

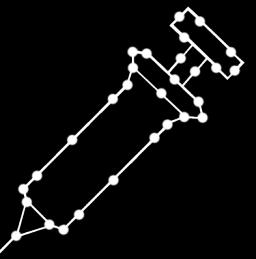
Covax Analytica

Covid-19 & Vaccine analysis

Ayman Madhour, Lukas Bach

“With a fast-moving pandemic, no one is safe, unless everyone is safe”*

**Global Alliance for Vaccines and Immunisation (GAVI) about the COVAX initiative*



Part 1: Covid-19 Worldwide

IMPACT

- Deaths: 3,97 Mio.¹
- Lost Jobs: 126 Mio.²
- GDP development: - 3,5% 2020³



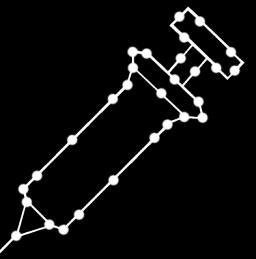
1 <https://de.statista.com/statistik/daten/studie/1103240/umfrage/entwicklung-der-weltweiten-todesfaelle-aufgrund-des-coronavirus/>

2 <https://www.tagesschau.de/wirtschaft/weltwirtschaft/ilo-jobs-corona-101.html>

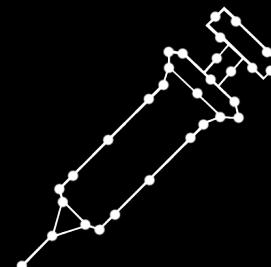
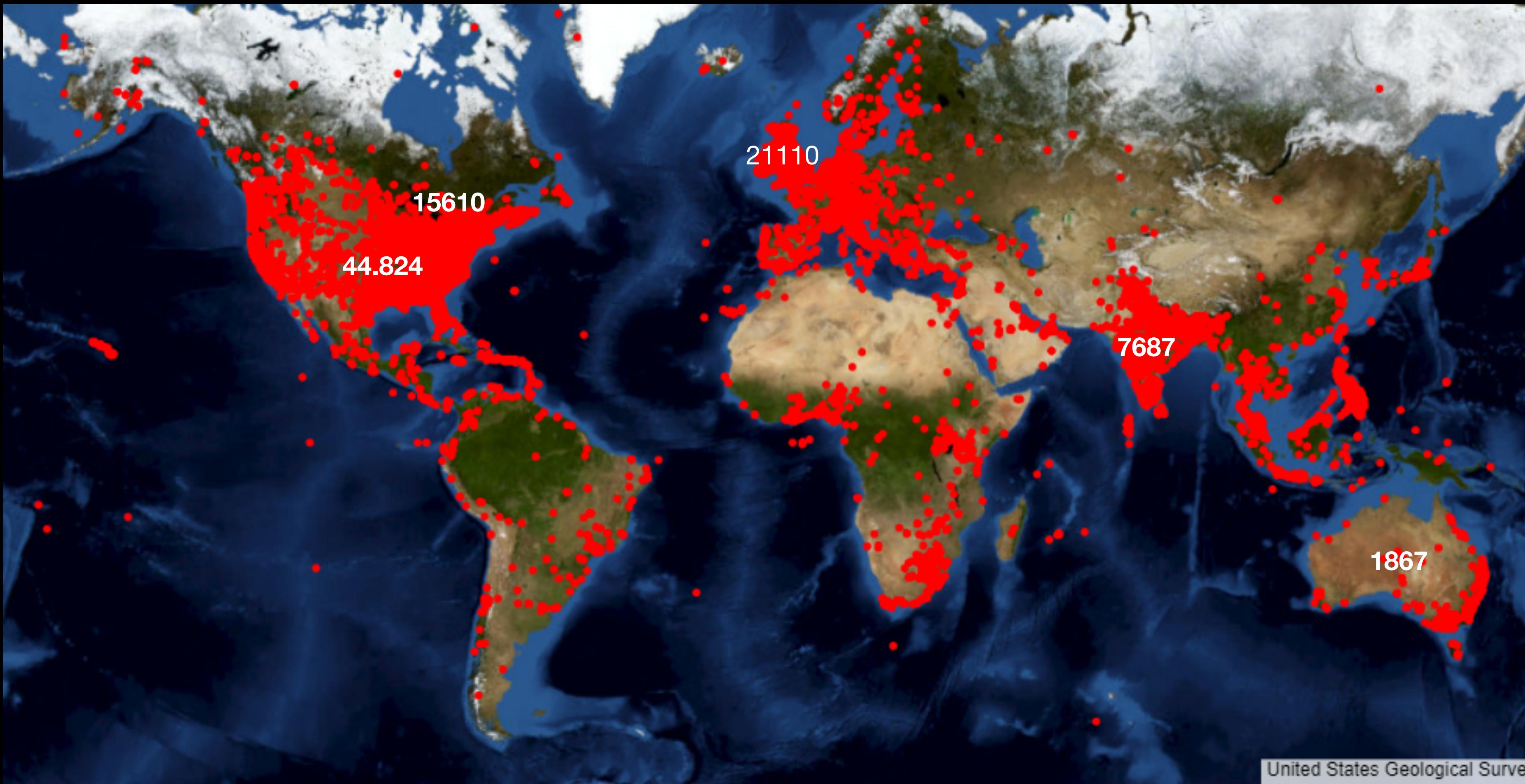
3 <https://de.statista.com/statistik/daten/studie/197039/umfrage/veraenderung-des-weltweiten-bruttoinlandsprodukts/>

The Dataset

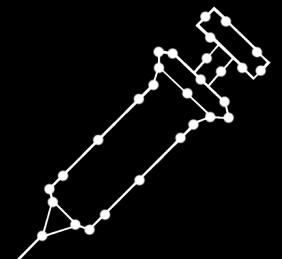
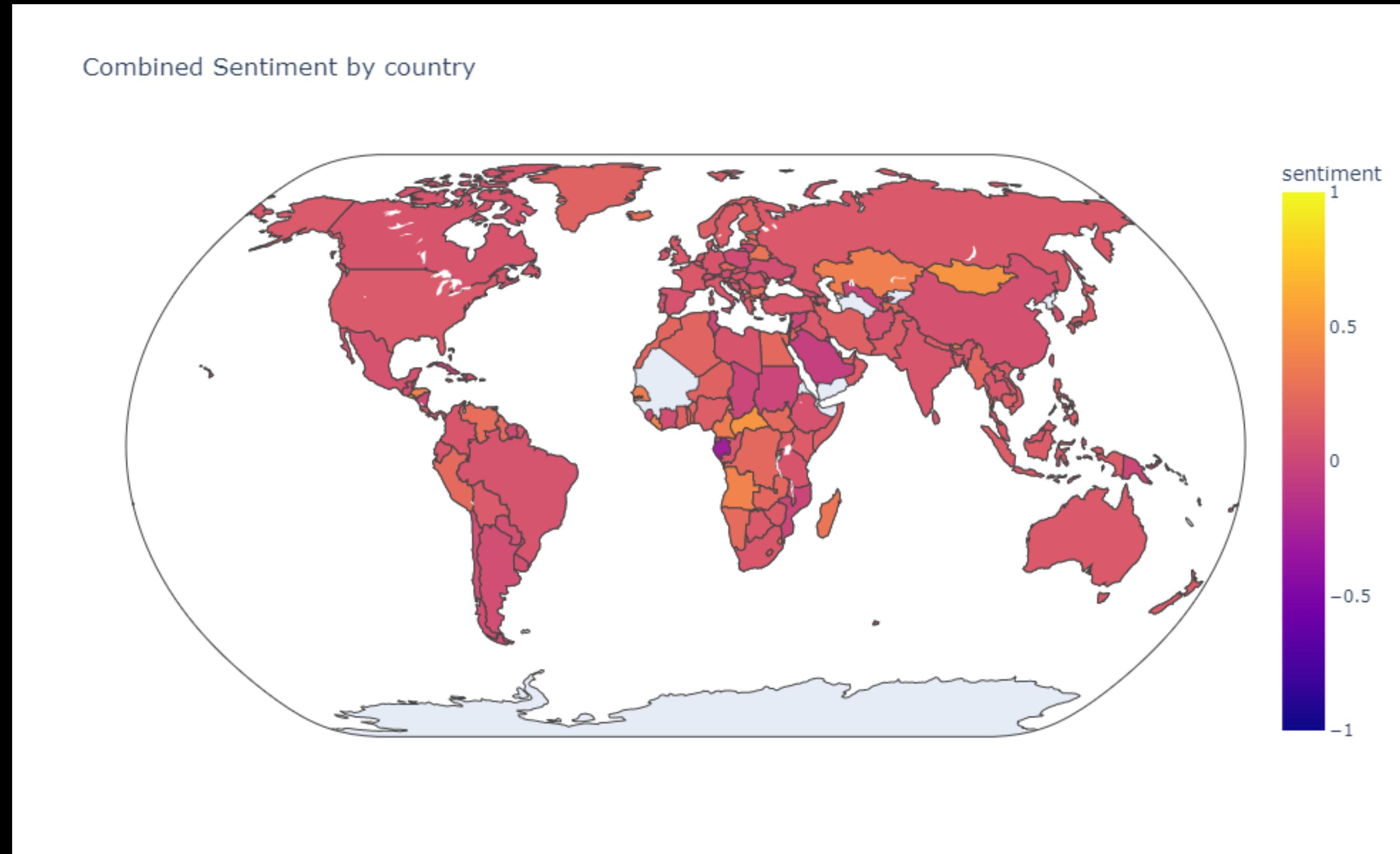
- Size: 110674 Tweets
- Parsing through Keywords:
 - Keywords were enhanced continuously
- Period: 01.11.2020 - 12.06.2021
- Sentiment included



Global Overview

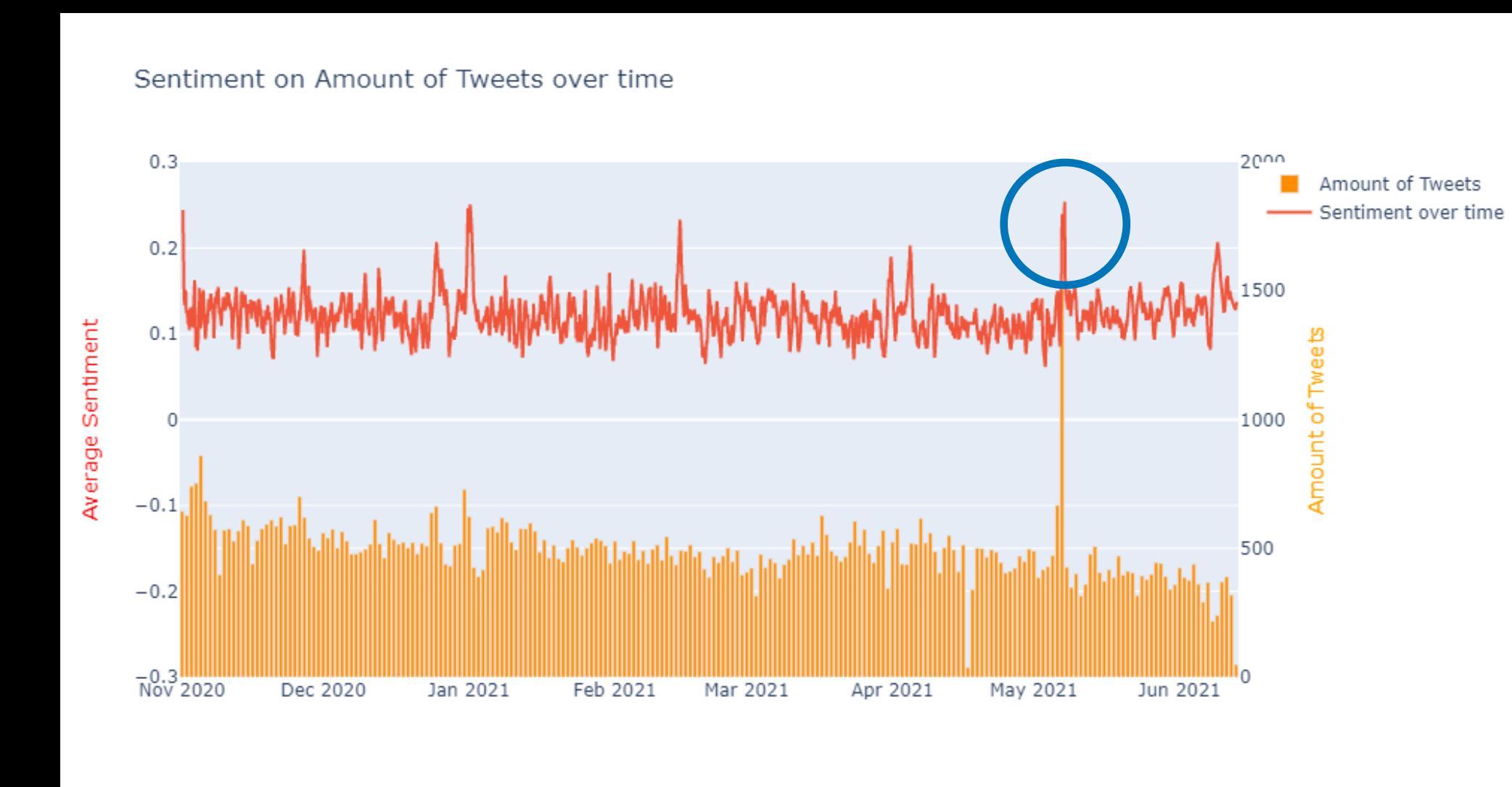


Average Sentiment



Amount of Tweets and average Sentiment

- Average of 500 Tweets per day
- Sentiment is overall positive



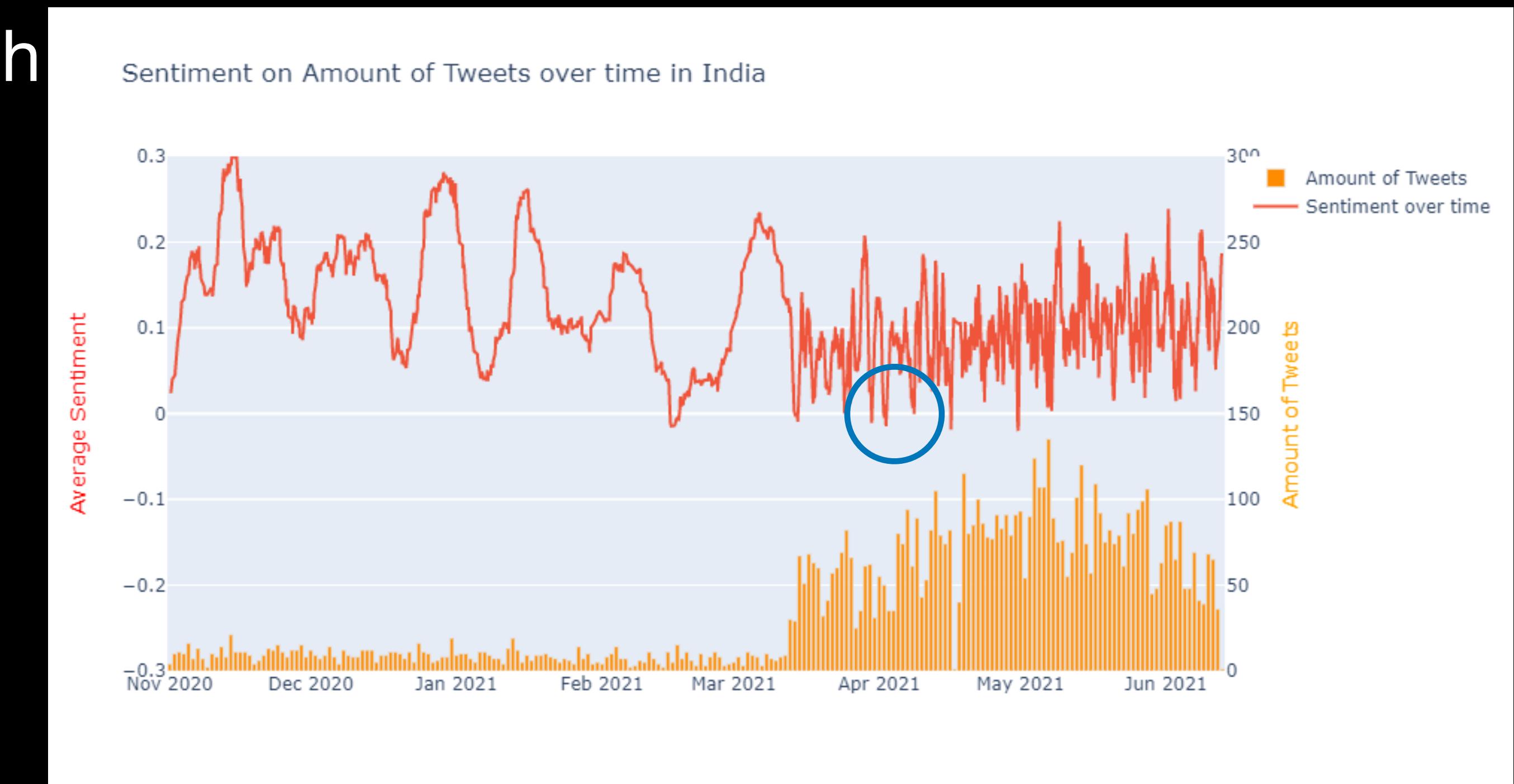
Focusing on Countries:

India

- Irregular Sentiment till 15th March
- Data growth since 15th March
- 1st - 30th April Kumbh Mela

Modi Govt prioritises building #ModiMahal, wasted money on superstition, allowed kumbh mela the biggest superspreader event, failed 2 procure vaccines. Modi himself gloated over the crowds @ his election rallies Now he cant hide in silence! #VistaNahiVaccine

Sentiment: -0.625



Kumbh Mela

- 10 Million attendants¹
- 1800% increase in Covid cases in the week that followed the festival²
- More than 168,000 new cases on 12th of April³



1 <https://www.theguardian.com/world/2021/may/30/kumbh-mela-how-a-superspreader-festival-seeded-covid-across-india>

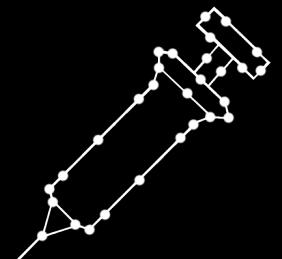
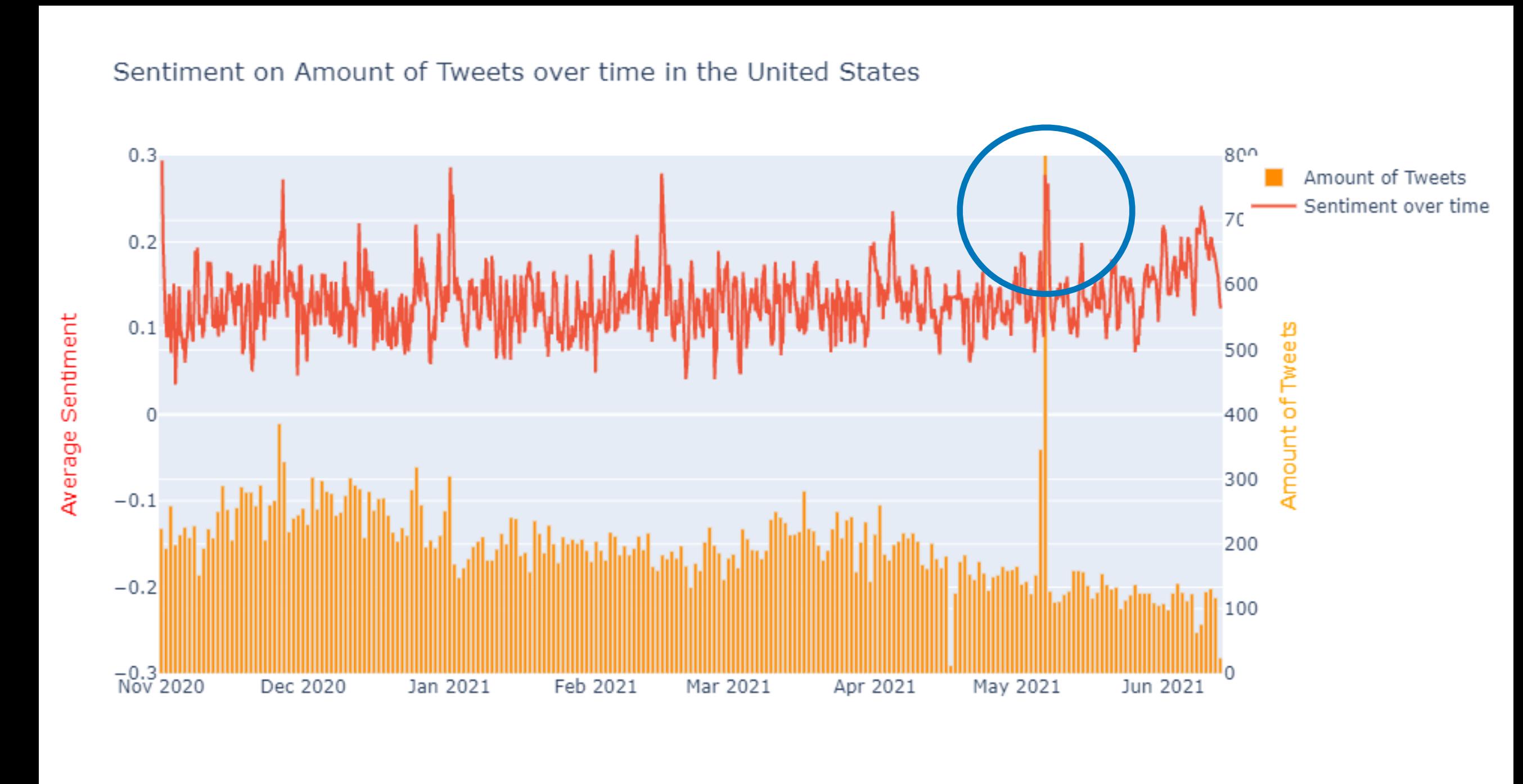
2 <https://www.bbc.com/news/world-asia-india-57005563>

3 https://www.danflyingsolo.com/wp-content/uploads/2019/02/KumbhMela_CanonPowershotSX470_22.jpg

USA

- Peak on 7th of May
 - with a neut. - pos. Sentiment
- National Tourism Day

Note to self: If there's ever another lockdown... find a beach and stay there.



United Kingdom

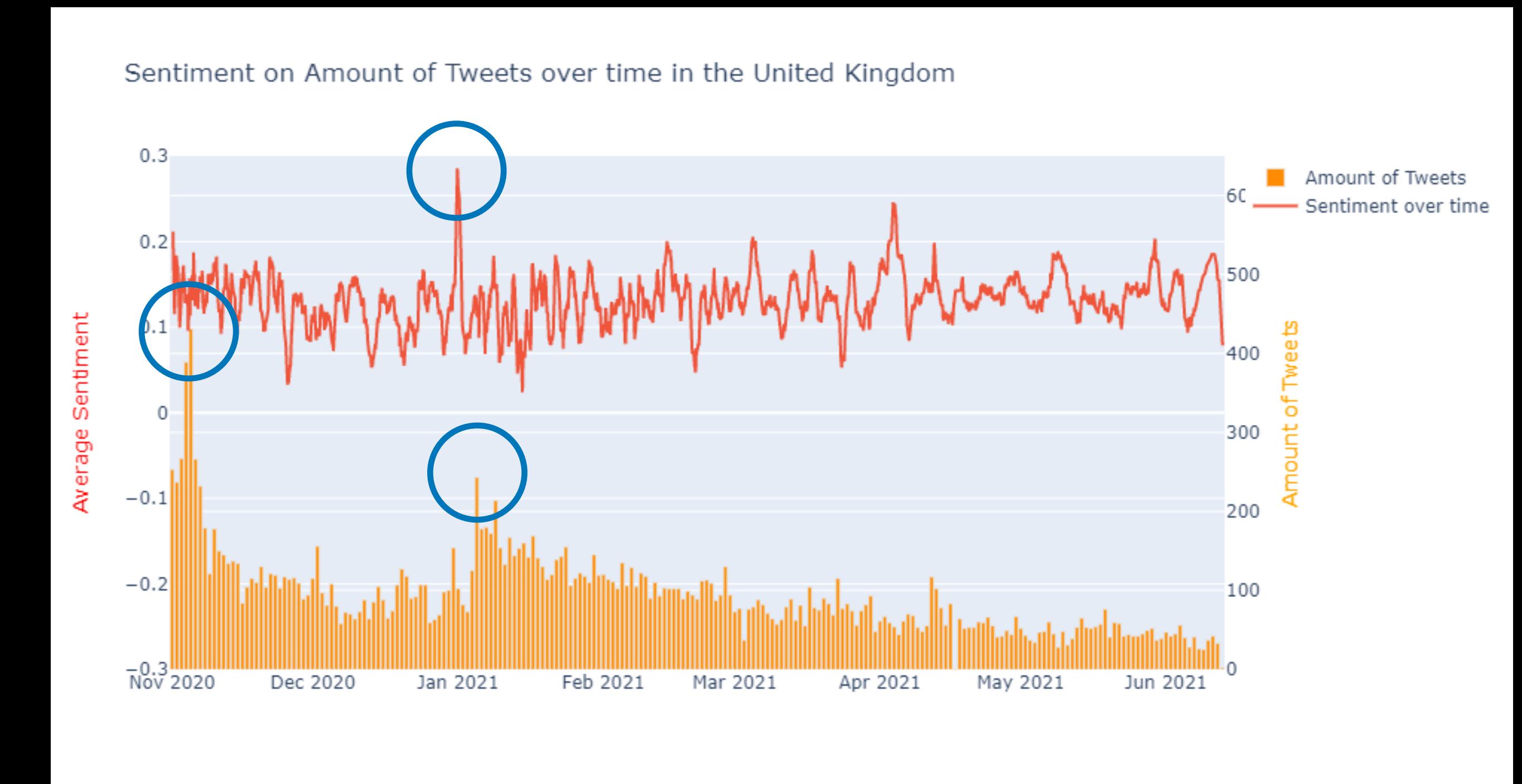
- Peak on 5th of November
 - with a neutral Sentiment
 - Second Lockdown announced

 **Scott Duncan-Brown**
@scottwdb

Welcome to Lockdown 2.0. just woke up to find the world is missing!!!! #lockdown2 @ Wembley Park, London instagram.com/p/CHM5AlkluDzg...

[Tweet übersetzen](#)

8:54 vorm. · 5. Nov. 2020 aus Brent, London · Instagram



Part 2: Vaccines Worldwide

PROGRESS

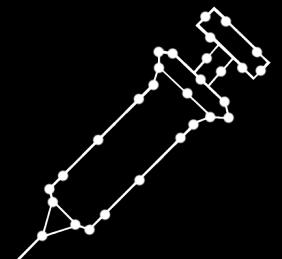
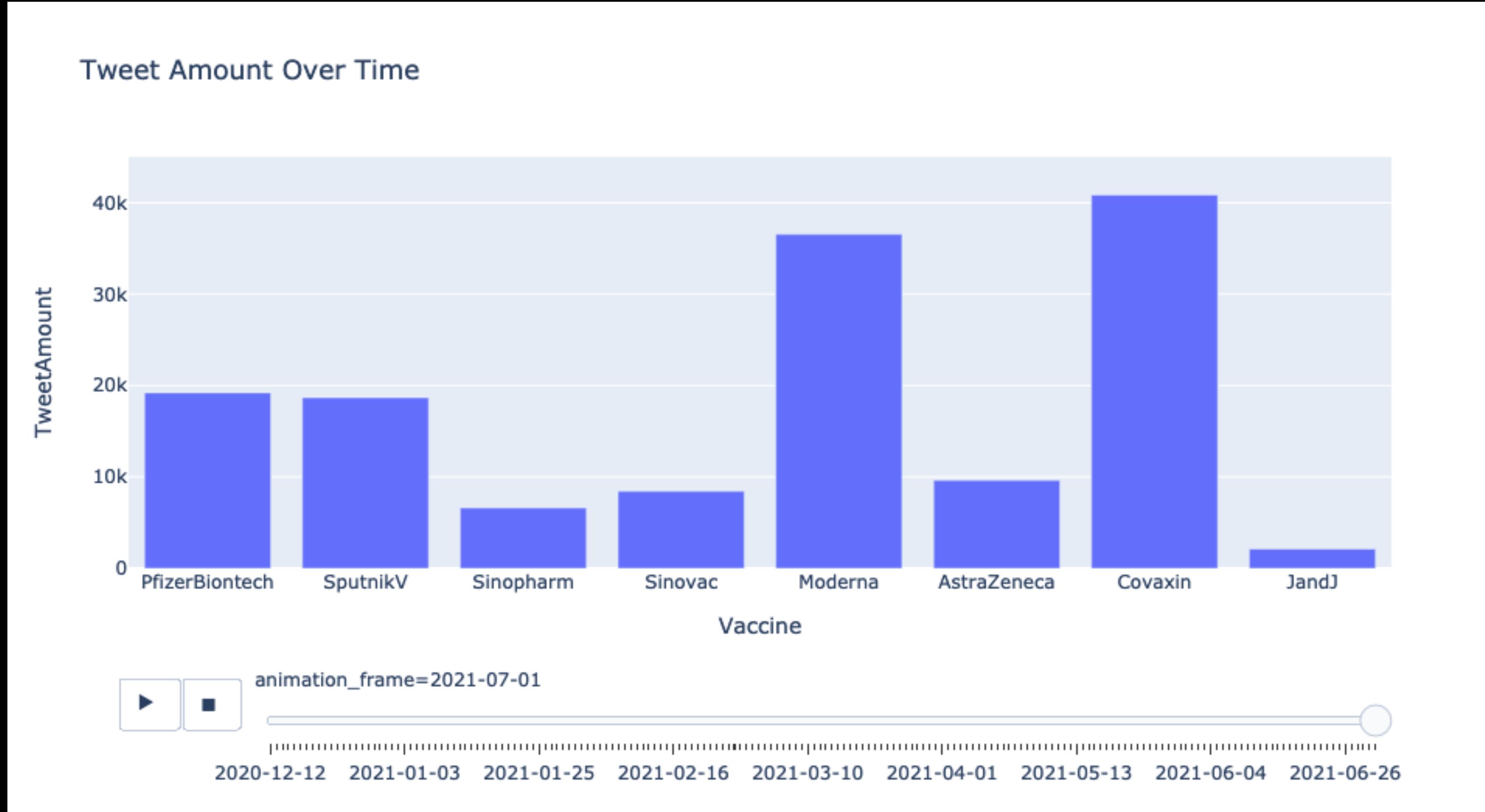
- More than 3 Billion vaccine doses have been administered
- 24% of the world population received at least one dose
- Goal is 70%
- Major setbacks (new variants, side-effects, vaccine-hesitancy)



