Algorithmic Behaviors Across Regions:
A Geolocation Audit of YouTube Search for COVID-19 Misinformation Between the United States and South Africa

Hayoung Jung, Prerna Juneja, Tanushree Mitra

Content Warning

ICWSM 2025
Proceedings of the Nineteenth International AAAI Conference on Web and Social Media

UNIVERSITY of WASHINGTON

COVID-19 Misinformation Continues To Be An **Issue**

Misleading information in 1 in 4 most viewed YouTube COVID-19 videos in English

Report Links Vaccine Hesitancy to More Deaths, Restrictions

APRIL 2022

Coronavirus and the Widening Global North-South Gap

Rosa Balfour, Lizza Bomassi, Marta Martinelli

GLOBAL AFFAIRS | HEALTH

A lack of vaccines in the global south worsens inequality

The problem of 'trickle-down science' from the Global North to the Global South

YouTube’s Response

COVID-19 medical misinformation policy

YouTube doesn't allow content about COVID-19 that poses a serious risk of egregious harm.

NEWS > NATIONAL

YouTube promises to crack down on videos that contain misinformation about vaccines

Western Focus of Algorithmic Audits

"The overwhelming focus on Western liberal democracies, particularly the US, undermines the field's ability to account for algorithmic impacts in other socio-political contexts"
(Urman et al., 2025)

Aleksandra Urman, Mykola Makhortykh, Aniko Hannak. WEIRD Audits? Research Trends, Linguistic and Geographical Disparities in the Algorithm Audits of Online Platforms -- A Systematic Literature Review. *Proc. of the 2025 ACM Conference on FAccT* (2025).

Sock-Puppet Audits

GOAL: Measure the prevalence of COVID-19 Misinformation in YouTube Search between the Global North and Global South

United States (US)

South Africa (SA)

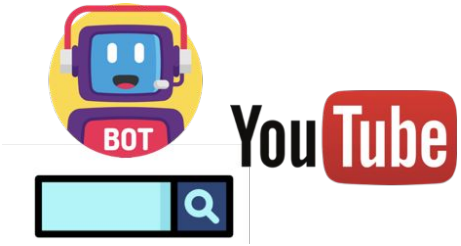
Methodology: Geolocation Audit of YouTube

1 Select Topics and Queries

Collaborate with expert fact-checkers

2 Experimental Setup

Employing sock-puppets with IP proxies



3 Measure Misinformation

Train classifier for large-scale labeling

1 Select Topics and Queries

Collaborate with PesaCheck, the largest fact-checking organization in Africa.

PESA CHECK

The expe
dataset

Using th
across t

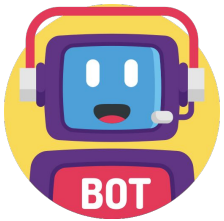
Contribution #1: Our extensive collaboration with *PesaCheck* helped integrate their expertise and anchor our study on globally persistent misinformation trends.

Biological Weapon	Biological Weapon, man-made virus
Lab Leak Theory	lab leak theory, Kungflu
5G Claims	5g and covid19 link, 5g conspiracy
Bill Gates Claims	bill gates exposed, bill gates vaccine chip
Spread of Virus	social spread, sanitize
Treatment of Virus	local concoctions, sesame oil
Population Control	population control, plandemic
Vaccine Content Claims	MRNA, fetal tissue research

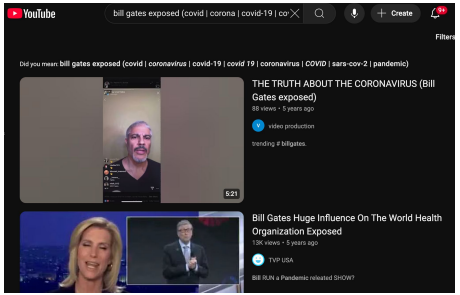
2 Experimental Setup

For our audit, we programmed *sock-puppets*, or bots, emulating real users.

