UNDERSTANDING AND MITIGATING COGNITIVE BIAS DURING WEB SEARCH

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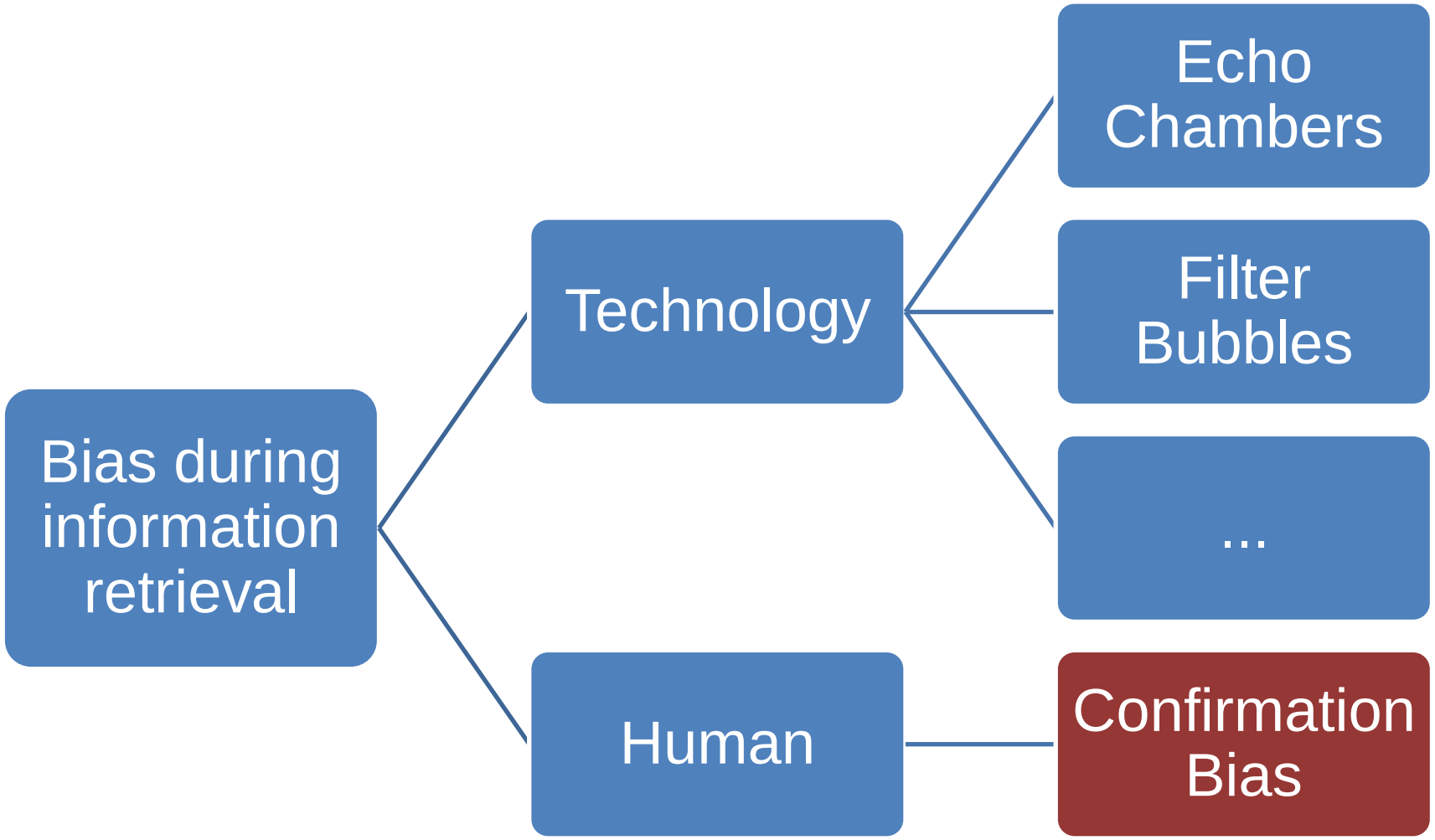
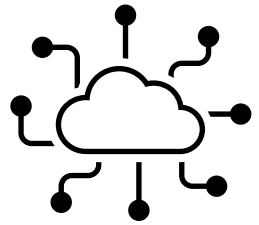
Introduction



What is Confirmation Bias?