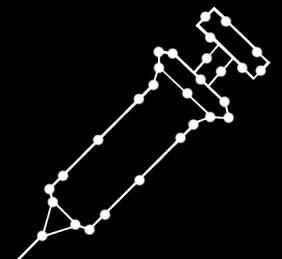
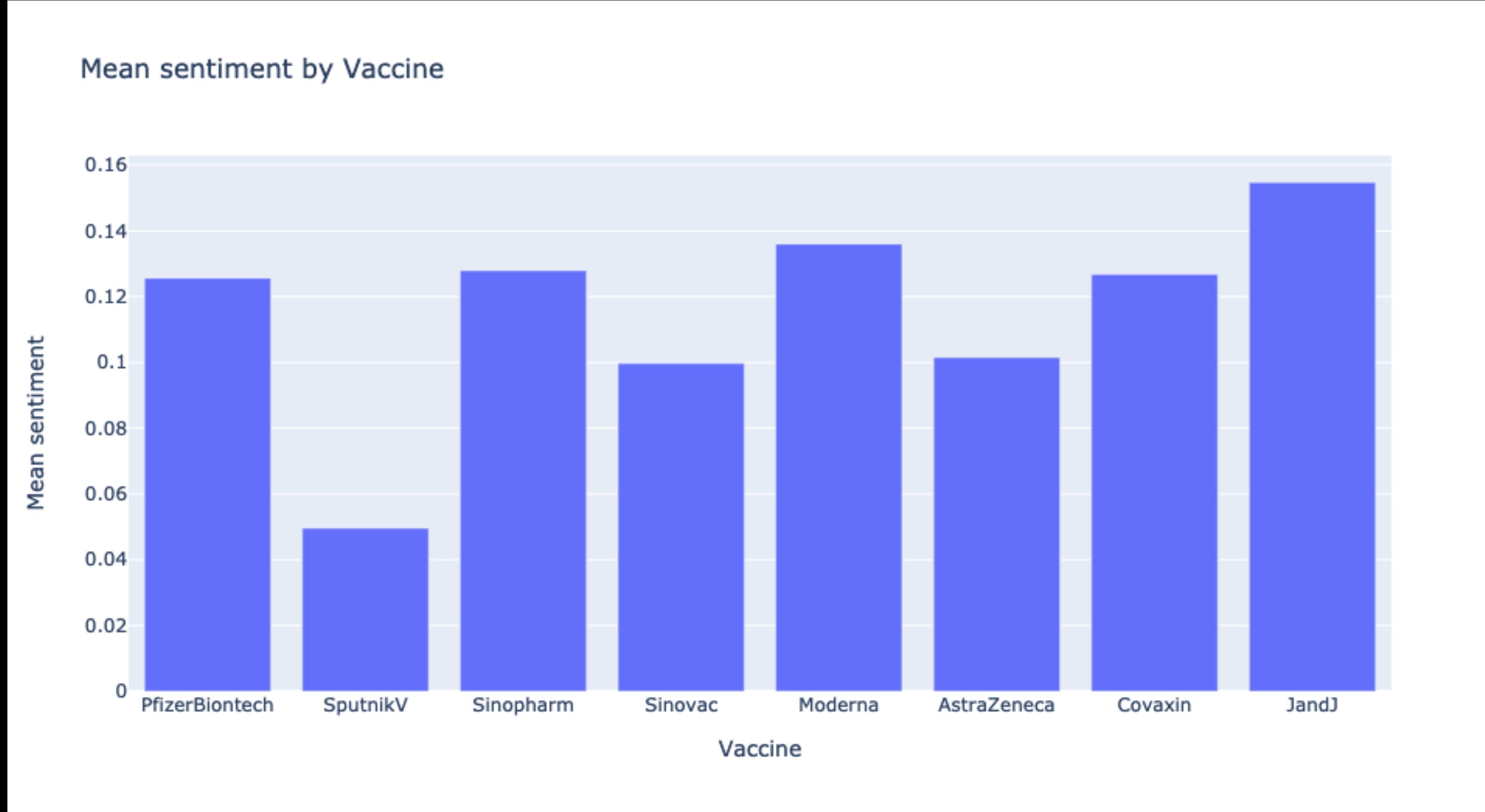
The Dataset:

- Hydrated Tweets
 - Data Period: 12.12.2020 - 01.07.2021
 - Worldwide Vaccination Progress
 - Google Trends

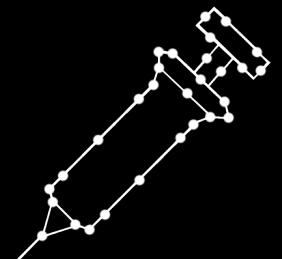
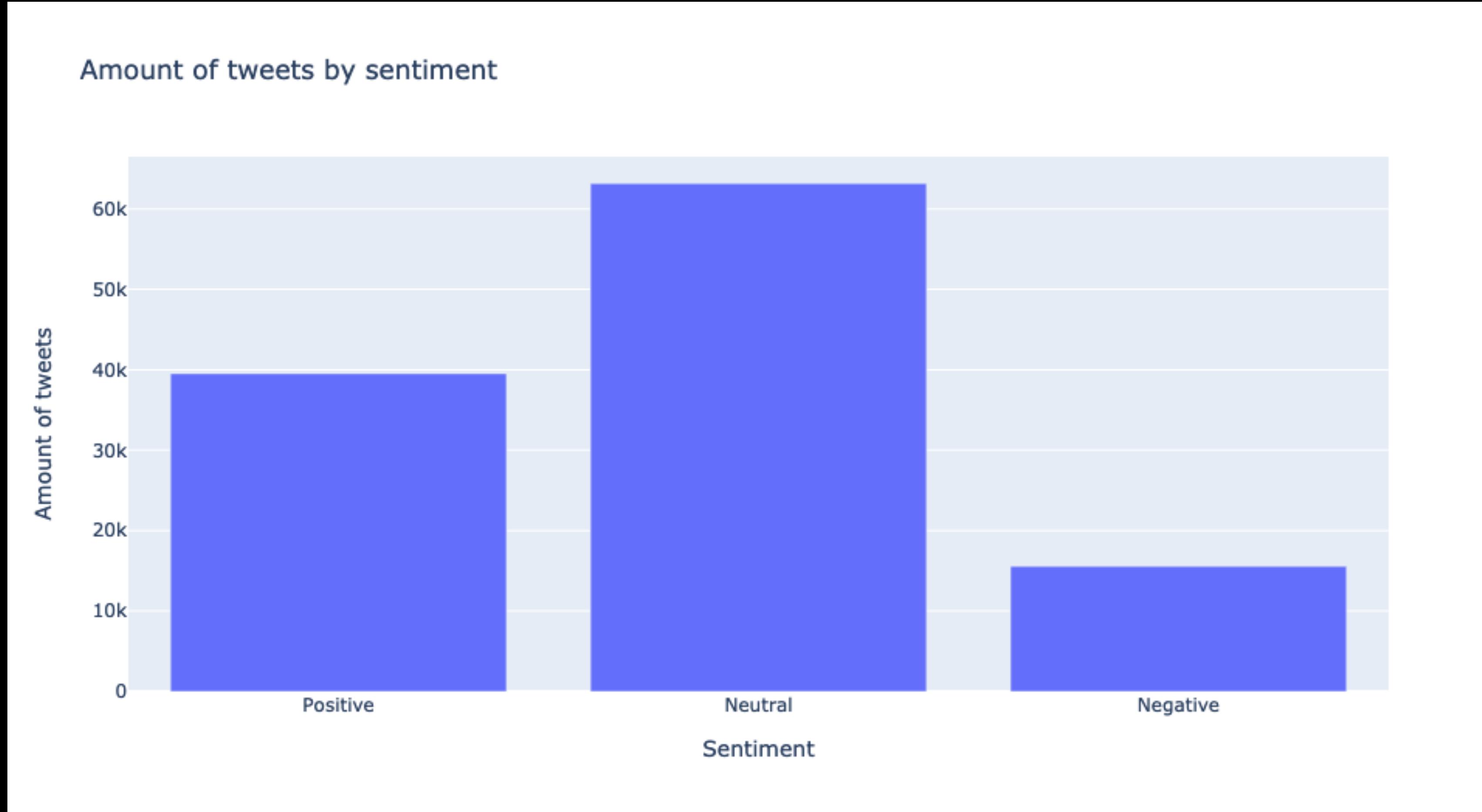
Sentiment Analysis: Findings



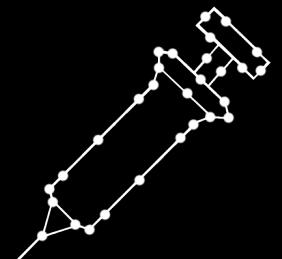
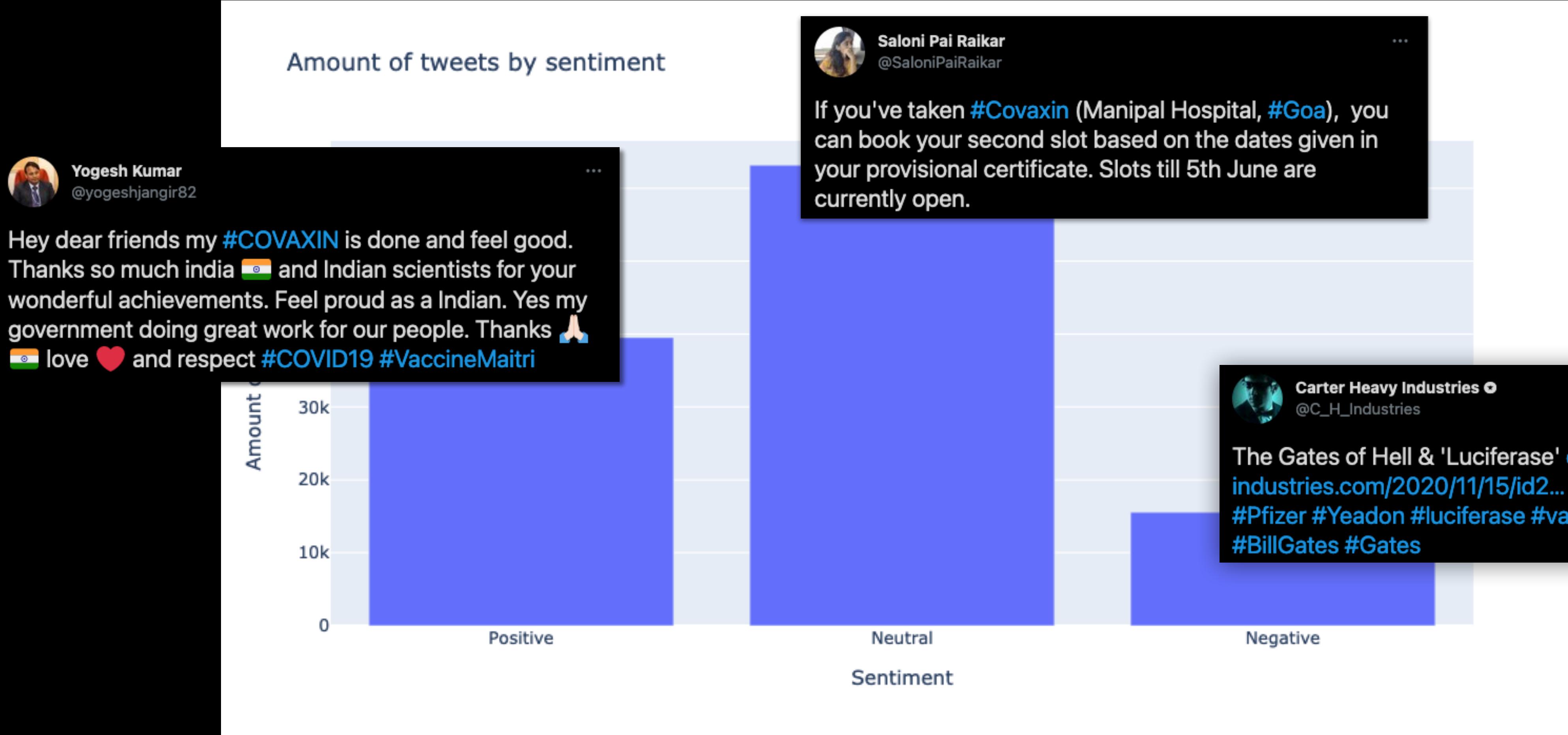
Sentiment Analysis: Findings



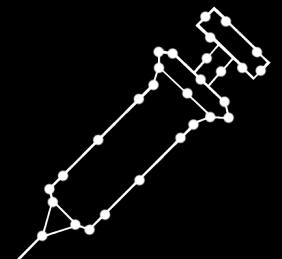
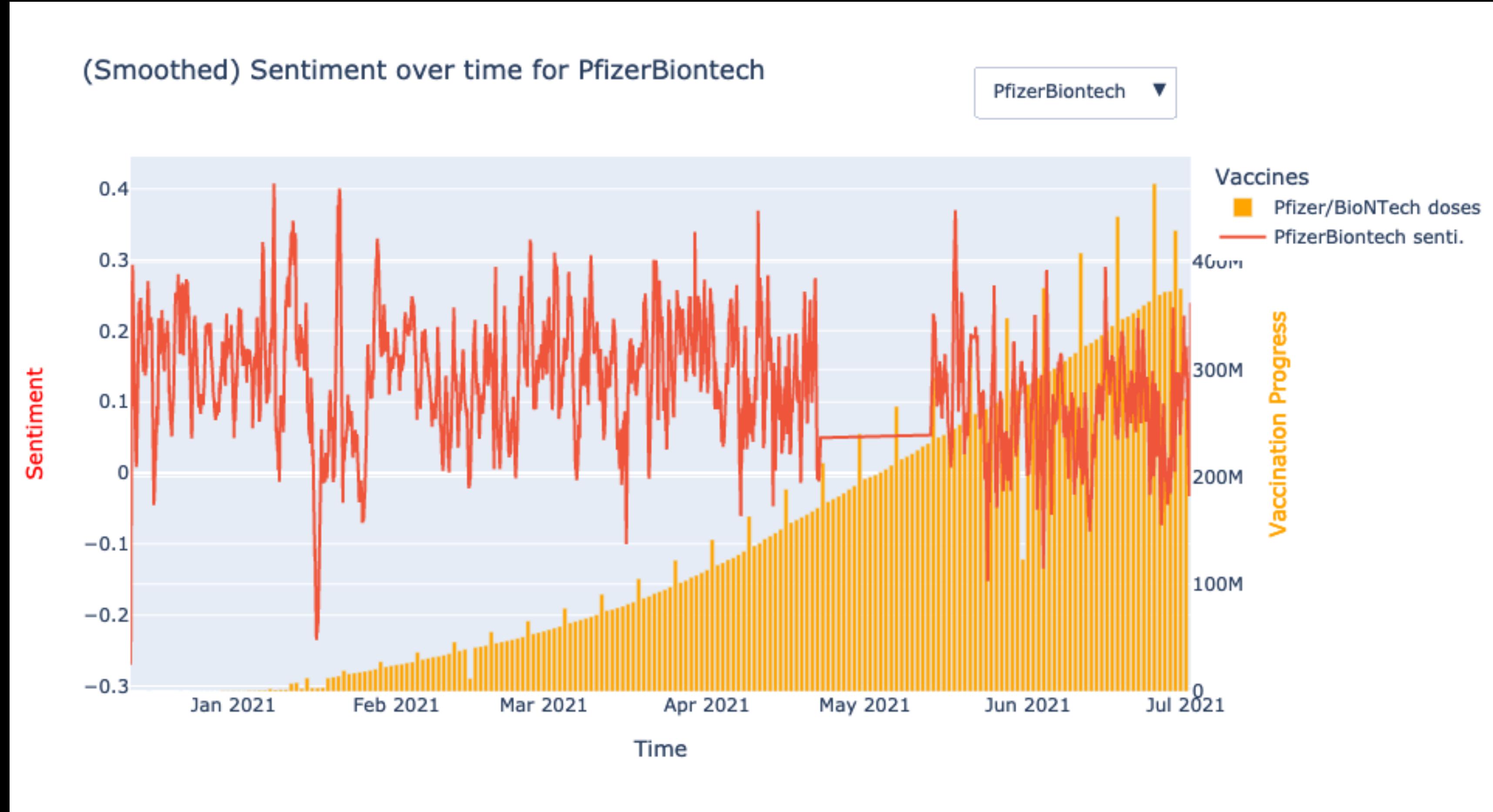
Sentiment Analysis: Findings