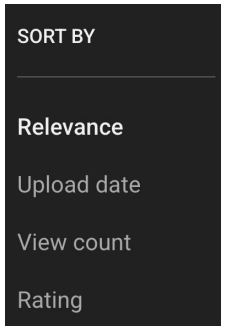
These bots perform automated web browser actions as below:



1. Search query 
2. Collect top-50 results in Search Engine Result Page (SERPs) →



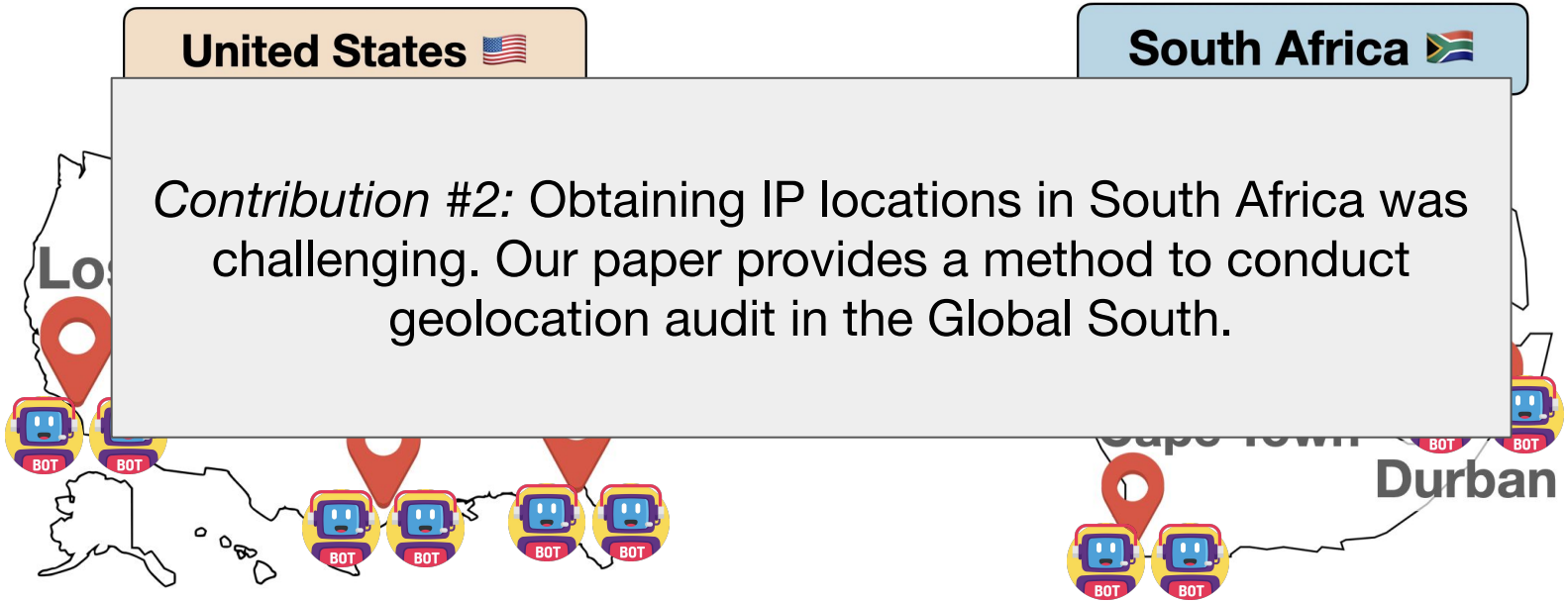
3. Repeat #2 across different search filter →



4. Repeat #1-3 for the next query

This entire procedure was repeated every day over 10 days

2 Experimental Setup



Contribution #2: Obtaining IP locations in South Africa was challenging. Our paper provides a method to conduct geolocation audit in the Global South.

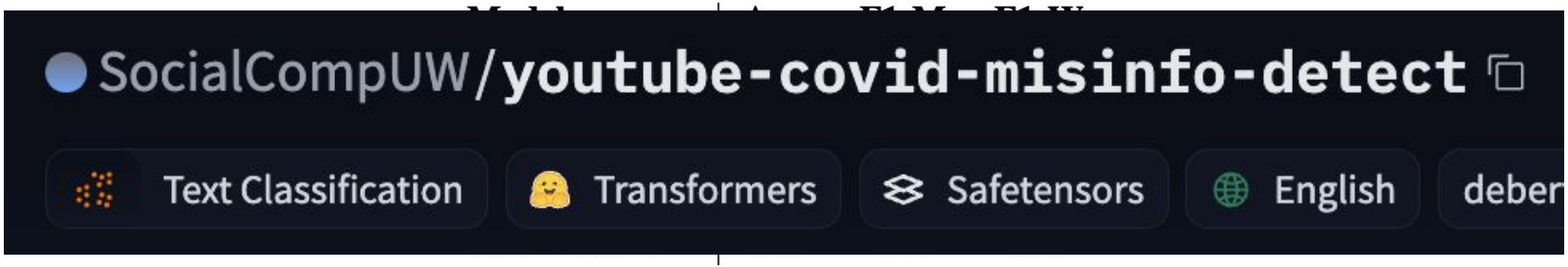
In total, we collected 915K search results (10K unique videos)

3 Measure Misinformation

How can we scalably detect COVID-19 misinformation in YouTube videos?

