UC San Diego

GROUP 7

Analysis of Sentiments of Tweets on COVID-19 Vaccines

Project Members:
Rajeev Dixit, Gokulakrishnan Candassamy, Hao Xiang,
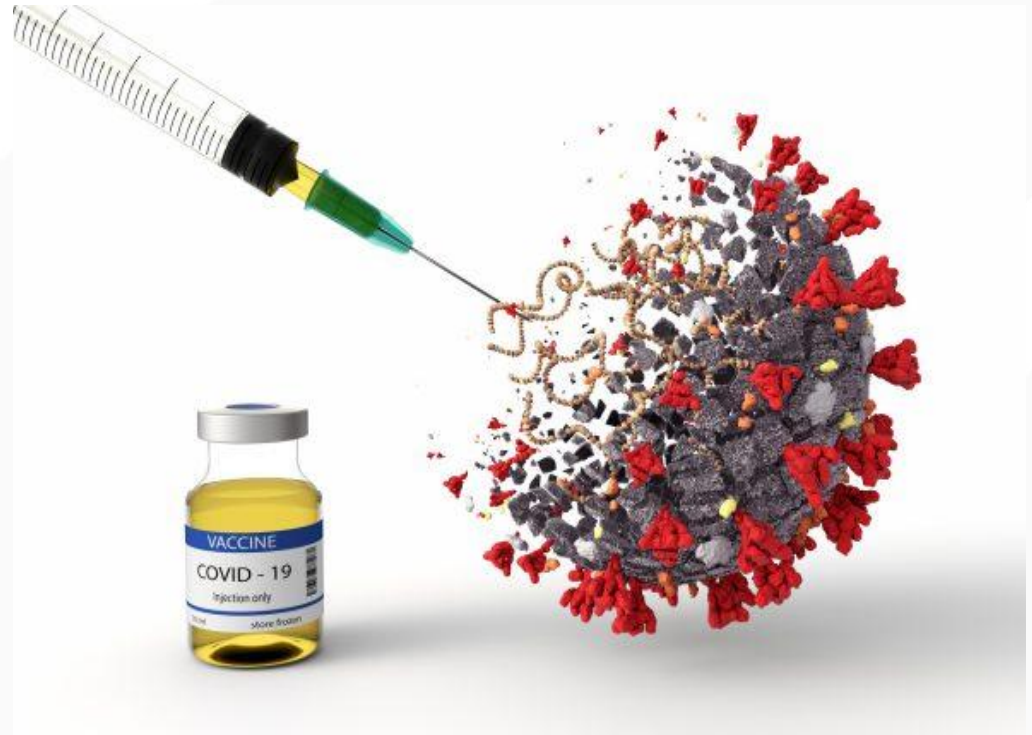Sean Kim, Siyuan Zhang

Introduction

MOTIVATION:
- Discovery of a vaccine against a virus that had already ravaged millions of lives worldwide.
- Vaccine hesitancy and other controversies surrounding the mRNA vaccines.

OBJECTIVE:
- To analyze the public opinion expressed via tweets so as to capture the sentiments of people.
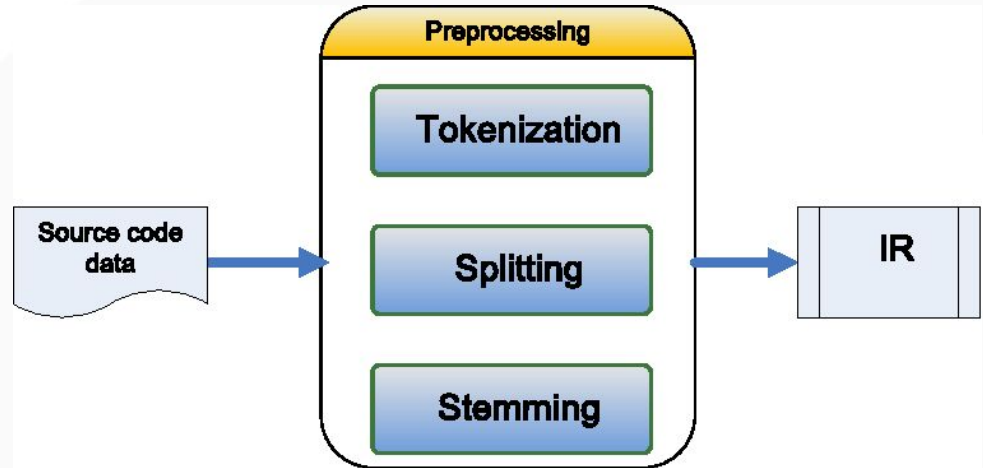
Dataset