"… the **seeking** or interpreting of **evidence** in ways that are partial to existing beliefs, expectations, or a hypothesis in hand." (Nickerson, 1998)



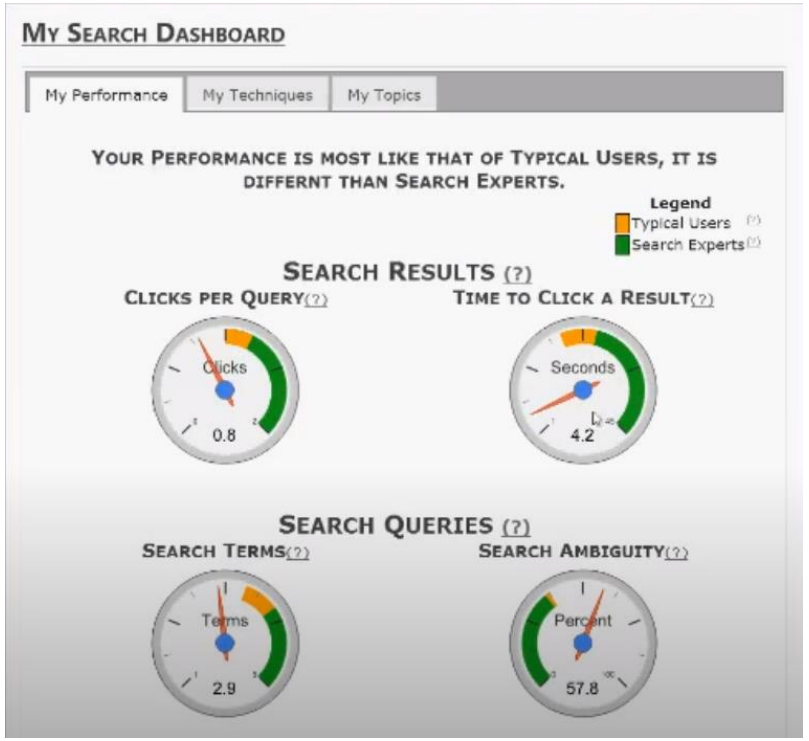
How can we **reduce** the influence of Confirmation Bias during web-search?

