rmit_cidda_ir_3 0.53650 0.444729 0.241975 (0.208, 0.275)   rmit_cidda_ir_6 0.534297 0.444563 0.241763 (0.208, 0.276)   rmit_cidda_ir_8 0.532212 0.446878 0.241549 (0.208, 0.276)	rmit_cidda_ir_4	0.538810	0.443463	0.243134	(0.209, 0.278)
rmit_cidda_ir_6 0.534297 0.445653 0.241763 (0.208, 0.276)   rmit_cidda_ir_8 0.532212 0.446878 0.241549 (0.208, 0.276)	rmit_cidda_ir_7	0.538240	0.444274	0.242620	(0.209, 0.276)
rmit_cidda_ir_8 0.532212 0.446878 0.241549 (0.208, 0.276)	rmit_cidda_ir_3	0.536504	0.444729	0.241975	(0.208, 0.275)
	rmit_cidda_ir_6	0.534297	0.445653	0.241763	(0.208, 0.276)
rmit_cidda_ir_2 0.519678 0.444310 0.234528 (0.201, 0.269)	rmit_cidda_ir_8	0.532212	0.446878	0.241549	(0.208, 0.276)
	rmit_cidda_ir_2	0.519678	0.444310	0.234528	(0.201, 0.269)



Higher score is better

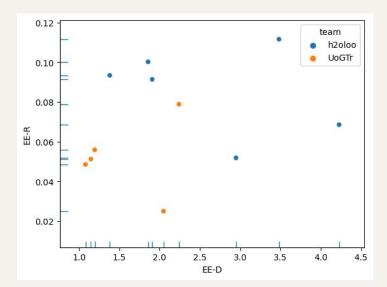
### **Task 1 - Individual Attributes**

	Overall	age	alpha	gender	langs	occ	pop	src-geo	sub-geo
run_name									
tmt5	0.362626	0.686027	0.719043	0.679535	0.678615	0.682496	0.631264	0.645316	0.644979
UoGRelvOnlyT1	0.325393	0.584286	0.591560	0.526585	0.589594	0.526671	0.580183	0.554831	0.538912
UoGTrT1ColPRF	0.325393	0.584286	0.591560	0.526585	0.589594	0.526671	0.580183	0.554831	0.538912
UoGTrExpE2	0.322974	0.579672	0.586859	0.545275	0.584931	0.544321	0.576468	0.548206	0.534440
0mt5	0.298972	0.583271	0.616369	0.583422	0.581721	0.584468	0.533271	0.552885	0.549564
0mt5_p	0.294887	0.555188	0.580112	0.551882	0.552981	0.551437	0.511165	0.531507	0.535161
tmt5_p	0.294553	0.548149	0.569553	0.543740	0.546267	0.542118	0.507668	0.527100	0.530302
FRT_constraint	0.278210	0.551129	0.571171	0.533015	0.549395	0.535801	0.522011	0.514404	0.505925
bm25_p	0.277292	0.517810	0.539497	0.515627	0.516485	0.514714	0.476814	0.496864	0.500517
UoGTrQE	0.273444	0.521577	0.529086	0.481319	0.522546	0.480685	0.497549	0.482825	0.490564

More on this tomorrow...

#### **Result:** Task 2

	EE-R	EE-D	EE-L	EE-L 95% CI
run_name				
UoGTrMabWeSA	0.0485	1.0791	1.1231	(0.9790, 1.3096)
UoGTrMabSaWR	0.0512	1.1462	1.1847	(1.0258, 1.3739)
UoGTrMabSAED	0.0558	1.1935	1.2228	(1.0507, 1.4185)
tmt5_p_e	0.0934	1.3803	1.3345	(1.1409, 1.5793)
0mt5_p_e	0.1002	1.8563	1.7968	(1.5600, 2.0779)
bm25_p_e	0.0914	1.9077	1.8659	(1.5343, 2.2897)
UoGTrMabSaNR	0.0249	2.0486	2.1397	(1.8286, 2.6452)
UogTRelvOnlyT2	0.0788	2.2398	2.2231	(1.8645, 2.7786)
0mt5_e	0.0518	2.9483	2.9856	(2.5022, 3.7271)
tmt5_e	0.1116	3.4819	3.3997	(3.0171, 3.8588)
ans_bm25_e	0.0685	4.2286	4.2324	(2.7795, 8.3580)



#### Lower EE-D is better; higher EE-R is better

#### Lower EE-L is better

### Task 2 - Individual Attributes

	Overall	age	alpha	gender	langs	occ	pop	src-geo	sub-geo
run_name									
UoGTrMabWeSA	1.123	7.215	6.798	15.163	8.756	15.127	22.197	4.798	5.925
UoGTrMabSaWR	1.185	7 <mark>.</mark> 194	7.259	15.291	8.978	15.226	22.674	4.979	6.303
UoGTrMabSAED	1.223	7.136	7.111	15.636	9.127	15.551	21.423	4.884	6.314
tmt5_p_e	1.334	21.024	6.554	18.282	23.936	16.420	31.123	11.142	14.070
0mt5_p_e	1.797	23.243	6.266	18.579	24.876	16.516	37.273	11.962	16.320
bm25_p_e	1.866	25.273	7.607	20.687	26.782	18.361	39.964	13.278	16.995
UoGTrMabSaNR	2.140	8.637	9.343	15.981	8.640	<mark>1</mark> 6.078	42.181	5.894	7.790
UogTRelvOnlyT2	2.223	11.152	11.037	19.964	11.686	19.738	22.193	6.136	9.654
0mt5_e	2.986	27.765	11.149	22.881	27.967	20.988	43.410	14.288	19.946
tmt5_e	3.400	28.021	10.255	35.293	35.676	32.521	38.150	19.642	23.982
ans_bm25_e	4.232	29.440	14.830	27.922	32.793	25.886	50.670	16.335	25.838

### Limitations

- Fairness Criteria
  - Geography: incomplete location information
  - Gender: possibility of misgendering
  - Multidimensional fairness counts all attributes as independent
- Task Definition
  - Doesn't consider missing or deleted articles
  - There are more important protected attributes

### Lessons Learned

- Increasing dimensions significantly increases complexity of computations, especially for determining target distributions
  - Final space was 11M dimensions!
  - Many points have no instances
  - Memory-intensive computations
- Performing well on multidimensions does not always equal good performance on individual dimensions.

Fair Ranking Track Plenary Session is on November 15th (9am - 12pm)

# Thanks

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