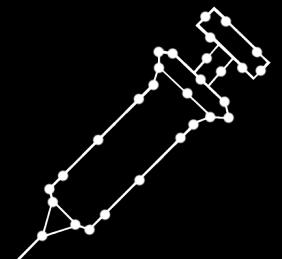
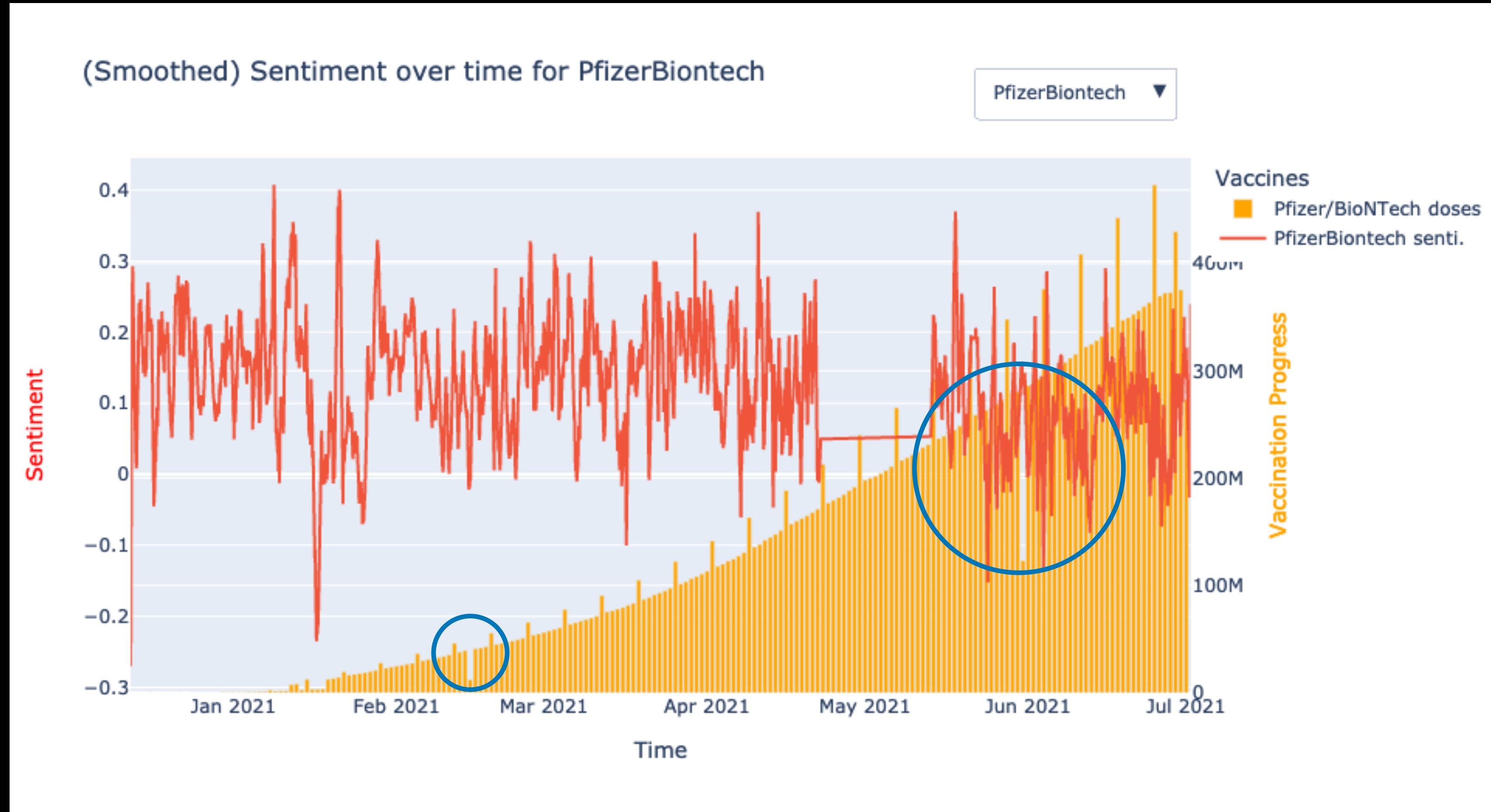
Sentiment Analysis: Findings



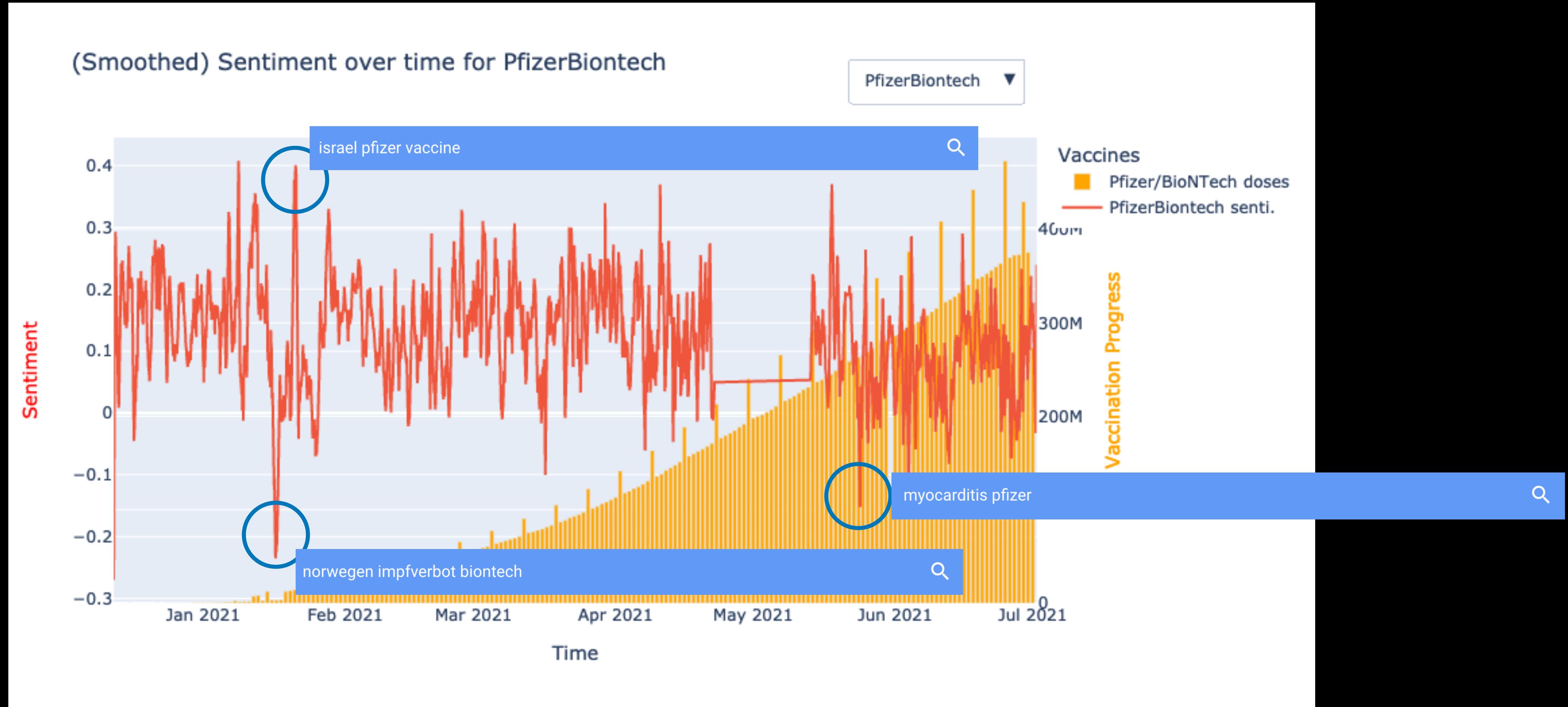
Sentiment Analysis: PfizerBiontech



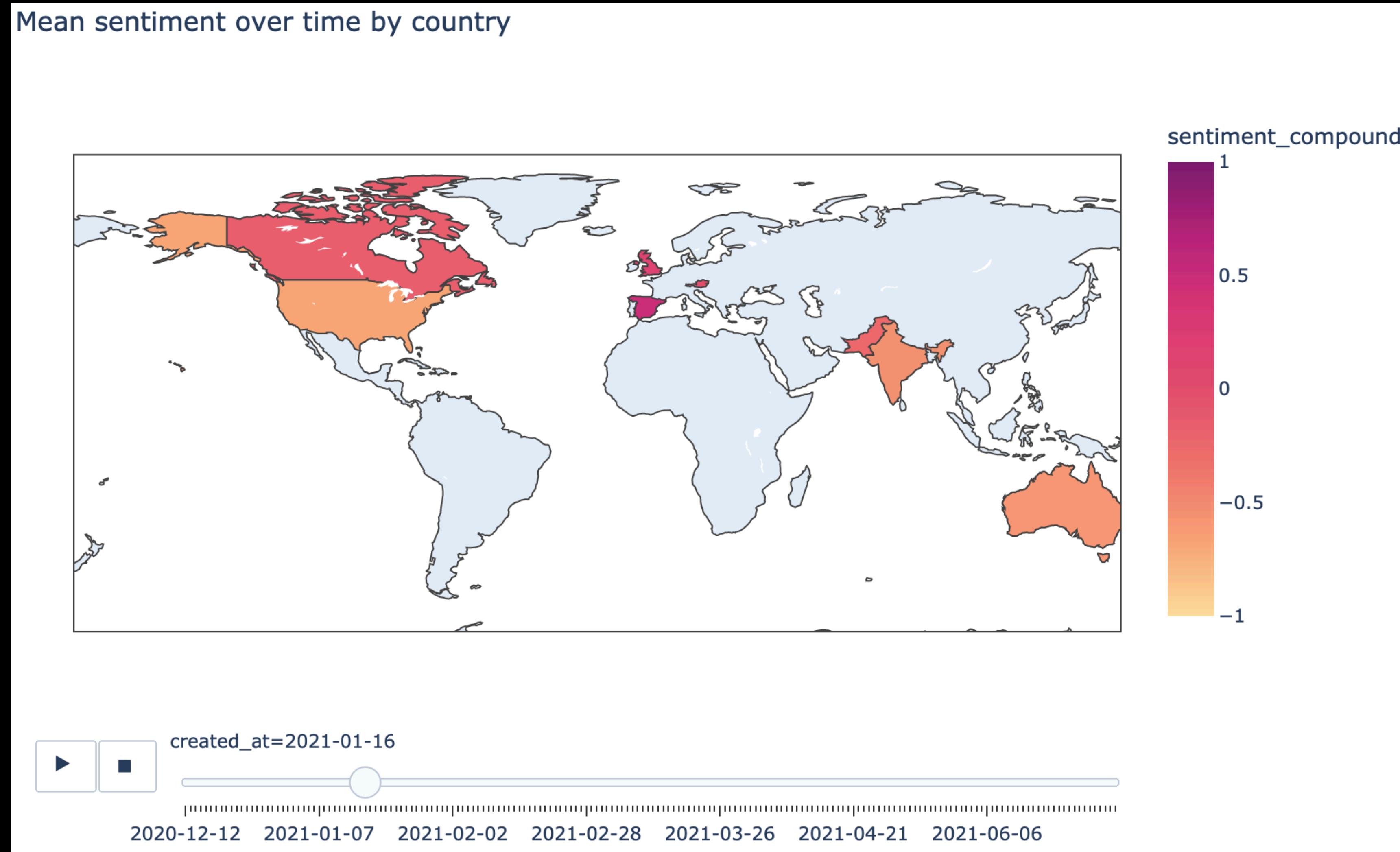
Sentiment Analysis: PfizerBiontech



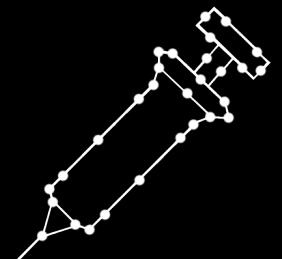
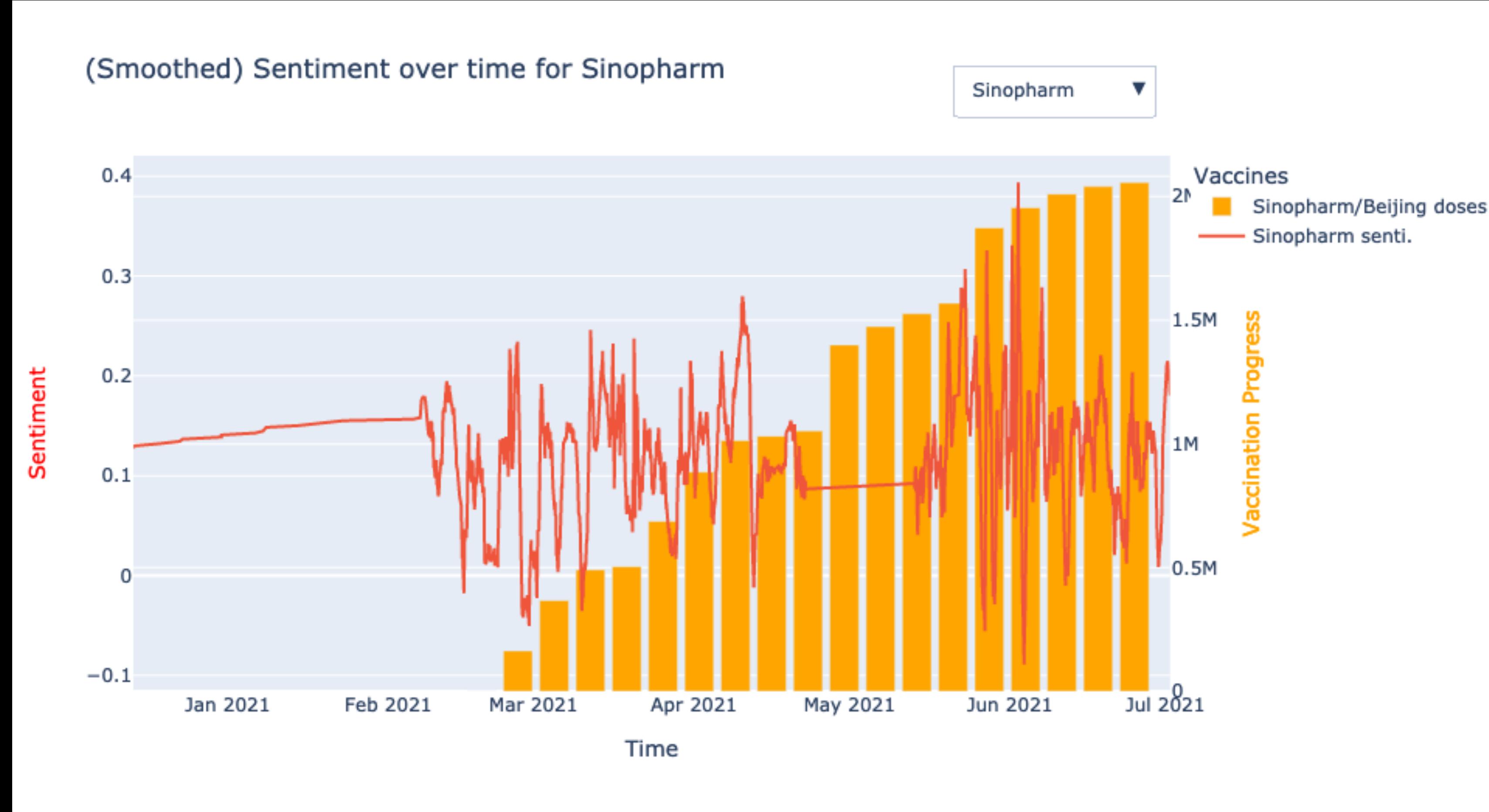
Sentiment Analysis: PfizerBiontech - Trends