Previous Work

Analyze Content

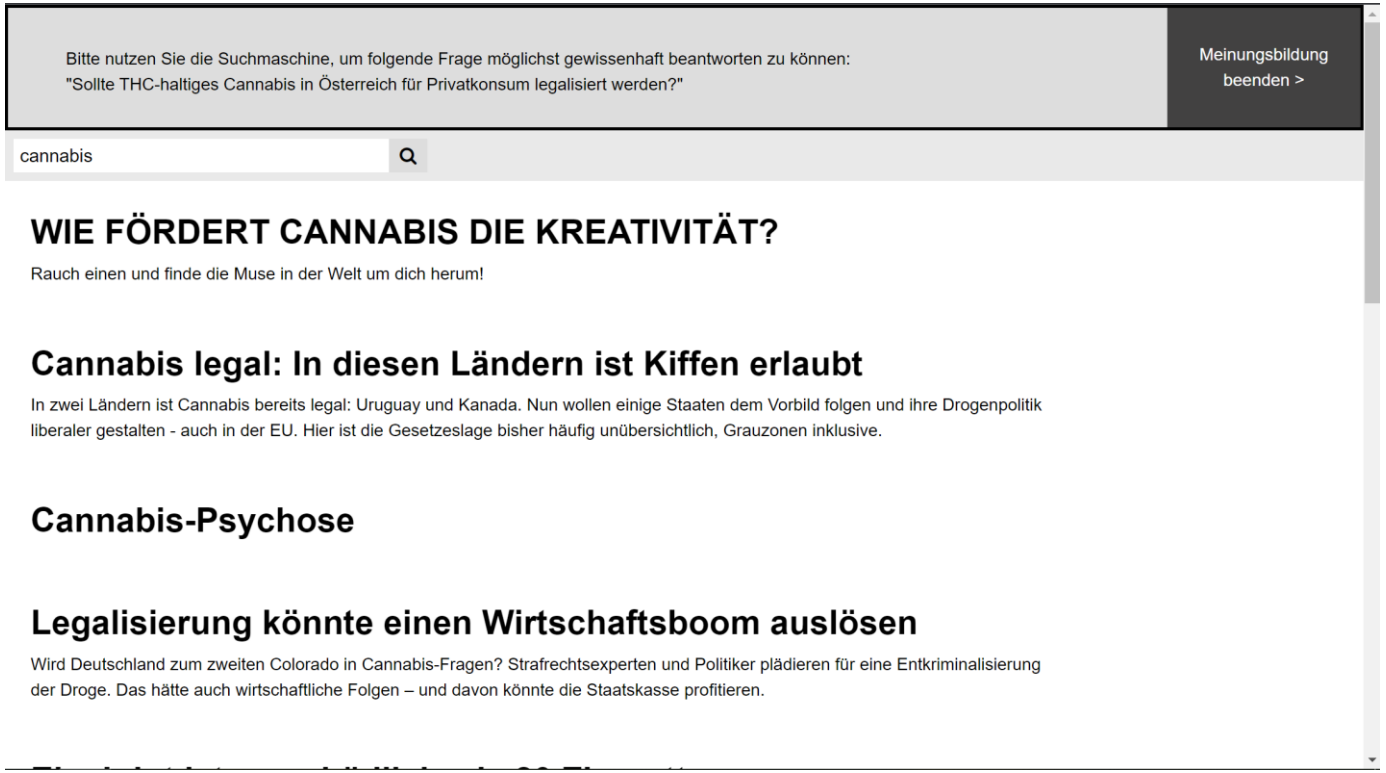
Balancer
(Munson & Resnick, 2013)

Analyze Behaviour



Search Dashboard
(Bateman et al., 2012)