- D policy.
  Th
- G
- Tr

Contribution #3: We make our dataset and model available on HuggingFace.



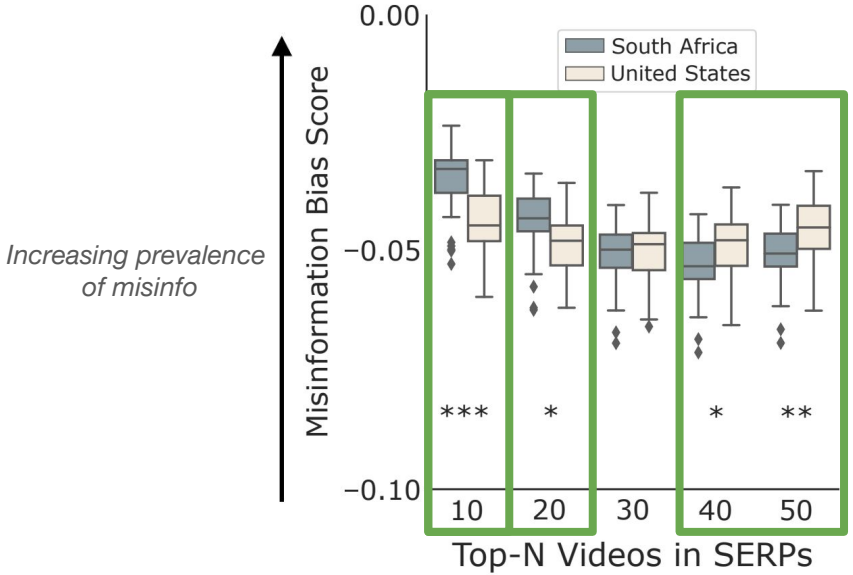
Metric for Measuring Misinformation

- To measure misinfo in SERPs, we use the Misinformation Bias Score (Hussein et al., 2020)
- Weighted average of videos labels in SERPs, giving more weight to higher-ranked videos.
- Score ranges from -1 to 1:
  - Positive scores indicate a lean towards misinformation
  - Negative scores indicate a lean towards opposing misinformation
- Higher scores suggest higher prevalence of misinformation in the SERP.

Eslam Hussein, Prerna Juneja, and Tanushree Mitra. 2020. Measuring Misinformation in Video Search Platforms: An Audit Study on YouTube. *Proc. ACM Hum.-Comput. Interact. 4, CSCW1.*

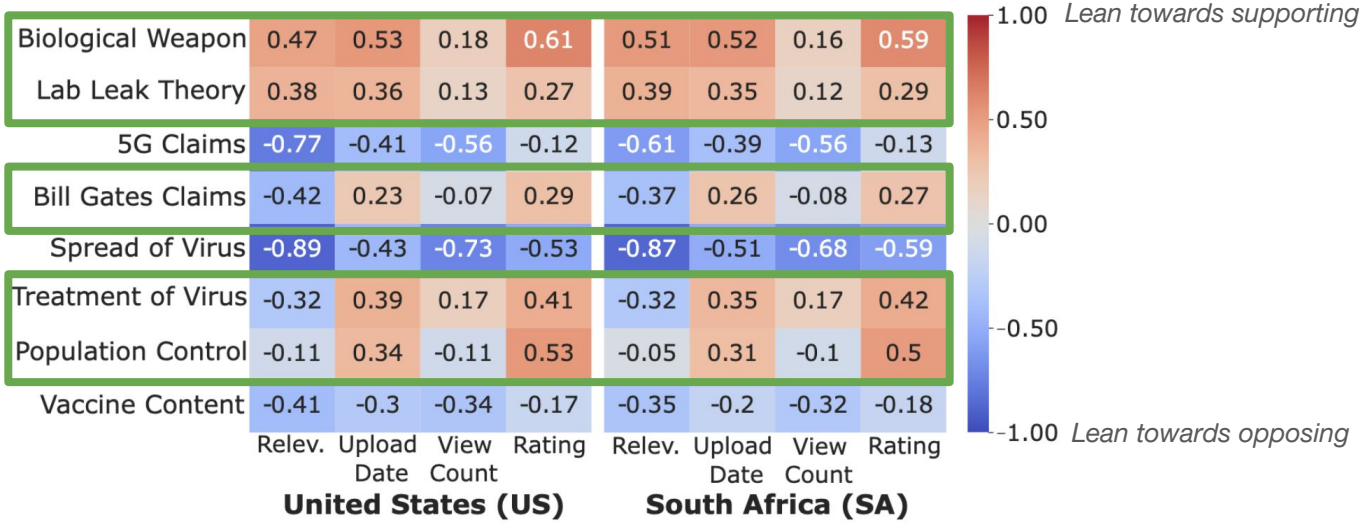
What is the prevalence of misinfo across geolocations?