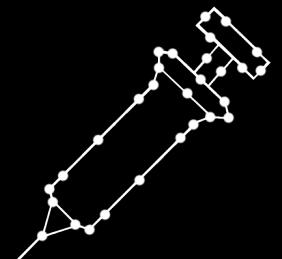
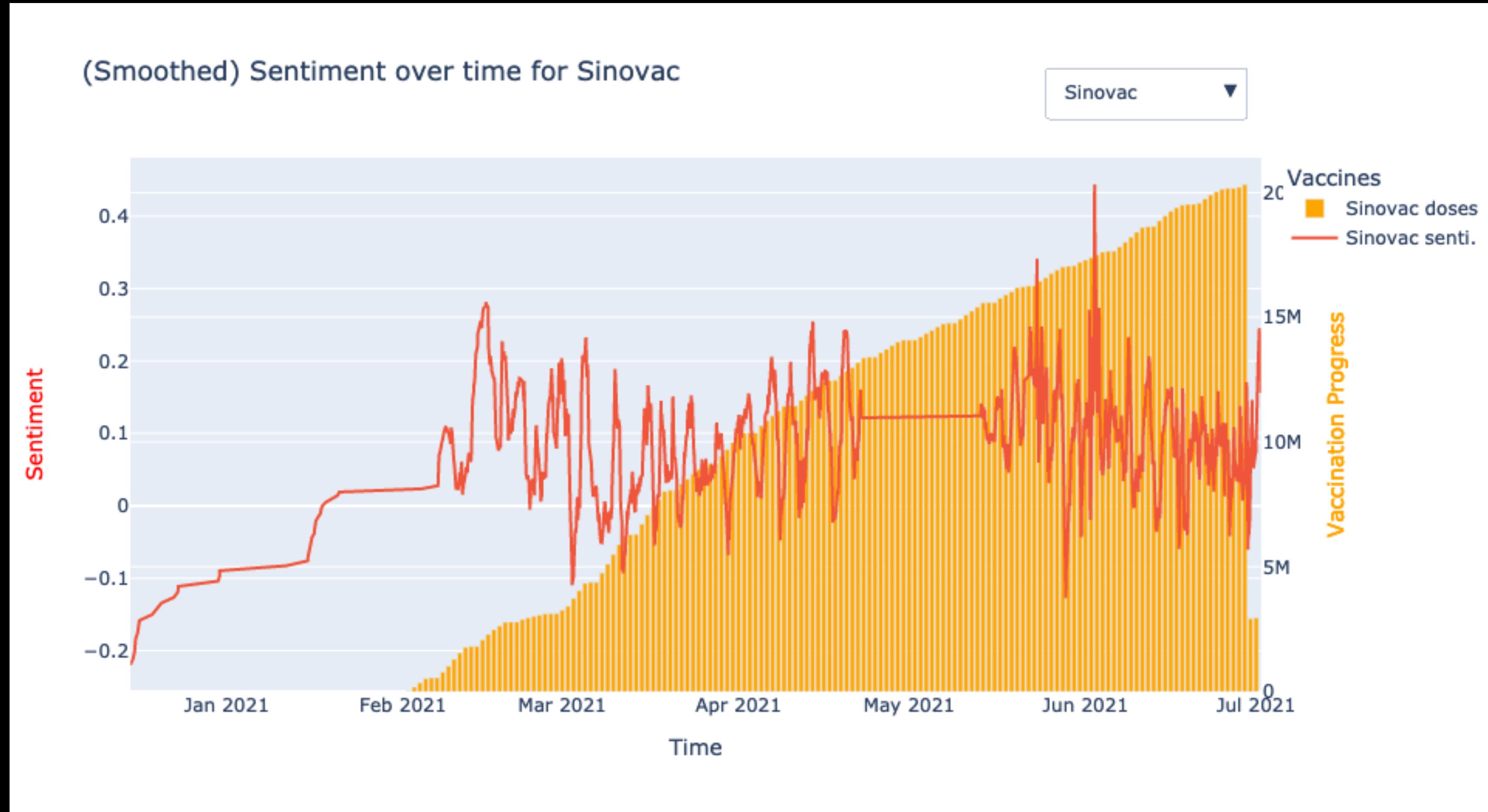
Sentiment Analysis: PfizerBiontech - Worldwide vaccine sentiment



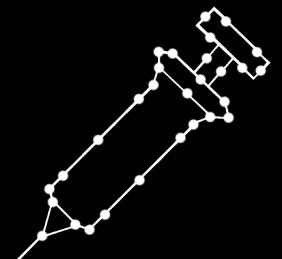
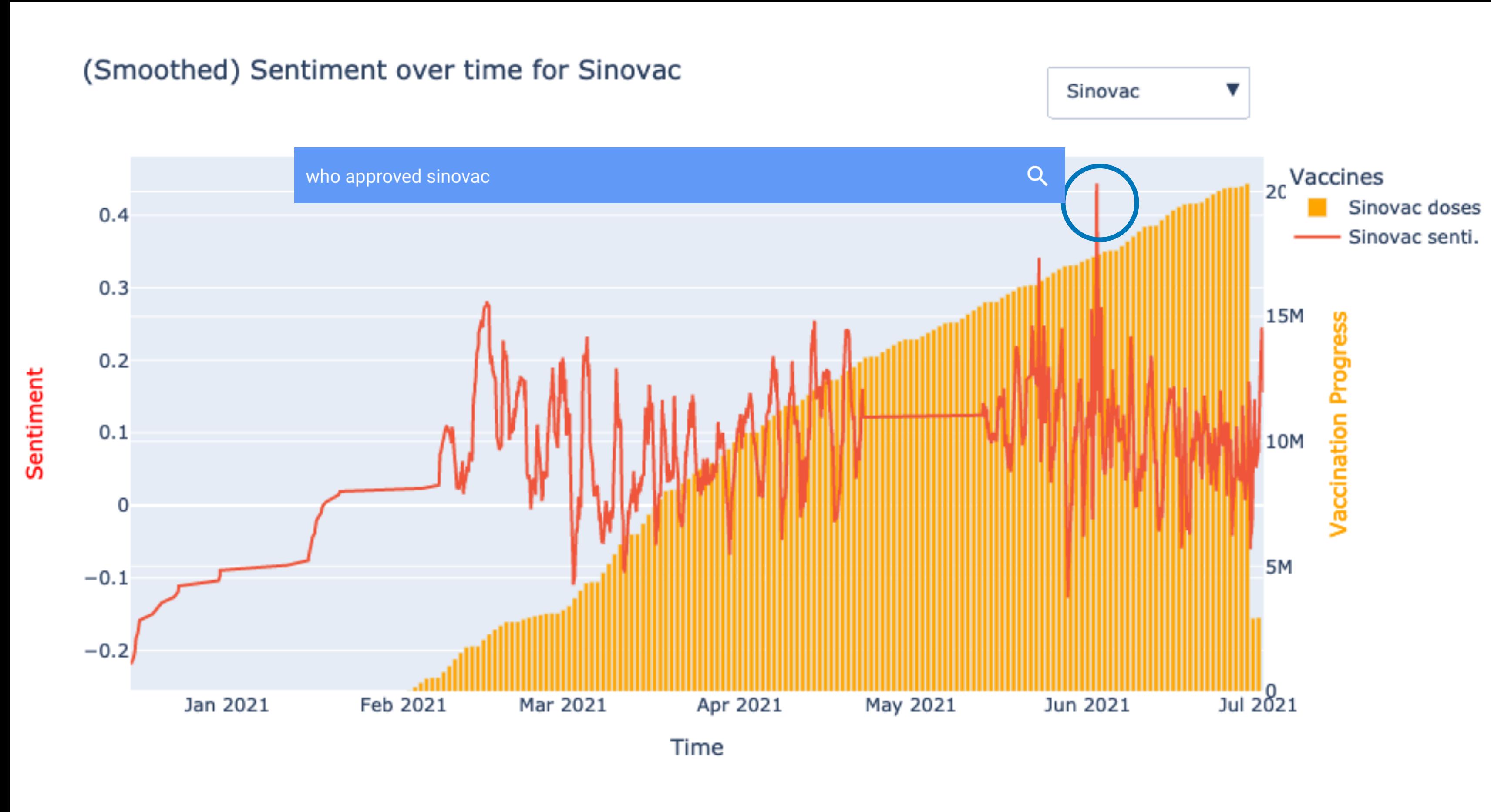
Sentiment Analysis: Sinopharm/Sinovac



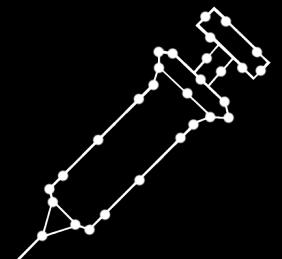
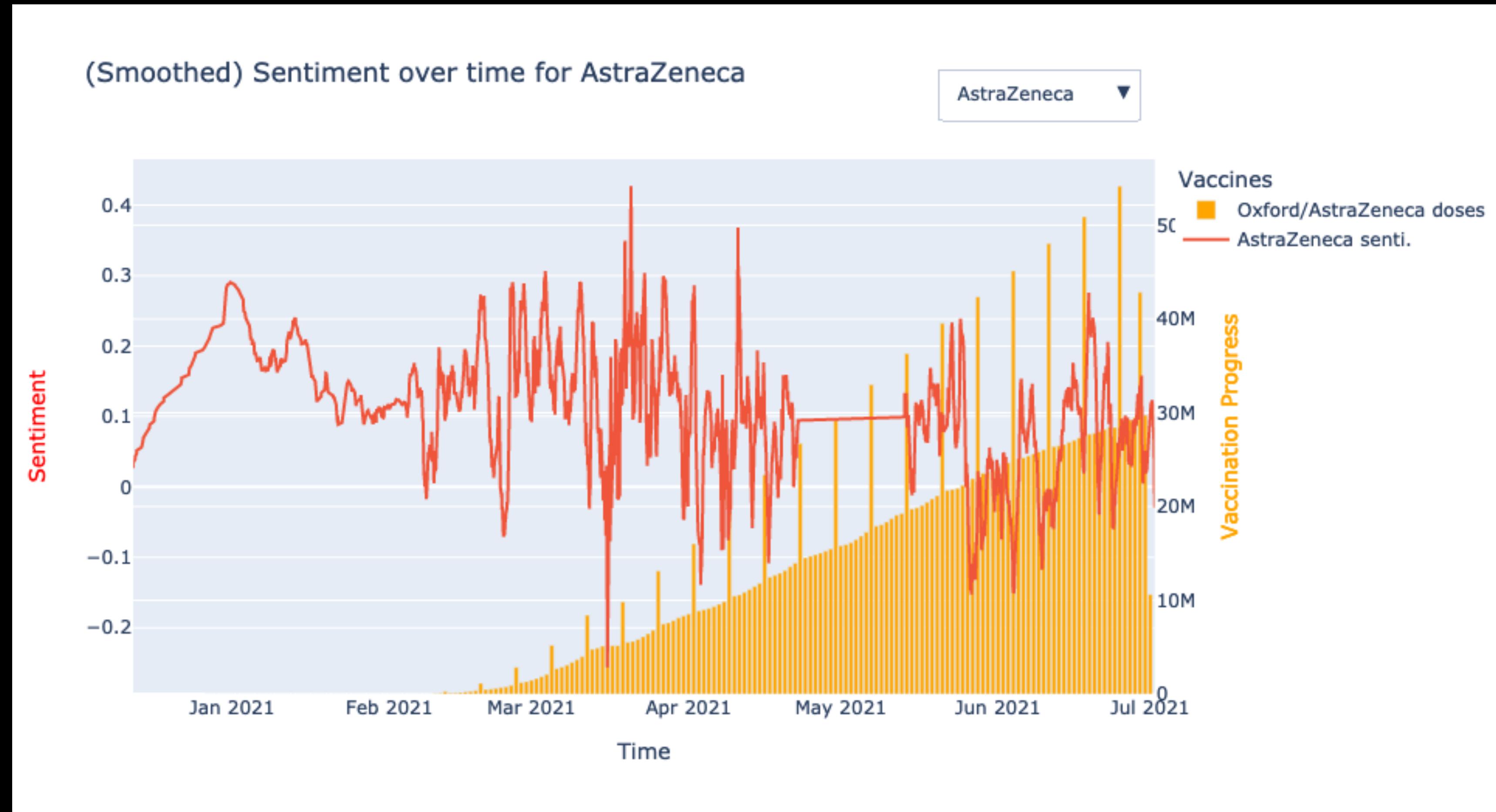
Sentiment Analysis: Sinopharm/Sinovac



