

Analyzing the Vaccination Debate in Social Media Data Pre- and Post-COVID-19 Pandemic

INTRODUCTION

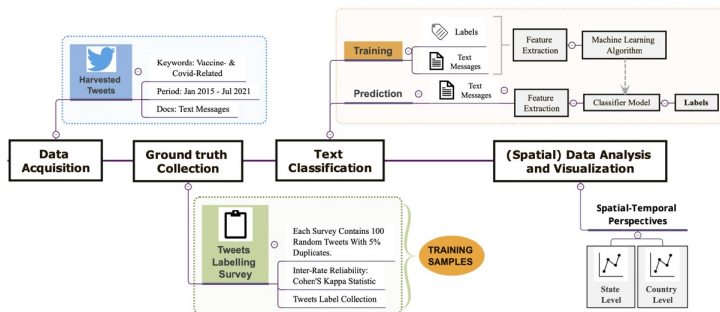
Background

- The **COVID-19** pandemic has unprecedentedly affected the daily routines of people everywhere.
- Vaccination campaigns** around the world have become prevalent.
- The implementation of vaccination campaigns is still challenging (e.g., effects on human longevity and health, the concerns related to religion and philosophical beliefs) → **Diverse vaccine sentiments**.

Objectives

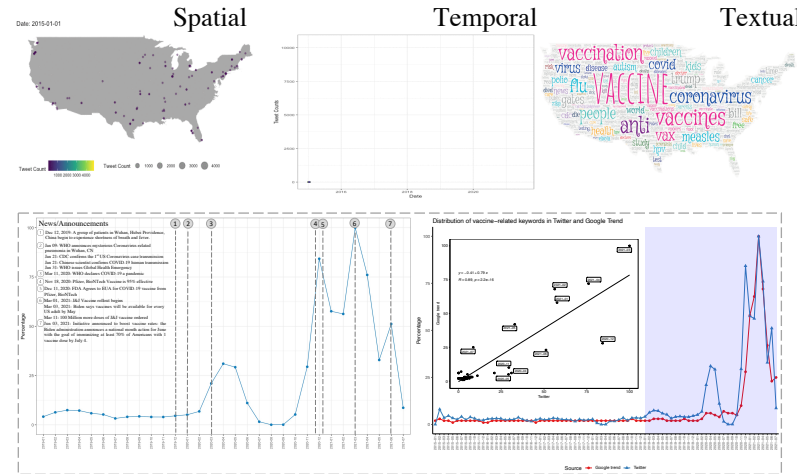
Analyze vaccine sentiments in **SPACE & TIME** and compare their dynamic changes in the context of COVID-19 by integrating **Word Embedding & Machine Learning** techniques based on **Social Media Data**.

RESEARCH OUTLINE

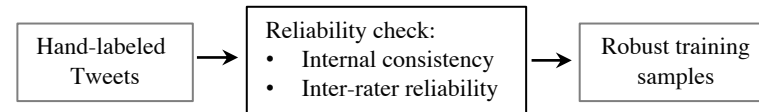


METHODOLOGY

(A) Data Acquisition



(B) Ground Truth Collection



(C) Text Classification



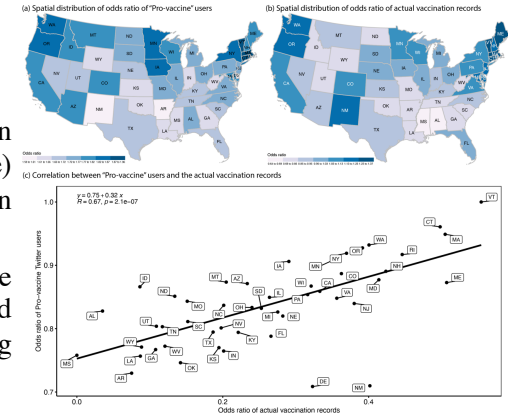
RESULTS

- The positive vaccine sentiment was the dominant opinion.
- The percentage of "Anti-vaccine" users increased after the outbreak, approaching the highest point in 2020 and shrinking in 2021.
- A similar trend was observed when disaggregating the sentiments at the state level.

RESULTS CONT.

Online v.s. Offline

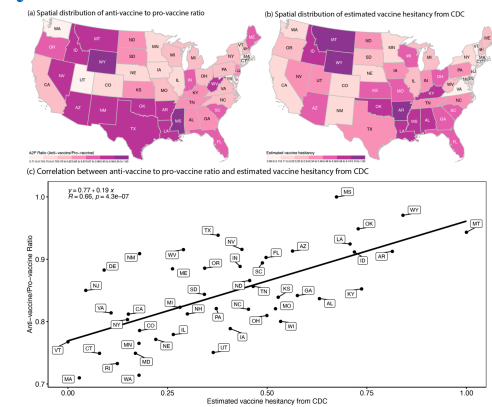
- A positive correlation between 'Pro-vaccine' users (online) and the actual vaccination rates (offline).
- The identified positive vaccine sentiments online can be used as an indicator for evaluating offline vaccination rates.



A2P Ratio: Vaccine Hesitancy

$$R_{A2P} = \frac{\text{Odds Ratio}_{\text{Anti-vaccine}}}{\text{Odds Ratio}_{\text{Pro-vaccine}}}$$

- A positive correlation between A2P ratio (online) and the estimated vaccine hesitancy from CDC (offline).
- A2P ratio can effectively monitor vaccine hesitancy in near real-time.



CONCLUSION

The study offers a scan of the changing pulse of the public's perceptions towards vaccination in light of vaccination campaigns and policy decision-making facing the current COVID-19 and future public health challenges.