Study Design

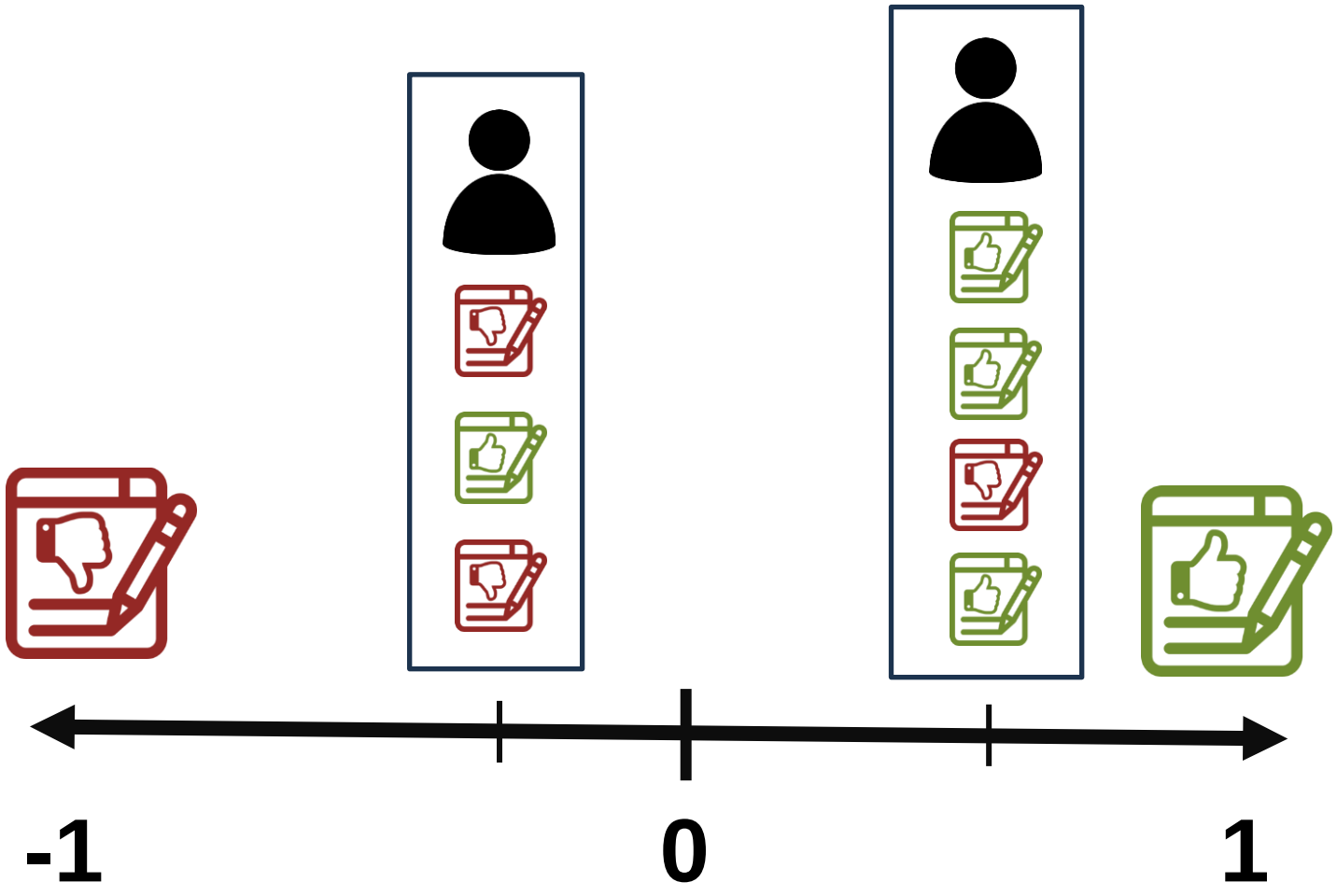


- Online
- Fully functional search engine
  - Using Meilisearch
- 49 web articles
  - 20 positive
  - 20 negative
  - 9 neutral
- Generalized search task

Topic: Legalization of Cannabis for recreational use in Austria

meilisearch

Sentiment of viewed articles



Study Design

Independent Variables

- Total Duration
- Time on SERP
- Time on results
- Number of queries
- Average query duration
- Number of clicked Results
- Average time per result
- Average Index
- Average Page

Dependent Variable

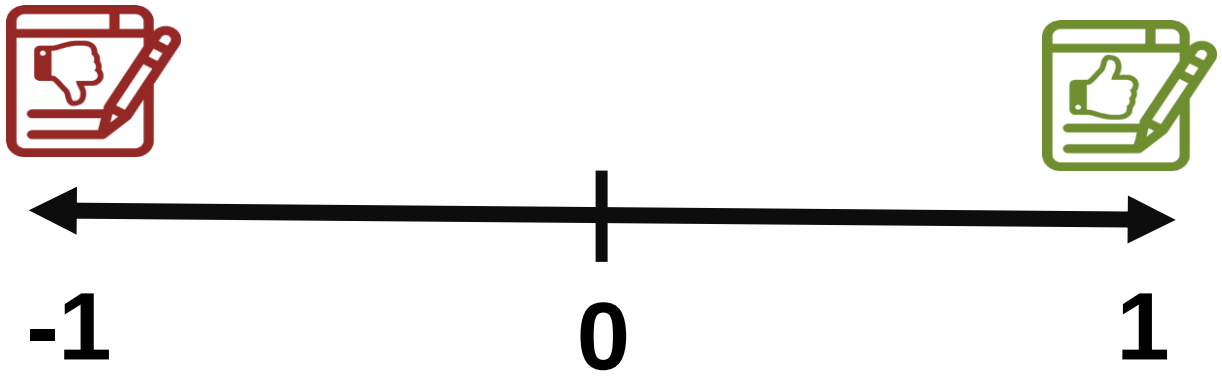
- Sentiment of viewed articles

Results – Linear correlation with expressed sentiment

Variable	Pearson correlation	*p*
duration	-.182	.243
time on results	-.19	.222
number queries	-.329*	.031
average query duration	-.108	.49
std. dev. query duration	-.259	.093
number clicked results	-.495**	.001
average time per result	-.071	.651
std. dev. time per result	-.202	.195
average index	-.324*	.034
average page	-.35*	.021