- [Kaggle dataset](#) created using Tweepy to access Twitter API.
- Recent tweets about vaccines from leading pharmaceutical companies like Pfizer, BioNTech, Moderna, AstraZeneca etc.
- Approximately 10K tweets.
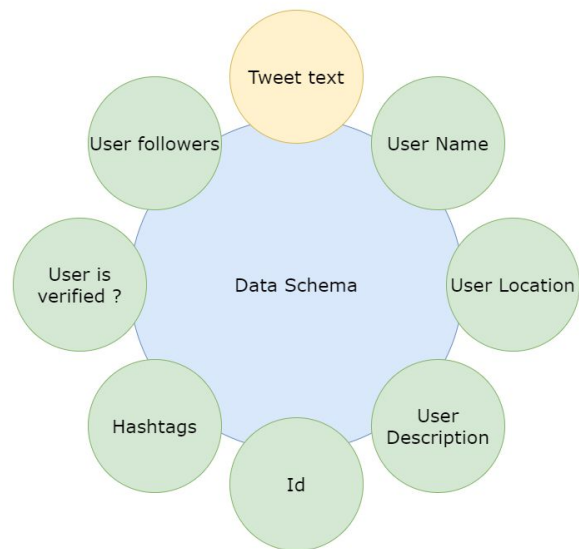
id	user_name	user_description	text
1.337780e+18	Alex Vie	Marine vet. Yogi. Krav Maga. Runner. Climber. ...	The trump administration failed to deliver on ...
1.338620e+18	KaileyBen-Sassi	Specialist antimicrobial & lead OPAT pharmacis...	Building on last week's 'trial' run and extend...
1.338590e+18	Susan Kirchdoerffer	Physician, entrepreneur, lover of chocolate, r...	@MeghanMcCain As a physician currently with co...

