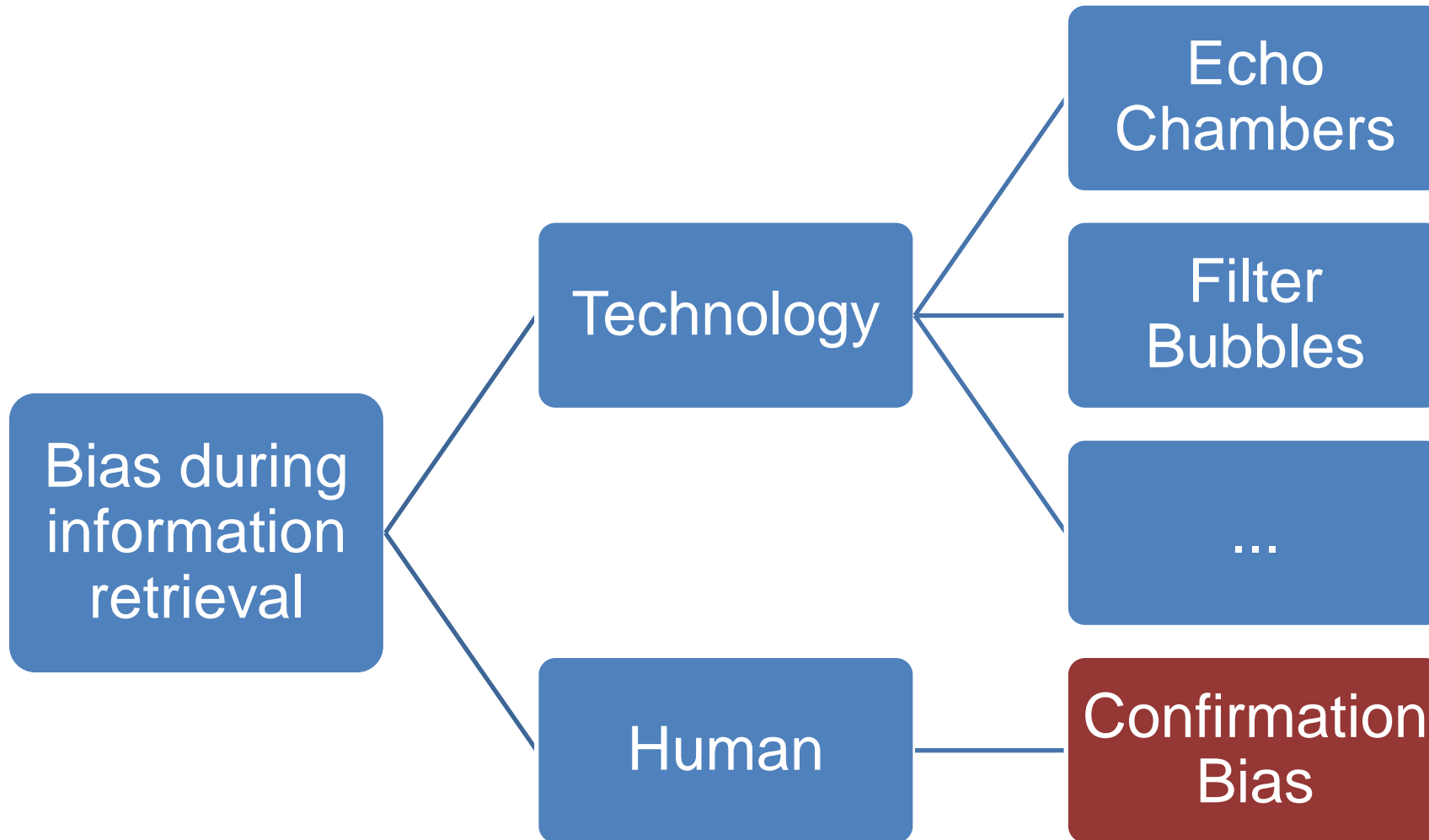


UNDERSTANDING AND MITIGATING COGNITIVE BIAS DURING WEB SEARCH

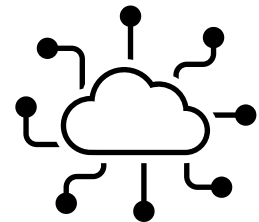
Simon Hitzginger
Alexander Nussbaumer
Christian Gütl
Chiara Ruß-Baumann