$^{**}p < .001, ^{*}p < 0.05$

Confirmation Bias



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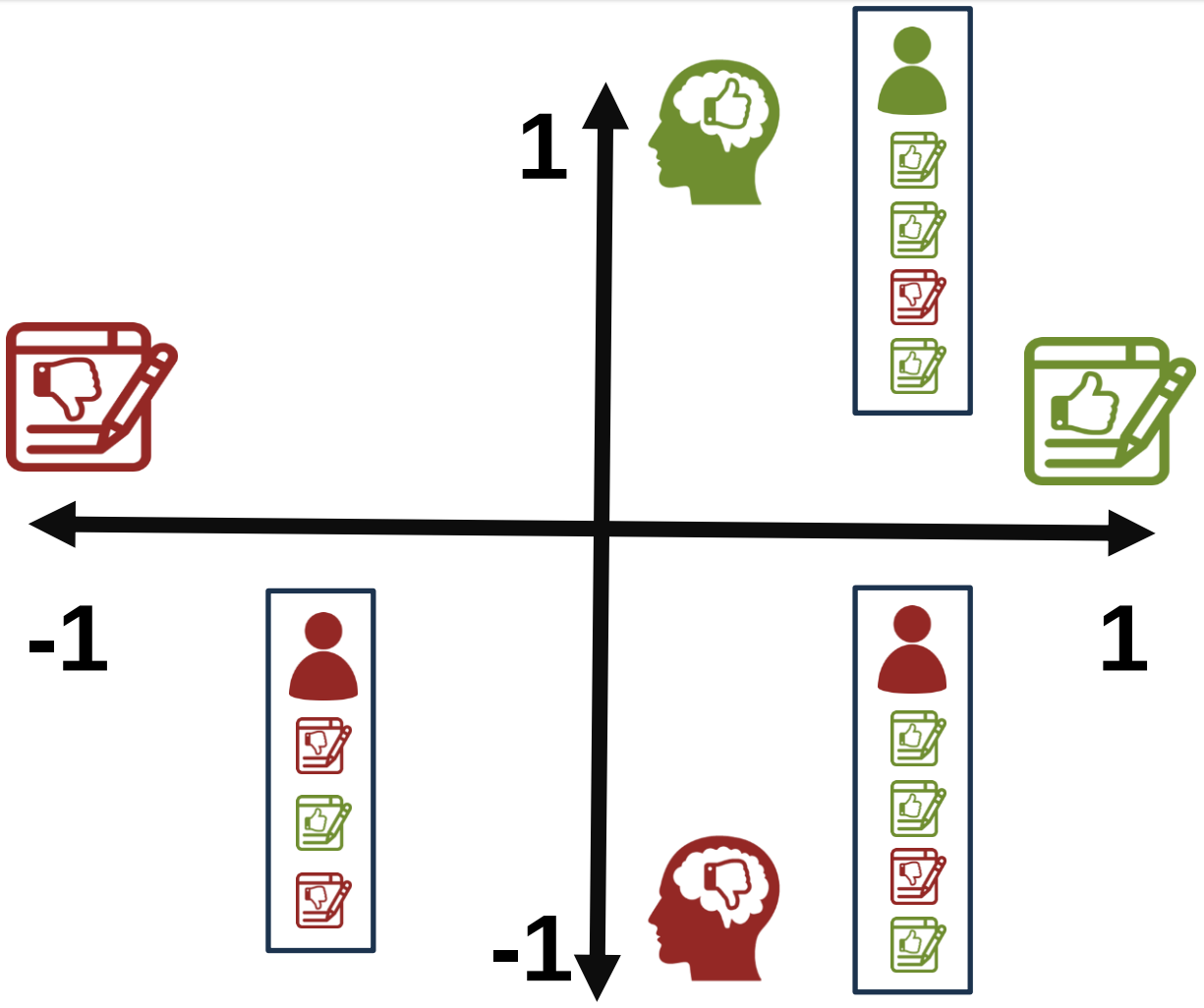