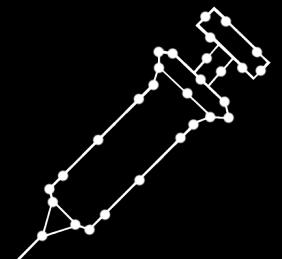
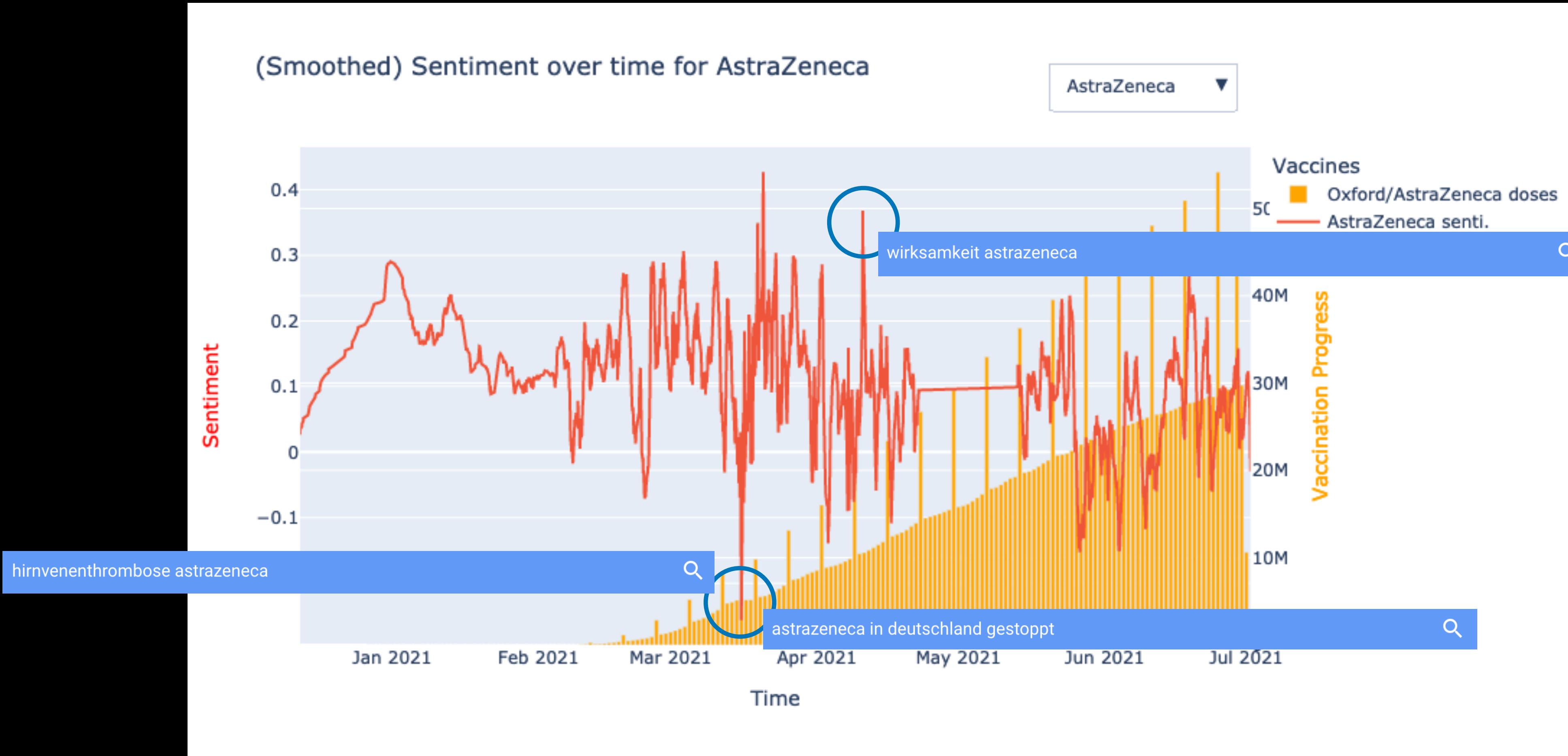
Sentiment Analysis: Sinopharm/Sinovac - Trends



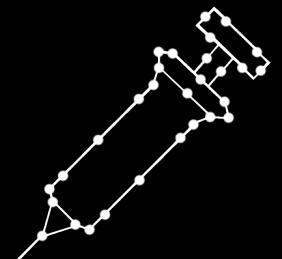
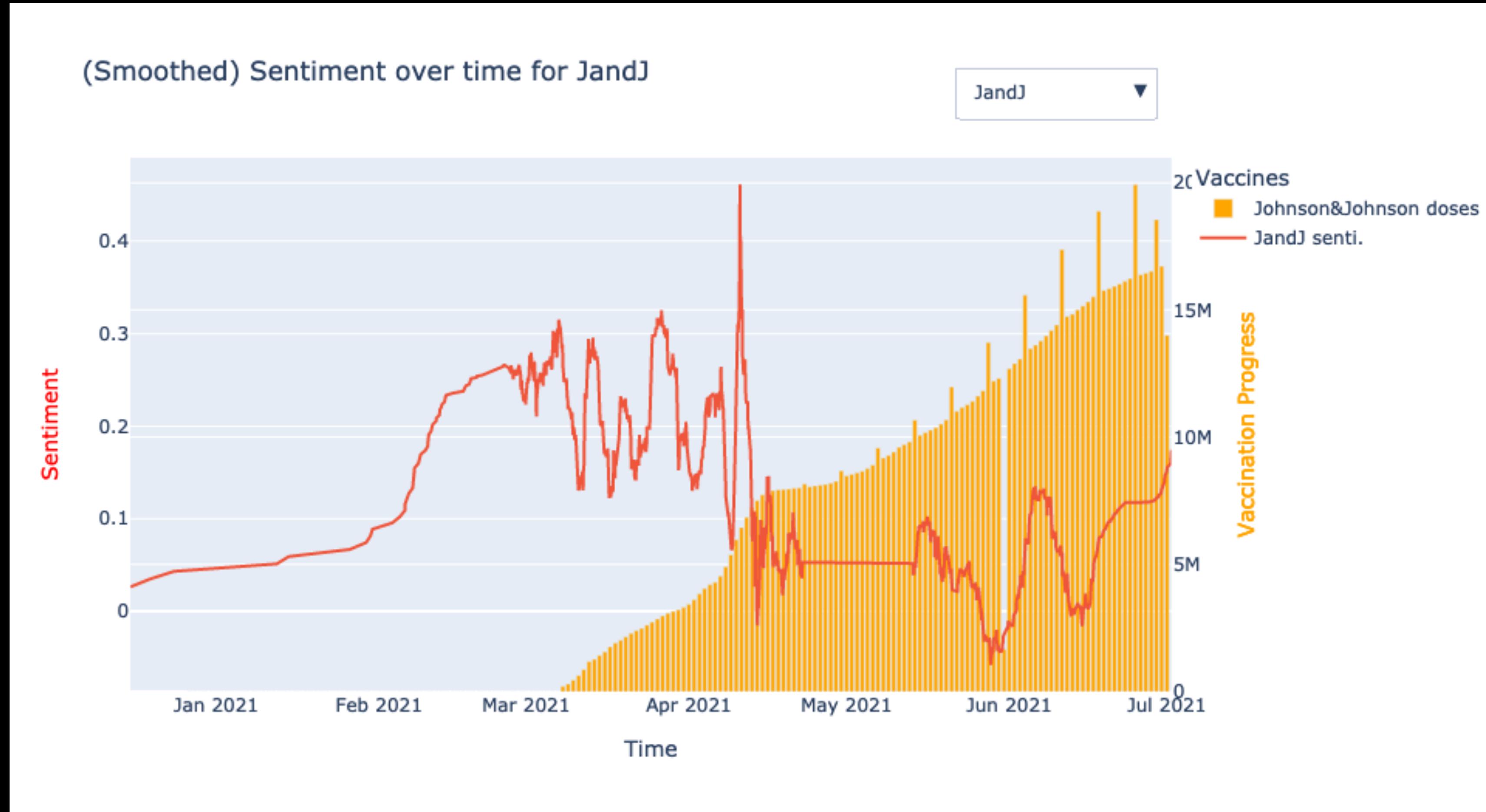
Sentiment Analysis: AstraZeneca



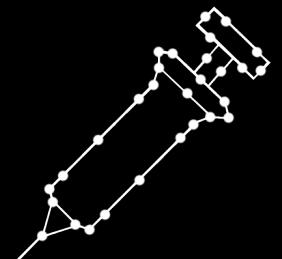
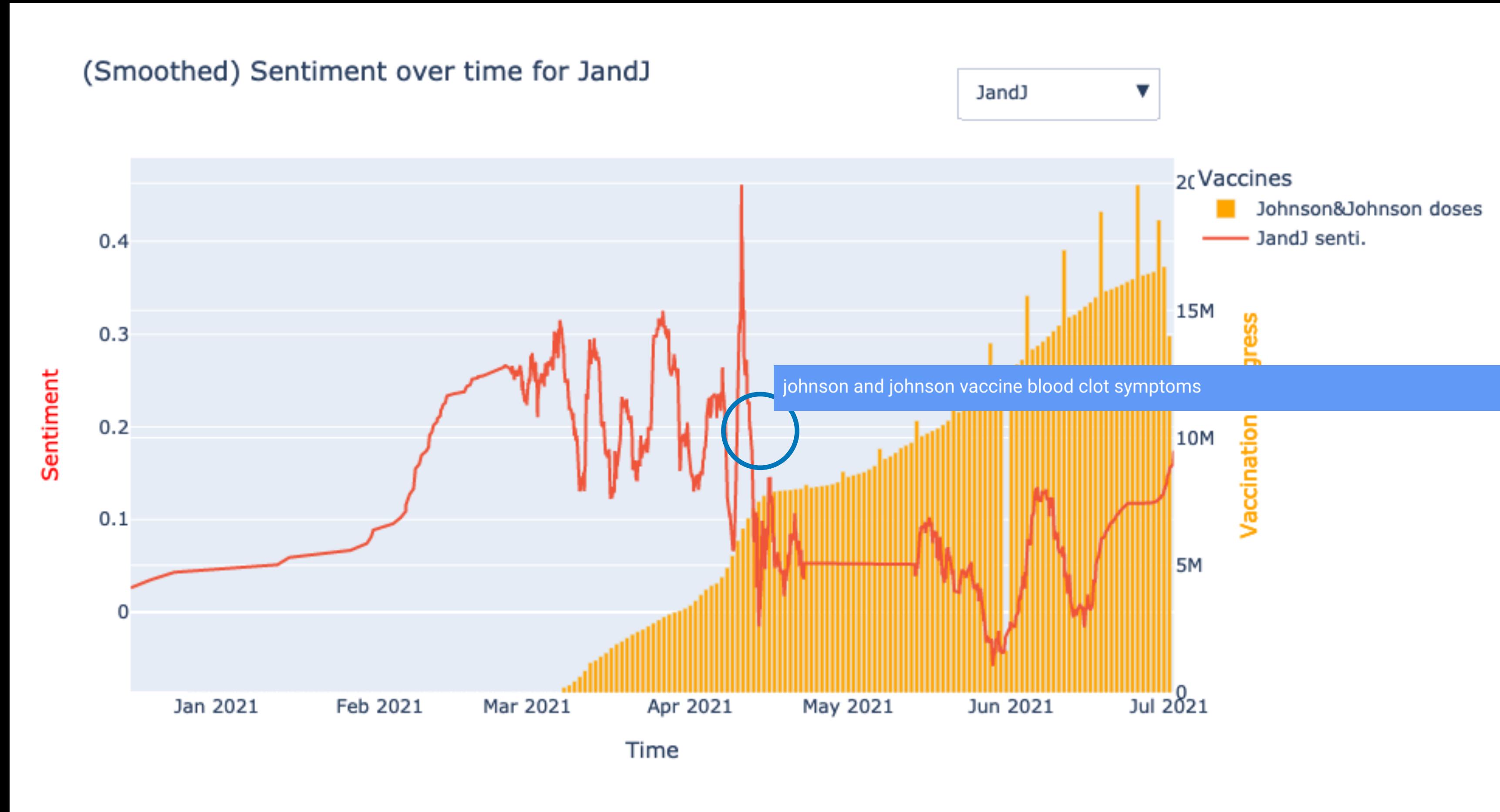
Sentiment Analysis: AstraZeneca - Trends



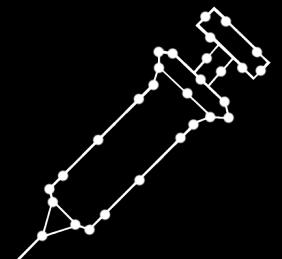
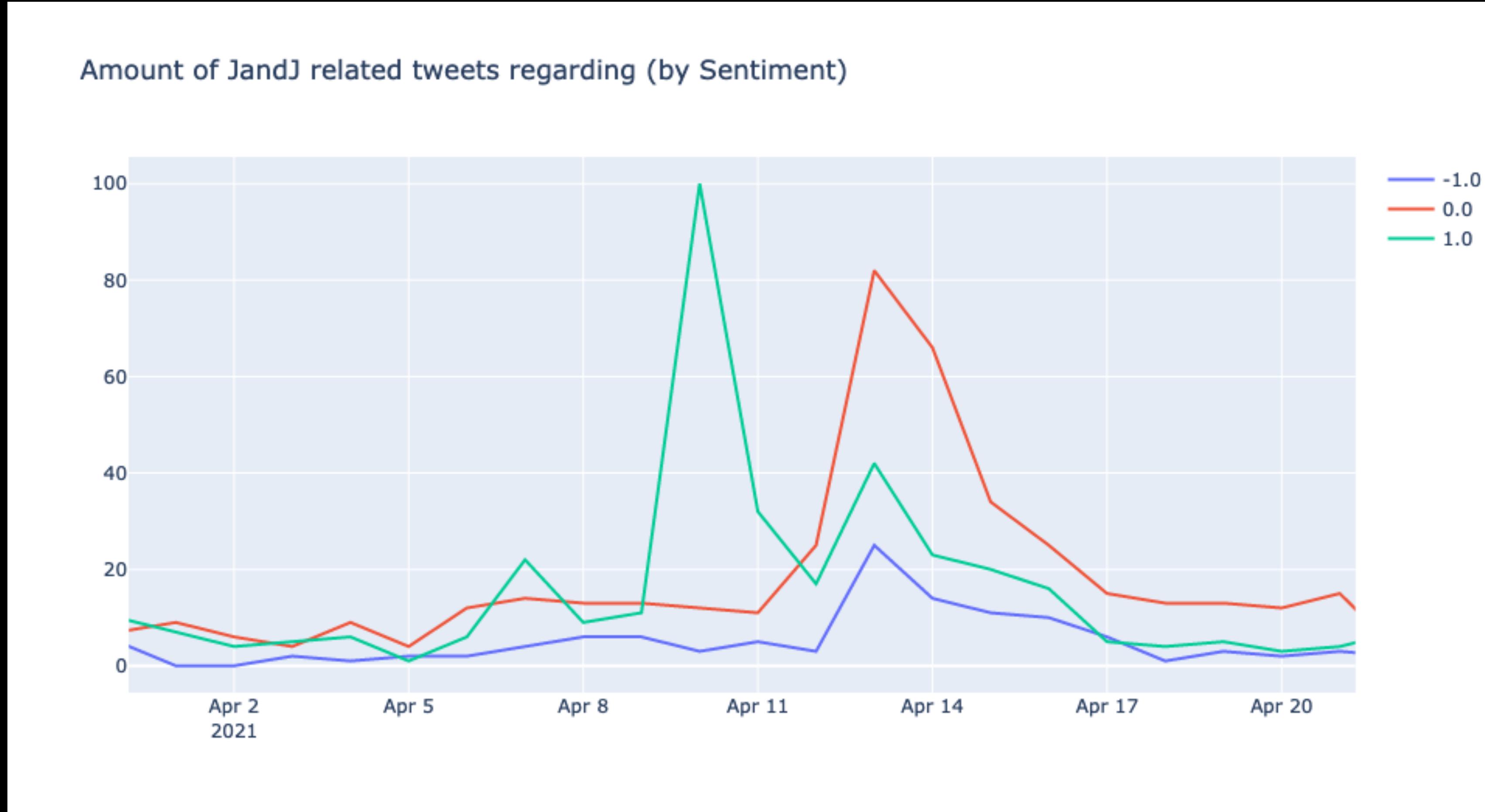
Sentiment Analysis: Johnson & Johnson