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

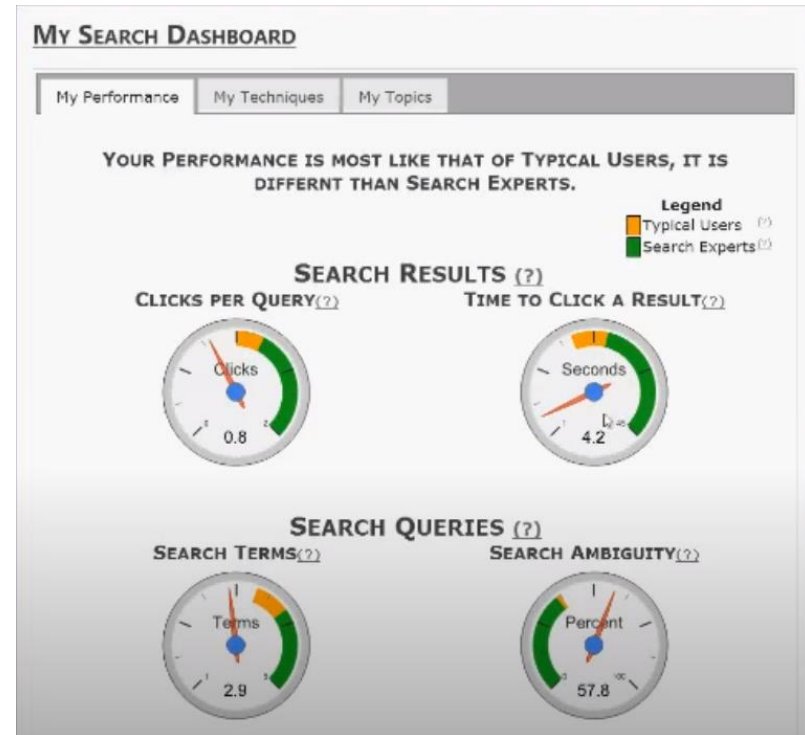
Analyze Content



Balancer

(Munson & Resnick, 2013)

Analyze Behaviour



Search Dashboard

(Bateman et al., 2012)

Study Design

Bitte nutzen Sie die Suchmaschine, um folgende Frage möglichst gewissenhaft beantworten zu können:
"Sollte THC-haltiges Cannabis in Österreich für Privatkonsum legalisiert werden?"

Meinungsbildung
beenden >

cannabis

WIE FÖRDERT CANNABIS DIE KREATIVITÄT?

Rauch einen und finde die Muse in der Welt um dich herum!

Cannabis legal: In diesen Ländern ist Kiffen erlaubt

In zwei Ländern ist Cannabis bereits legal: Uruguay und Kanada. Nun wollen einige Staaten dem Vorbild folgen und ihre Drogenpolitik liberaler gestalten - auch in der EU. Hier ist die Gesetzeslage bisher häufig unübersichtlich, Grauzonen inklusive.