Confirmation Bias
=
Alignment of previous opinion and bias of viewed articles

Results – Correlation with Confirmation Bias

Variable	Pearson correlation	p
duration	-.27	.08
time on results	-.316*	.039
number queries	-.005	.975
average query duration	-.298	.052
std. dev. query duration	-.052	.739
number clicked results	-.056	.72
average time per result	-.21	.176
std. dev. time per result	-.312*	.042
average index	.018	.907
average page	.031	.843

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Comparison

Average Sentiment of viewed articles

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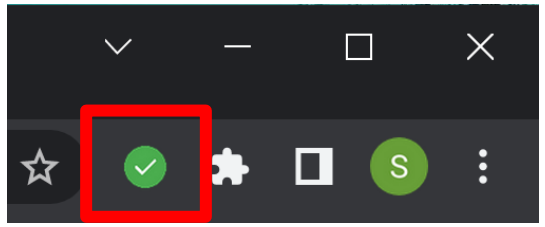
Practical Application

Browser Extension

Inform User of biased search sessions

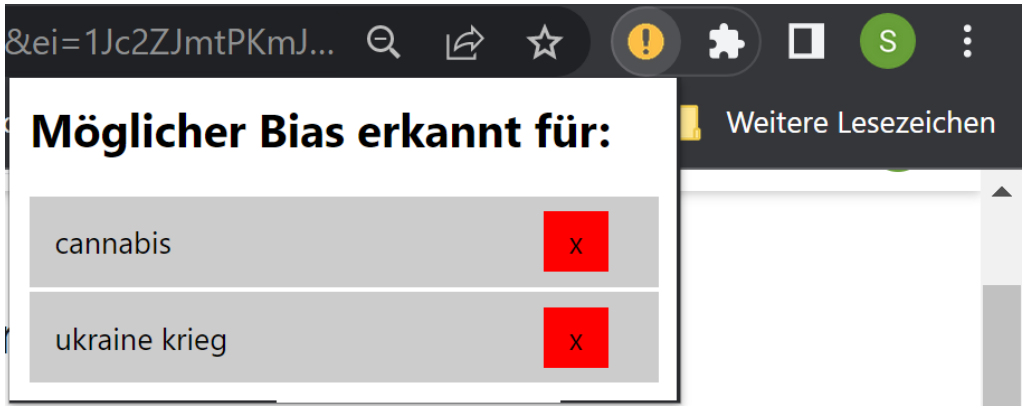
Track search behaviour

Identify search sessions



Analyse Bias

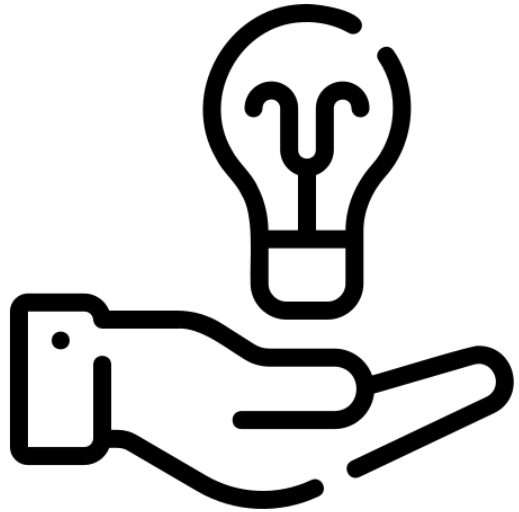
Icon to grab attention



Popup shows search sessions with bias

Conclusion

- Prediction of bias using behaviour is possible
  - More data needed



Contact and Discussion

Any Questions?

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