Data Pipeline

- Data Preprocessing - Retain only useful text after cleaning the tweets.
- Identifying the users' sentiment using a combination of the following packages:
  - TF - IDF
  - NLTK
  - TextBlob
- Analyzing spatio-temporal distribution for the sentiment scores.
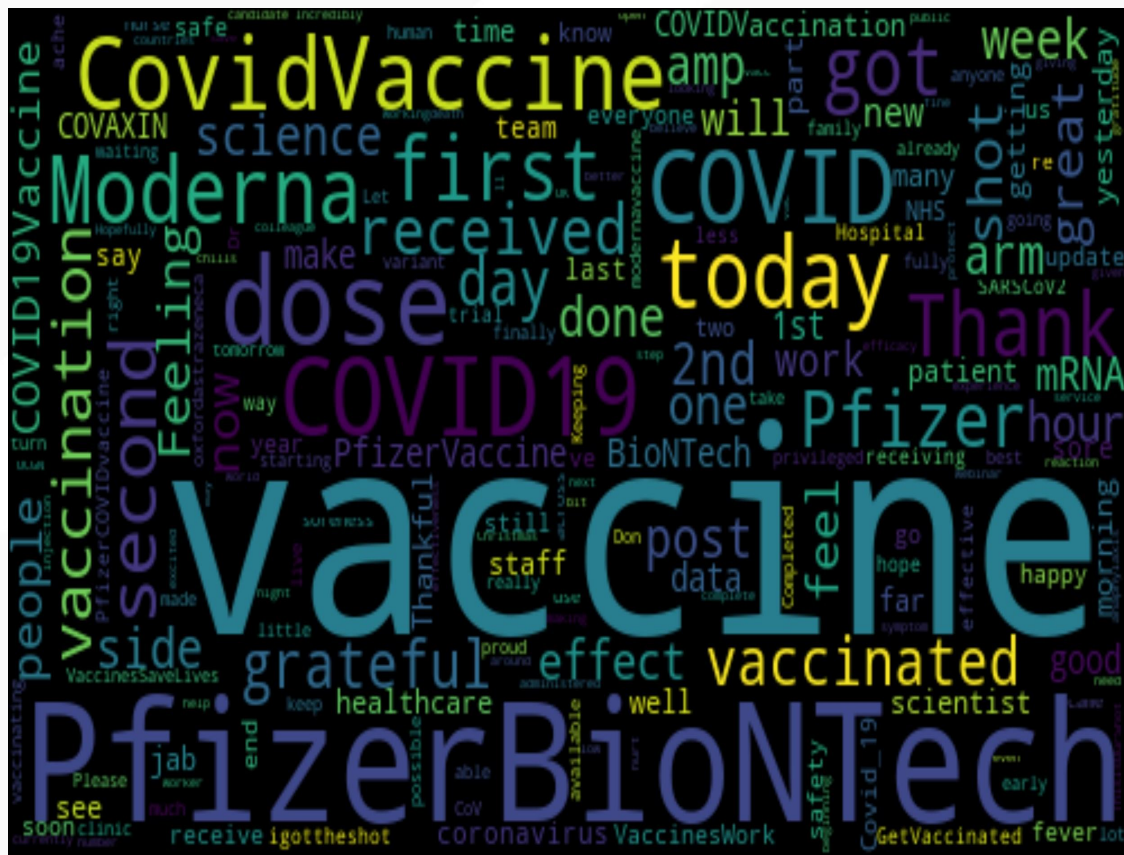
Sentiment Metrics Explained

- Sentiment Analysis:
  - Sentiment_score = average(TF-IDF score, NLTK's pretrained sentiment analyzer score)
  - $-1 \leq$ Sentiment_score $\leq +1$

- Polarity vs. Subjectivity Analysis:
  - Obtained from TextBlob package
  - $-1 \leq$ Polarity $\leq +1$
  - $0 \leq$ Subjectivity ≤ 1