Cannabis-Psychose

Legalisierung könnte einen Wirtschaftsboom auslösen

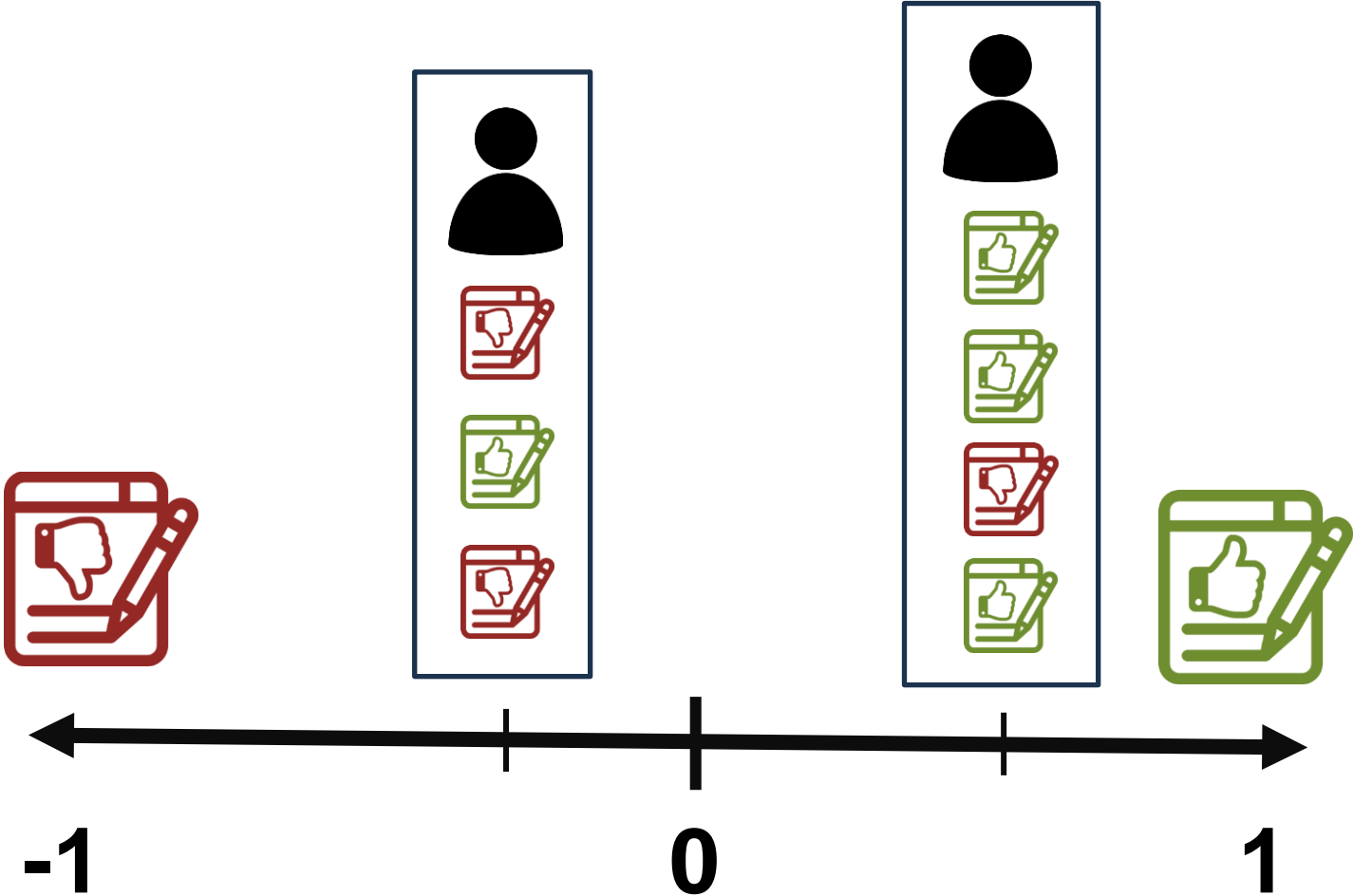
Wird Deutschland zum zweiten Colorado in Cannabis-Fragen? Strafrechtsexperten und Politiker plädieren für eine Entkriminalisierung der Droge. Das hätte auch wirtschaftliche Folgen – und davon könnte die Staatskasse profitieren.