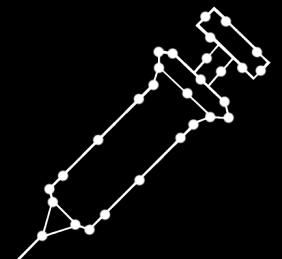
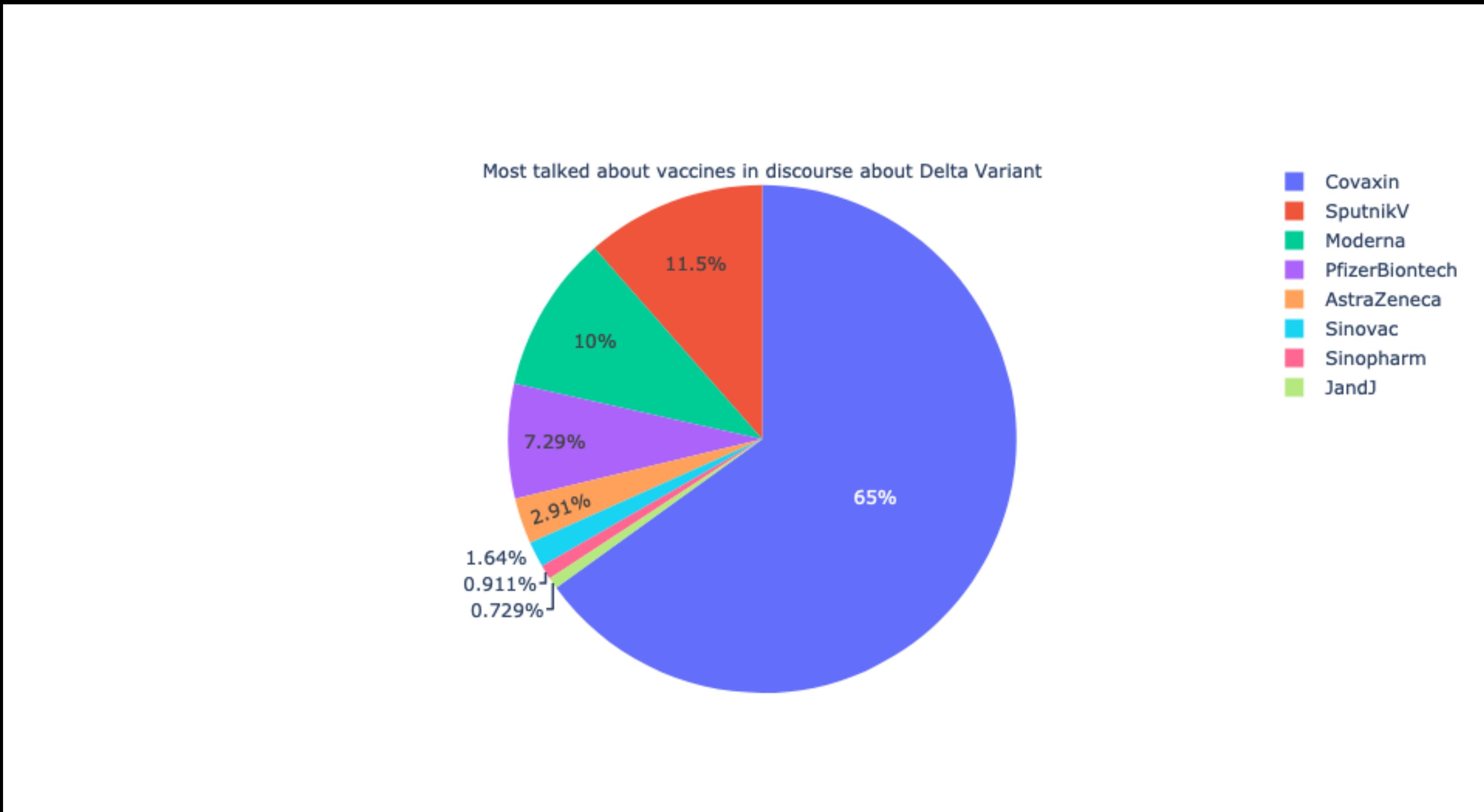
Sentiment Analysis: Johnson & Johnson - Trends



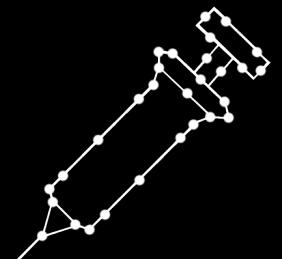
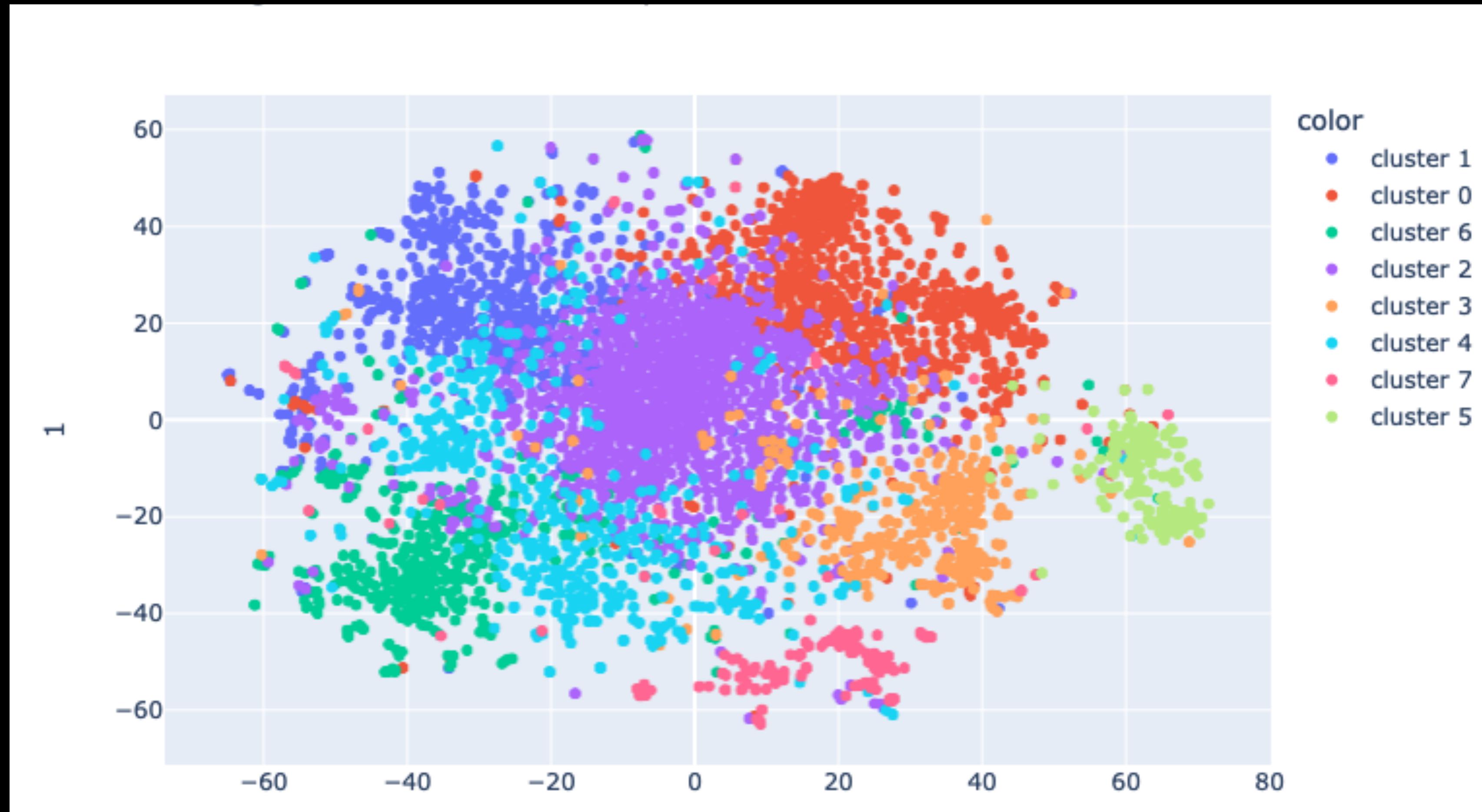
Sentiment Analysis: Johnson & Johnson - Reaction the news



Text Analysis: Delta Variant

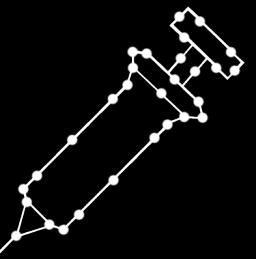


Text Analysis: Word2Vec



Text Analysis: Word2Vec - Similar words

- “billgates” → [“greatreset”, “plandemic”, “genocide”, “drfauci”, “merck”]
- “pfizer”+“horrible” → [“knocked”, “tiredness”, “migraine”, “covidarm”]
- “sinopharm”+“horrible” → [“discomfort”, “crap”, “feverish”, “nausea”]
- “drfauci”-“bad” → [“rajiv”] (ehem. ermordeter Politiker in Indien)



The Conclusion

Conclusion

- Language barrier can't be neglected
- Sensationalism is a massive driver of negative Sentiment
- Suggestion: similar to what Social Media is doing, add a “Fact Check” and dampen sensationalism
- The way social media is designed, people stay in bubbles
 - Finding a way to encourage “cross-bubble” discourse is recommended
 - Fact Checks and False Information warnings are a good start to dampen spreading of misinformation



Appendix

Preprocessing and data-engineering

	<code>id</code>	<code>created_at</code>	<code>user</code>	<code>geo</code>	<code>full_text</code>	<code>hashtags</code>	<code>user_id</code>
0	1338158543359250432	2020-12-13 16:27:13+00:00	{'id': 76052772, 'id_str': '76052772', 'name':...}	NaN	While the world has been on the wrong side of ...	['covid19', 'supplychain', 'logistics', 'vacci...']	76052772

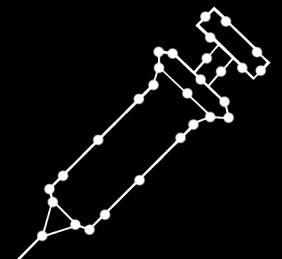
- Assign tweets to vaccines (one-hot-encoded) by the hashtags used

PfizerBiontech	SputnikV	Sinopharm	Sinovac	Moderna	AstraZeneca	Covaxin	JandJ
1	0	0	0	0	0	0	0

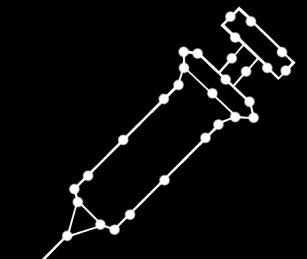
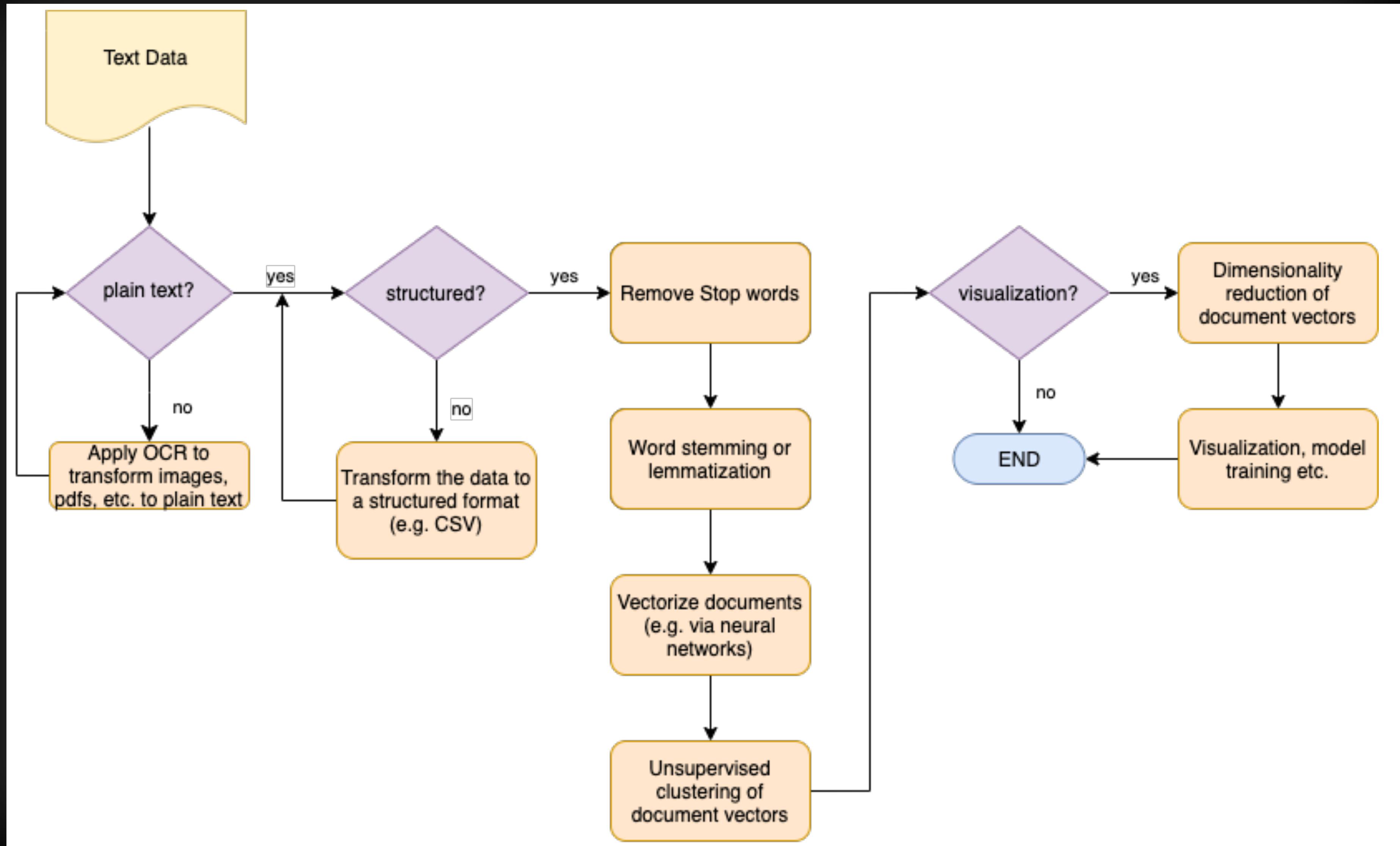
- Parse country via tweet and user location

```
7          Canada
11         Palestinian Territory
25          India
28          Germany
36          United States
...
118253     Russian Federation
118260     India
118266     Russian Federation
118267     India
118271     India
Name: user_location, Length: 30835, dtype: object
```

- Run through NLP-pipeline (Stop-words removal, URL removal, lemmatization)