Understanding Sentiment Analysis and Sentiment Accuracy in Social Data Research

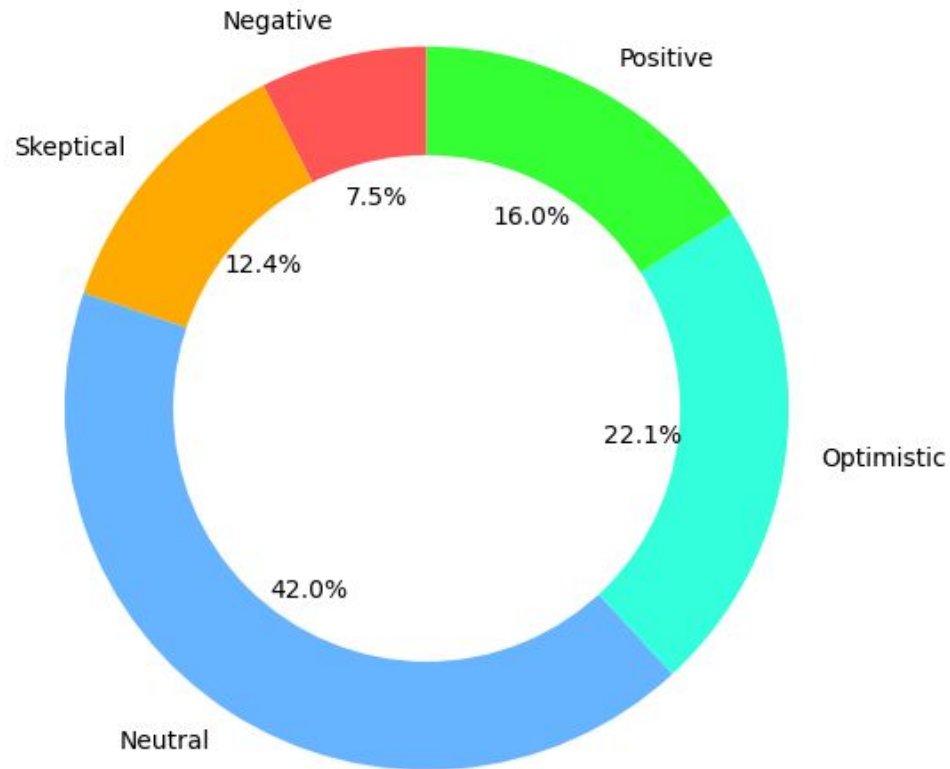# SOME SAMPLE TWEETS WITH CALCULATED METRICS

Khaleej Times @khaleejtimes

#BREAKING #PfizerBioNTech #COVID19 #vaccine provokes serious allergic reaction in #USA

Pfizer-BioNTech Covid vaccine provokes serious allergic reaction in US health w...
Pfizer said it was 'actively working with local health authorities to assess' the case.
khaleejtimes.com

8:22 PM · Dec 16, 2020 · Twitter Web App

15 Retweets   4 Quote Tweets   36 Likes

Score: -0.77 Sentiment: Negative

CNBC-TV18 @CNBCTV18News

"The first batch of doses of Pfizer-BioNTech's COVID-19 vaccine have arrived in Canada," PM Trudeau said on Twitter.
#covid19vaccine, #coronavirusvaccine #pfizerbiontech

First batch of Pfizer/BioNTEch COVID-19 vaccines arrives in Canada
The vaccines left Belgium, where they were produced, on Friday, and traveled to Germany and the United States before being split up and sent to different parts ...
cnbctv18.com

3:36 AM · Dec 14, 2020 · Hootsuite Inc.

1 Retweet   12 Likes

Score: 0.0 Sentiment: Neutral

New Straits Times @NST_Online

#NSTworld "I am delighted to announce that the #EMA scientific committee met today and recommended a conditional marketing authorisation in the #EU for the #vaccine developed by #Pfizer and #BioNTech."

nst.com.my/world/world/20...

#coronavirus #covid19 #PfizerBioNTech

EU regulator approves Pfizer-BioNTech vaccine | New Straits Times
THE HAGUE: The European Medicines Agency said on Monday that it had approved the Pfizer-BioNTech coronavirus vaccine, paving the way for ...
nst.com.my