- 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

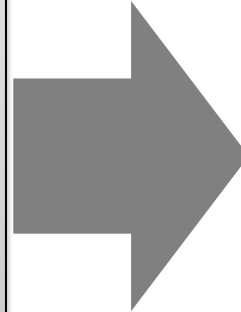
Sentiment of viewed articles



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

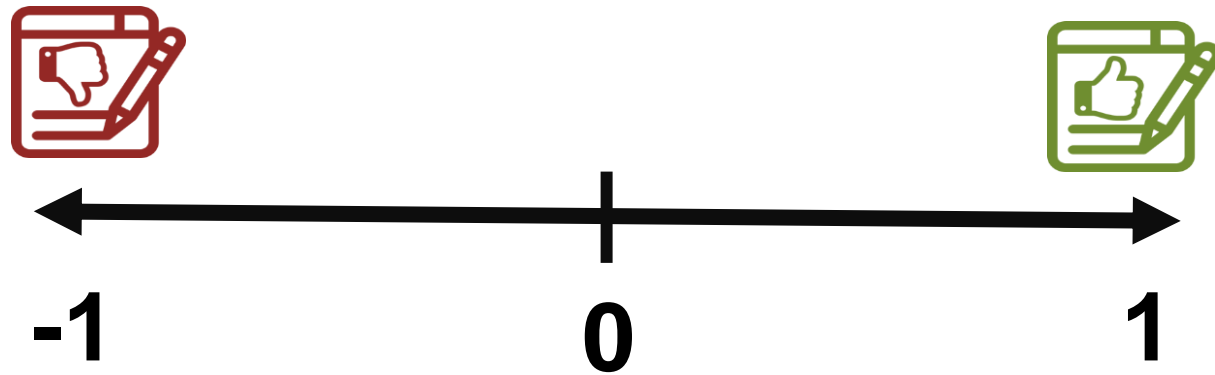


Results – Linear correlation with expressed sentiment

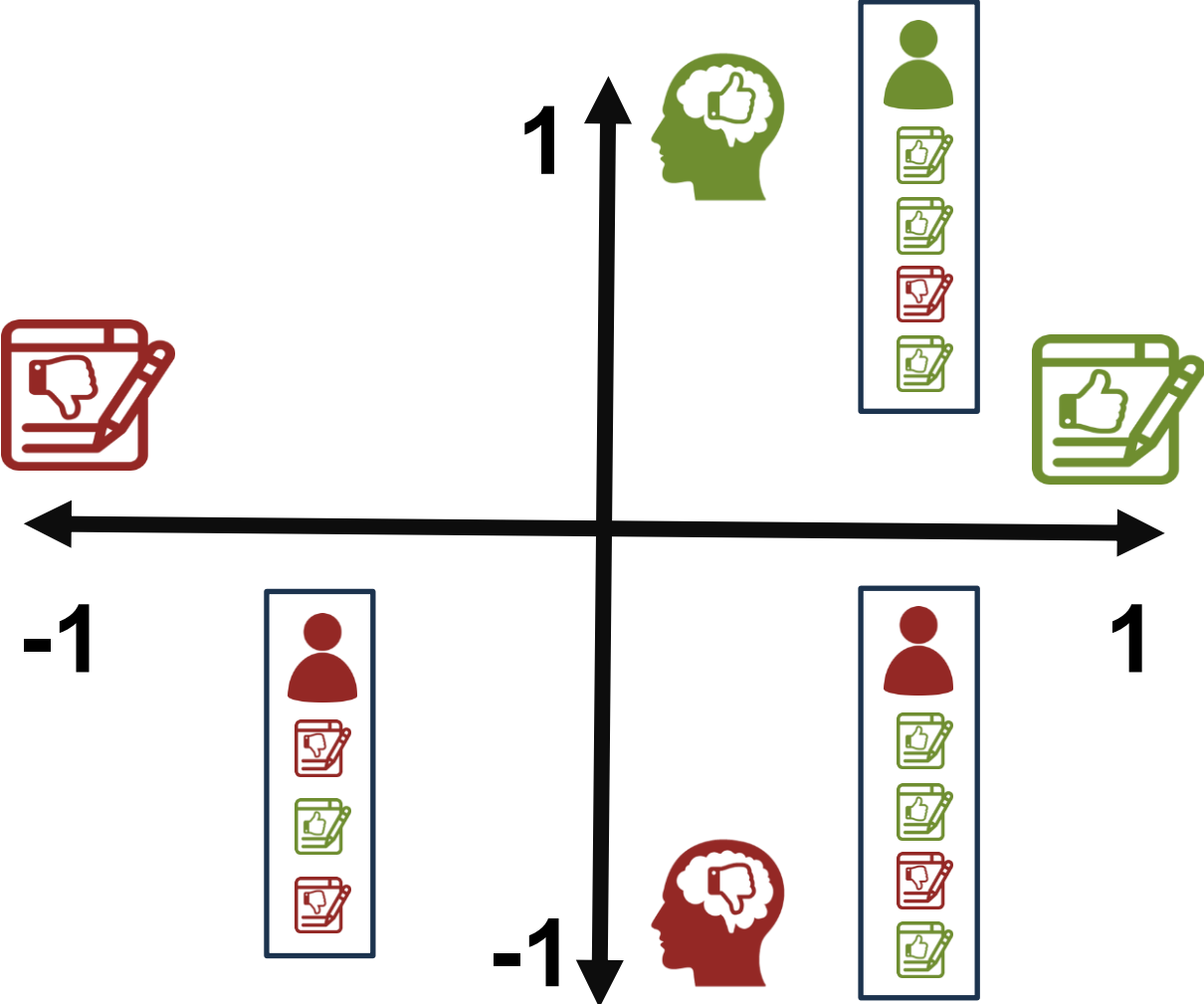
Variable	Pearson correlation	<i>p</i>
duration	-.182	.243
time on results	-.19	.222
number queries	-.329*	.031
average query duration	-.108	.49
std. dev. query duration	-.259	.093
number clicked results	-.495**	.001
average time per result	-.071	.651
std. dev. time per result	-.202	.195
average index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