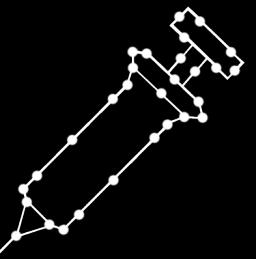
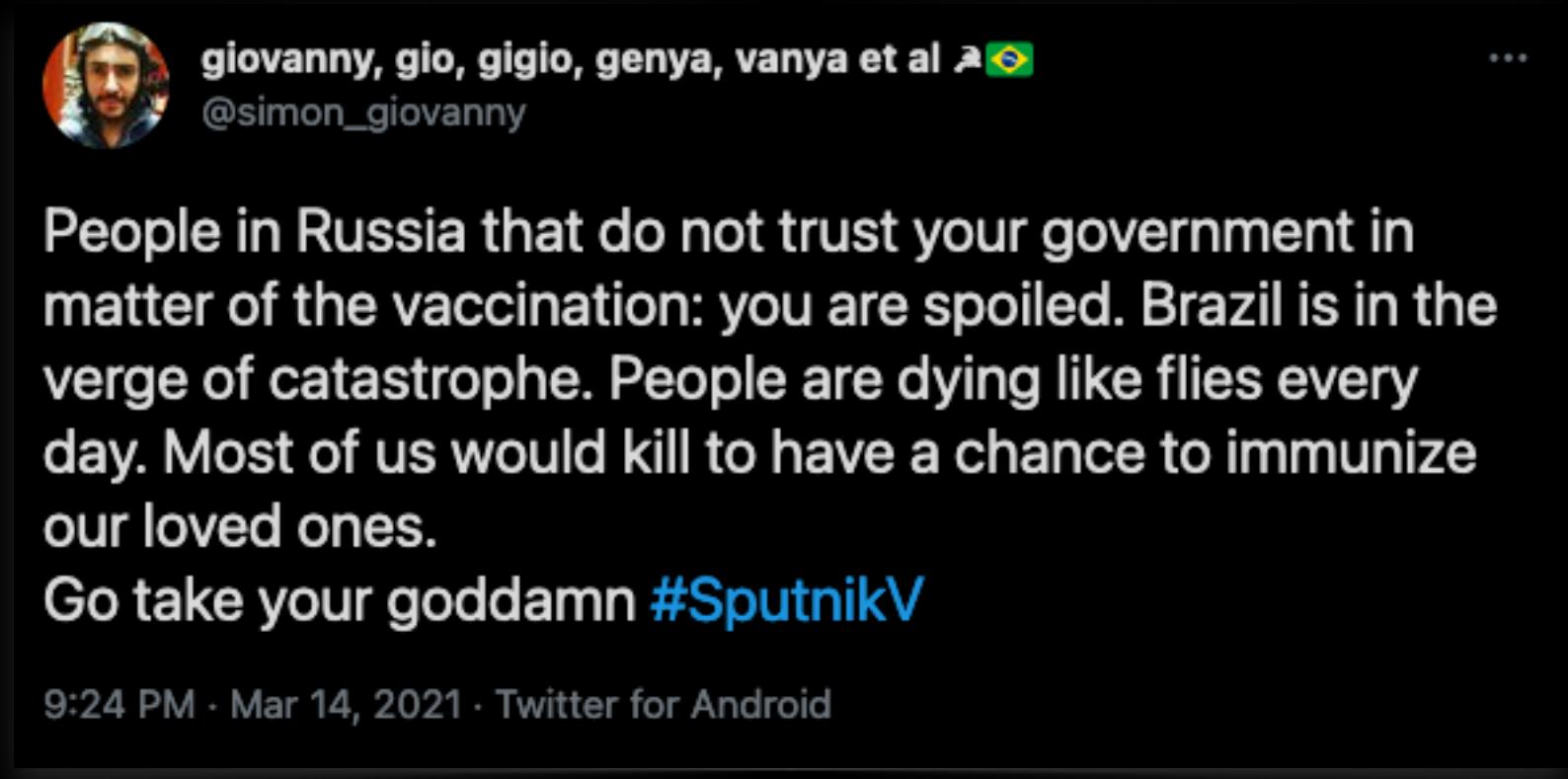


NLP Pipeline



Sentiment Analysis:

- Assign sentiment via NLTK.sentiment library
- Difficulties, how should these tweets be classified?

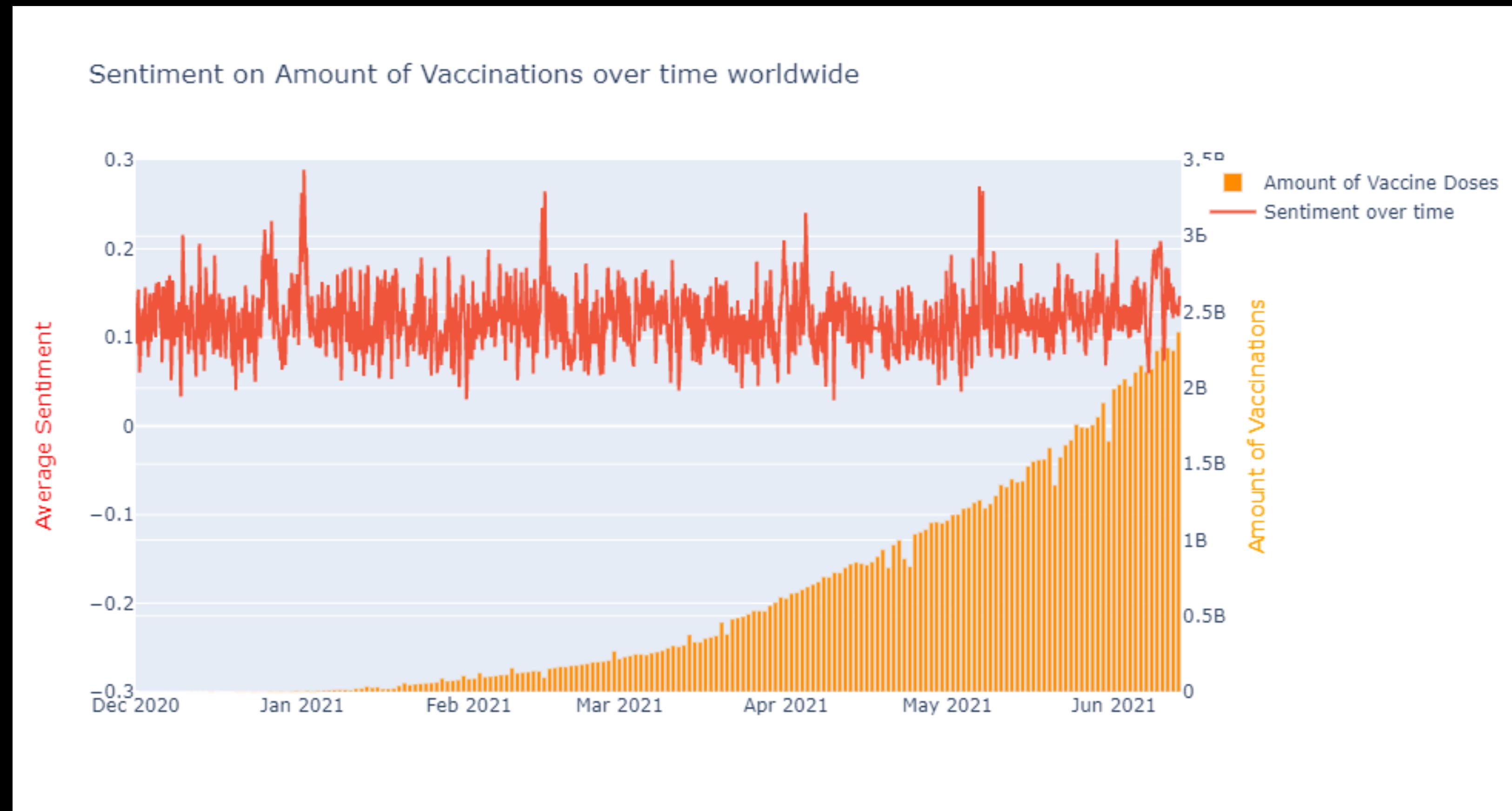


Used Technologies

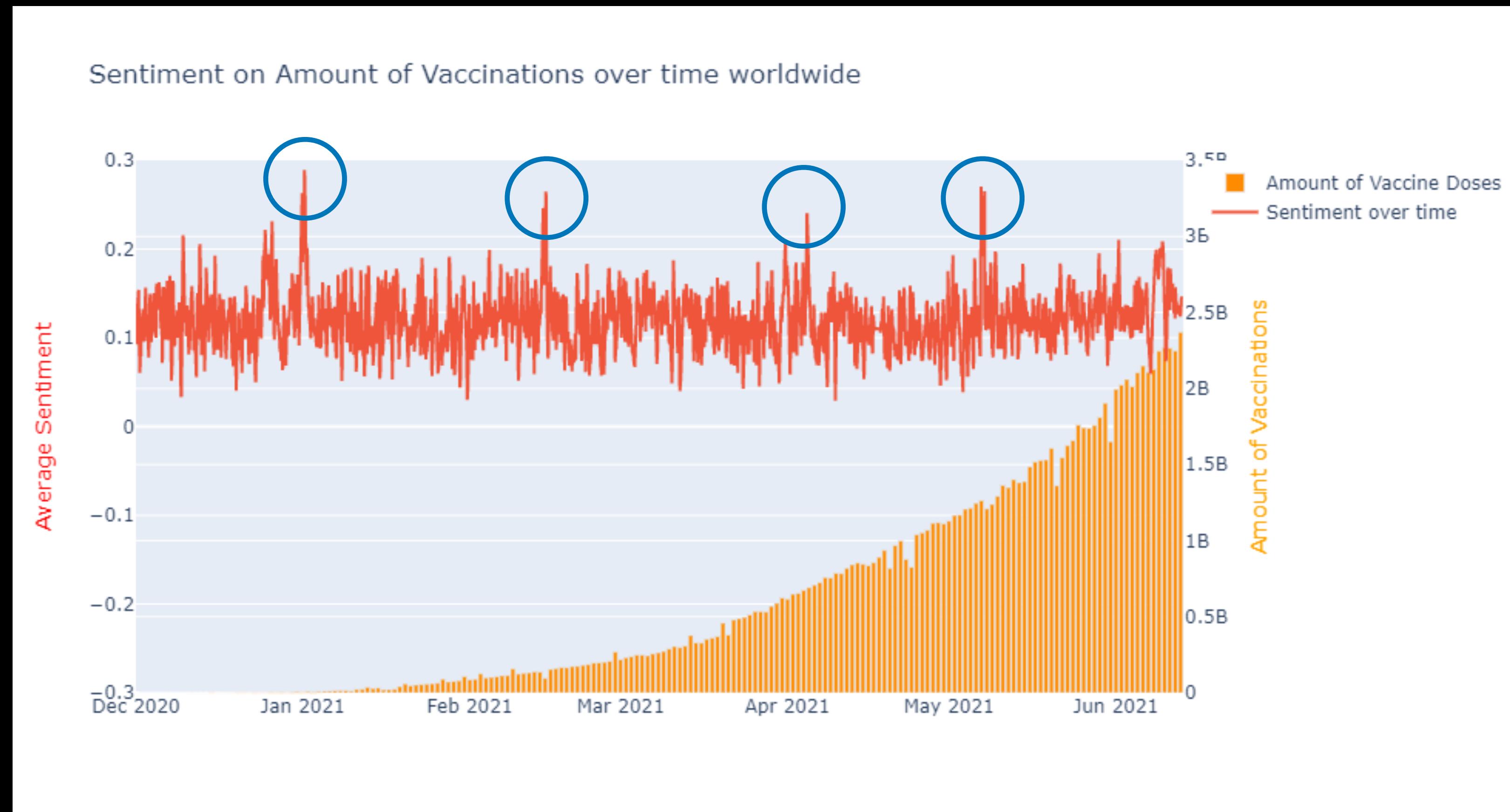
- Jupyter Notebooks
- Plotly for Visualization
- Hydrator
- Reverse_Geocode/pycountry
- Sentiment (TextBlob/NLTK)
- Savgol Filter



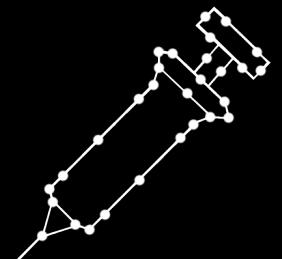
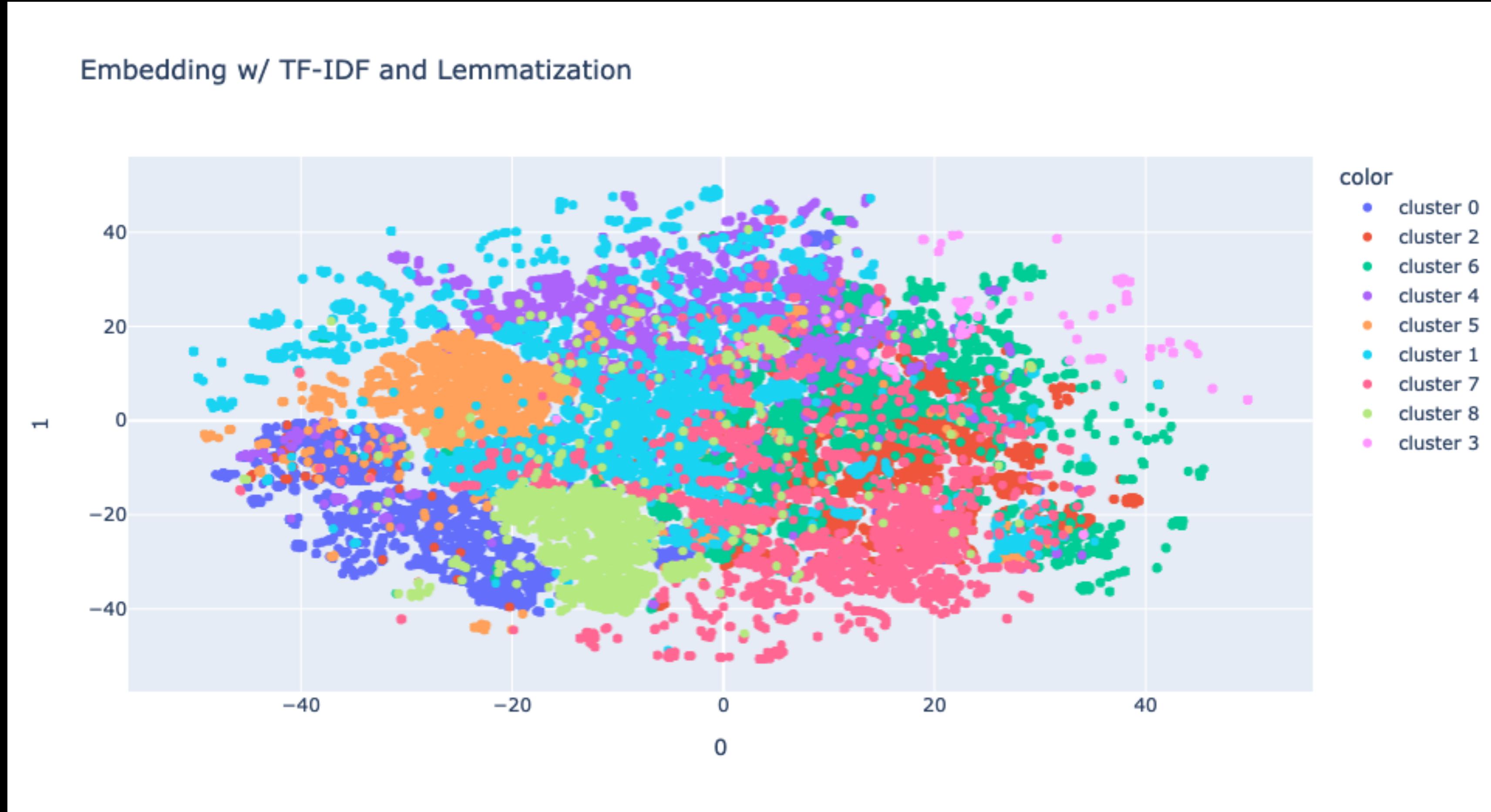
Overall Sentiment on Vaccination Status



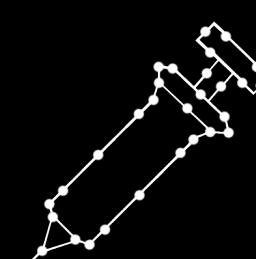
Overall Sentiment on Vaccination Status



Text Analysis: Findings



Sentiment Analysis: Sinopharm/Sinovac - Sentiment by Country



Most talked about Vaccine in Germany

Germany ▼

- Vaccines
- Moderna
 - PfizerBiontech
 - SputnikV
 - AstraZeneca
 - Covaxin
 - Sinovac
 - Sinopharm
 - JandJ