- Top-10 videos in search engine result pages (SERPs) contained highest prevalence of misinfo
- For top-10 and top-20 videos, bots in South Africa received significantly more misinformative SERPs than bots in the United States. ***Geolocation bias.***



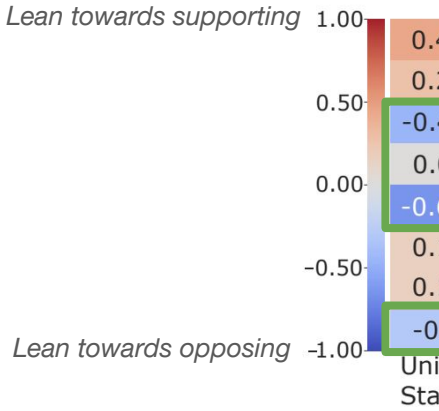
Which topics were the most problematic?

- Two topics like Biological Weapon and Lab Leak Theory was consistently misinformative across the search filters in both countries.
- Three topics showed negative scores in SERPs when sorted by “Relevance,” but positive scores when switched to “Upload Date” and “Rating”



Misinformation Bias across Topics.

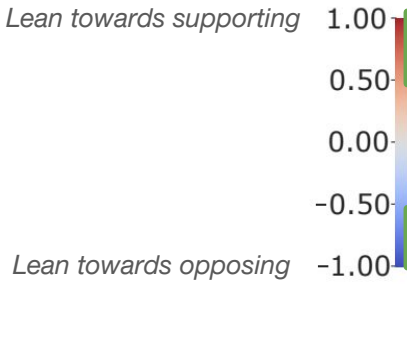
- For three topics, bots in South Africa encountered significantly more misinformative SERPs than bots in the United States. ***Geolocation bias***
- The reverse only holds true for one topic.



United States	South Africa	Topics	*p*	*Mean Rank Diff.*
0.45	0.44	Biological Weapon	-	-
0.28	0.29	Lab Leak Theory	-	-
-0.46	-0.42	5G Claims	***	SA > US
0.01	0.02	Bill Gates Claims	***	SA > US
-0.65	-0.67	Spread of Virus	***	US > SA
0.16	0.15	Treatment of Virus	-	-
0.16	0.17	Population Control	-	-
-0.3	-0.26	Vaccine Content Claims	***	SA > US

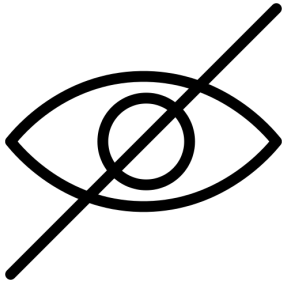
Misinformation Bias across Search Filters

- For the “Rating” filter, bots in the United States received significantly more misinformative SERPs than those in South Africa.
- For the *default “Relevance” filter*, bots in South Africa received significantly more misinformative SERPs than those in the United States.

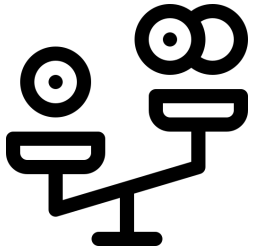


Search Filters	*p*	*Mean Rank Diff.*
Relevance	***	SA > US
Upload Date	-	-
View Count	-	-
Rating	***	US > SA

Implications & Broader Impact



Blind Spots in YouTube's Moderation



Geographic Disparities Pose Societal & Health Risks

Call For Consistent and Equitable Algorithmic Behaviors

Summary & Contributions

1. **Beyond the Global North:** We investigate the less-explored context of the Global South, extending the scope of previous algorithmic audits, which focus on the Global North.

2. **Collaboration with Fact-Checkers:** We extensively collaborate with experts at PesaCheck for impact, helping integrate their expertise and anchoring our study.

3. **Open-Source Contribution:** We made **publicly available** our labeled dataset and fine-tuned model for detecting COVID-19 misinformation in YouTube videos

Thank you!

Hayoung Jung, Prerna Juneja, Tanushree Mitra
{hjung10, tmitra}@uw.edu, pjuneja@seattle.edu

ICWSM 2025
Proceedings of the Nineteenth International AAAI Conference on Web and Social Media

UNIVERSITY of WASHINGTON