** $p < .001$, * $p < 0.05$

Confirmation Bias



Confirmation Bias



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

Results – Correlation with Confirmation Bias

Variable	Pearson correlation	<i>p</i>
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

** $p < .001$, * $p < 0.05$

Comparison

Average Sentiment of viewed articles

Variable	Pearson correlation	<i>p</i>
duration	-.182	.243
time on results	-.19	.222
number queries	-.329*	.031
average query duration	-.108	.49
std. dev. query duration	-.259	.093
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Confirmation Bias

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Practical Application

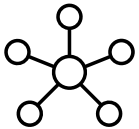
Browser Extension



Inform User of biased search sessions



Track search behaviour



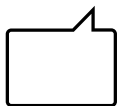
Identify search sessions



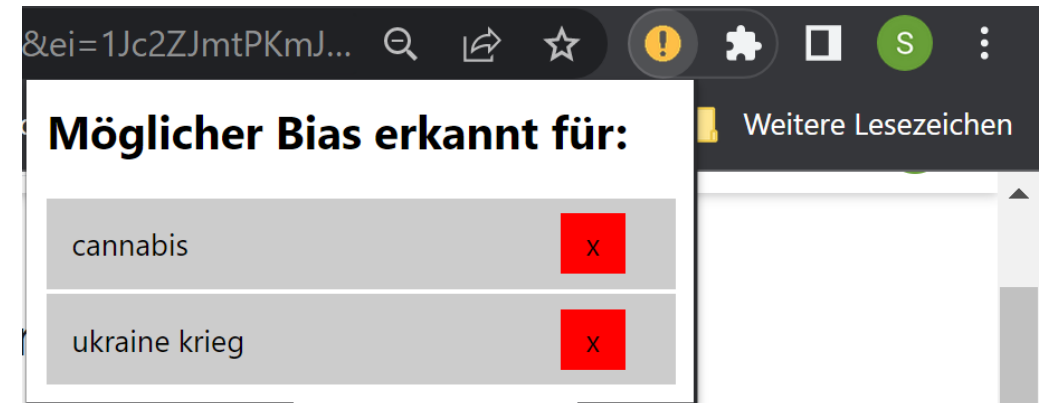
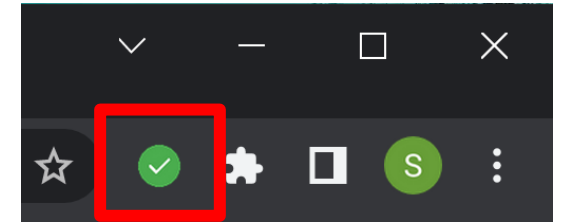
Analyse Bias



Icon to grab attention

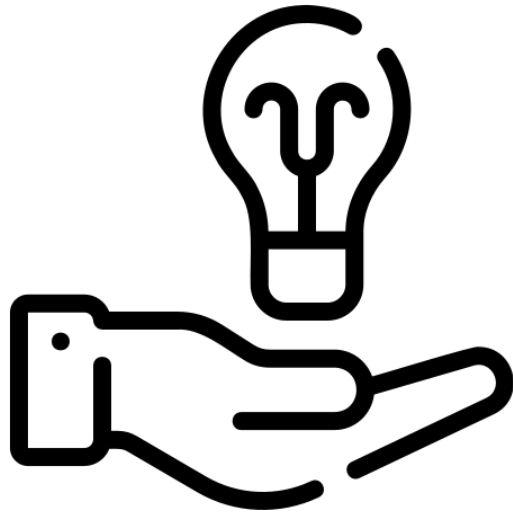


Popup shows search sessions with bias



Conclusion

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



Contact and Discussion

Any Questions?



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simon.hitzginger@student.tugraz.at