Peer Review Report

Review Report on Topic Modelling and Sentiment Analysis of Tweets related to Freedom Convoy 2022 in Canada

Original Article, Int J Public Health

EVALUATION

Q 1   **Please summarize the main findings of the study.**

The paper presents an API-based twitter survey investigating what topics and sentiments dominated the online discussion on Twitter regarding the Freedom Convoy 2022.
They analyzed 403,545 tweets between January 15 to February 14, 2022.
They find overall more positive than negative comments about the convoy. The paper claims that the patterns found might help to better understand the events and might allow future interventions in similar situations.

Q 2   **Please highlight the limitations and strengths.**

A strength of this study is how well-written and clearly structured the results are. Everything is presented in a precise and well-ordered fashion. It was easy to read and follow and provided sufficient details about the application of the different methodological steps and techniques.
Also, the tools used, and applications included (Vader, LDA) were up to the current standard of topic modeling and sentiment analysis research. The authors clearly named and described the limitations of their study in sufficient detail.

The authors already mentioned one important limitation I find problematic: The selection of keywords and search terms might be biased strongly towards finding support.
Especially as the authors excluded critical and satirical search terms like "#FluTruxKlan" and "#KarenKonvoy" it appears likely that a multitude of critical tweets including these terms and hashtags might have been excluded. I find this especially problematic as "Freedom Convoy" as a term already carries a positive connotation which makes it less attractive for critics and opponents to use. The paper does not provide any information about the magnitude of the distortion one could expect from this researcher's decision.

Another problem I see is the rather limited number of concussions derived from the research: Sentiments on Twitter were rather positive, according to the authors. But the trend over time regarding topics and sentiment direction is rather unspectacular. The authors proposed that their findings might help to identify trends useful to decision-makers in the domain of public health. They claim that sentiment analysis prior to and post the Parliament Hill protest would give useful insights and allow useful interventions by decision makers. Currently, I don't see what useful conclusions decision makers can realistically derive from the presented results. How can this topic modeling or sentiment modeling results guide public health officials and help to inform decision-makers? How does this provide useful new insights for researchers? The authors should clarify this point.

Q 3   **Please provide your detailed review report to the authors. The editors prefer to receive your review structured in major and minor comments. Please consider in your review the methods (statistical methods valid and correctly applied (e.g. sample size, choice of test), is the study replicable based on the method description?), results, data interpretation and references. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.**

Generally a well-written paper, well-executed method, and application of sentiment analysis and topic modeling. The findings are, however, rather limited in scope and usefulness. Bias in keywords might be problematic.

Major issues

Issue 1

The research appears to be biased towards some keywords that carry a positive connotation. "Freedom Convoy" is an expression that certainly is more salient to supporters than to opponents of the movement. Finding rather positive comments on social media corresponding with this positive description is therefore not really surprising.

It would have been very helpful if the quantity of tweets using hashtags and keywords like "#FluTruxKlan" and "#KarenKonvoy" would have been evaluated in relation to the other hashtags to better estimate how strong this bias might be. Maybe these Hashtags have little interaction and influence but based on the presented results readers cannot know.

The authors claim that the conversation on Twitter was rather positive towards the freedom convoy in general. They should provide more proof for this claim by better checking and evaluating in the paper if opponents have used alternative keywords and hashtags.

Issue 2
The authors claim that:

line 212
"This becomes a bit more transparent by examining
sentiments after January 29, 2022, when the main rally outside Parliament Hill, as it serves as a turning point where most topics approached neutral."

and

line 222
"The shift in sentiment patterns prior to and post the Parliament Hill protest on January 29, 2022 suggests that a build-up of sentiments on social media could potentially act as a precursor to foreshadow events that may require early actions to mitigate consequences. Using sentiment analysis to inform decision-making once an event has already happened may be too late, as most topics post January 29th shift towards neutral, which offers limited interpretability."

While "identifying" this shift preemptively would really add value to public health and security research by giving opportunities for intervention, I struggle to see this supposed effect of foreshadowing in the provided data visualizations.

The sentiment trends are remarkably unspectacular and topic models are comparatively constant pre- and post-January 29. There is a small dip in sentiments 24-72 hours after Jan 29. But this is hardly a good indication to guide any preemptive public policy intervention.

There appears to be more random fluctuation pre-January 29 in both sentiment and topic domain, but no clear patterns emerge that would support this bold argument, as far as I can judge it with the provided data and graphs.

The authors should either add substantial evidence from their data to better proof this point or clarify, how this pattern shift can be clearly identified and used for any meaningful anticipation of events.

Minor Issues

I have found no minor issues with language, presentation, and methods.

The cited scientific literature is minimalistic, and several sentiment analysis and topic modeling papers could be added to better interlink the research with the current state of research.

PLEASE COMMENT

Q 4 **Is the title appropriate, concise, attractive?**

yes

Q 5 **Are the keywords appropriate?**

yes, they are appropriate.

Q 6 **Is the English language of sufficient quality?**

yes, it is.

Q 7 **Is the quality of the figures and tables satisfactory?**

Yes.

Q 8 **Does the reference list cover the relevant literature adequately and in an unbiased manner?)**

it is minimalistic. Regarding covid19, sentiment analysis, and topic modeling there is plenty that could be added.

QUALITY ASSESSMENT

Q 9	Originality	3/5
Q 10	Rigor	5/5
Q 11	Significance to the field	3/5
Q 12	Interest to a general audience	4/5
Q 13	Quality of the writing	5/5
Q 14	Overall scientific quality of the study	4/5

REVISION LEVEL

Q 15 **Please make a recommendation based on your comments:**

Major revisions.