4:03 PM · Dec 21, 2020 · TweetDeck

2 Retweets   3 Likes

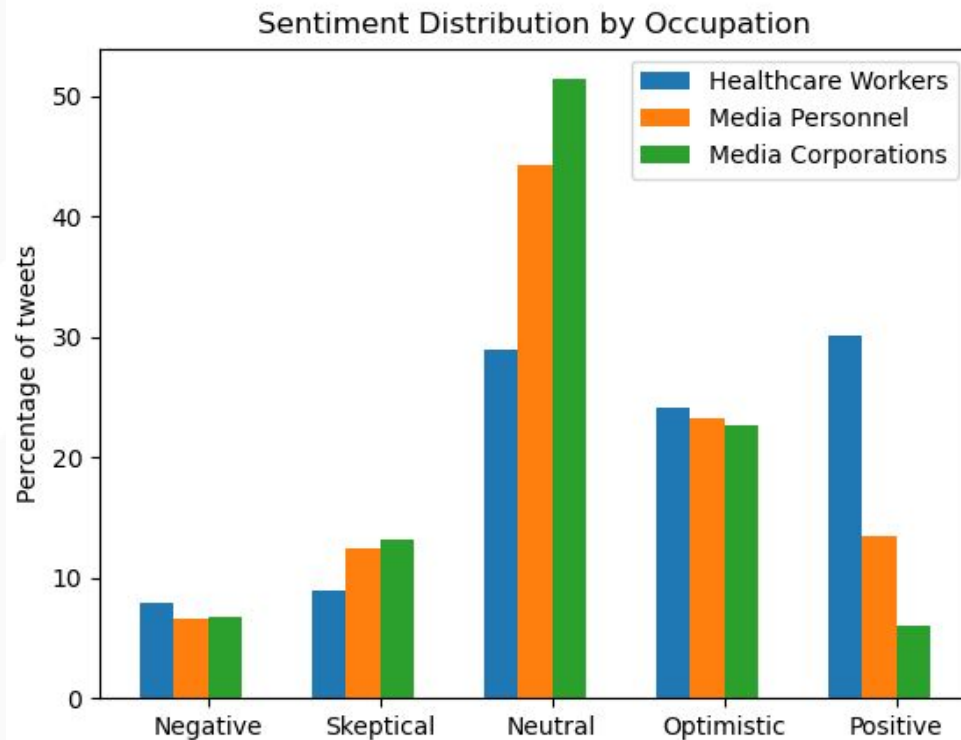**Score: 0.61 Sentiment: Positive**

Sentiment Distribution across five Categories

WHAT DO THESE PEOPLE THINK?

Sentiment Distribution

Sentiment Distribution by Occupation

Media Corporations

Distribution of Tweets of Media Corporations

Media Personnel
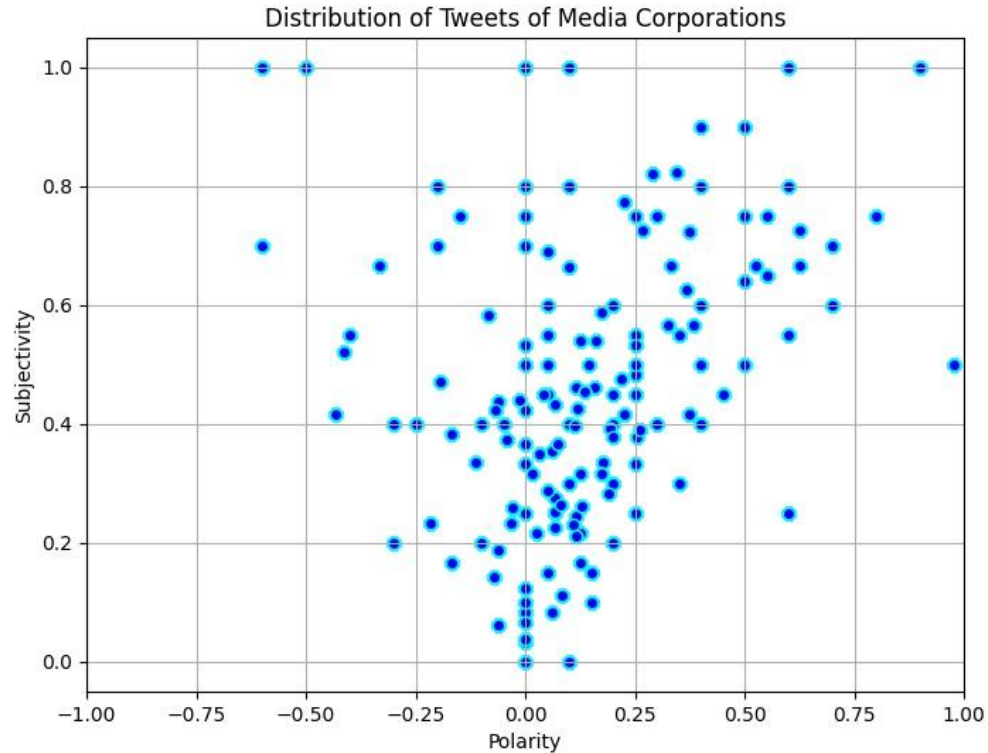
Distribution of Tweets of Media Personnel

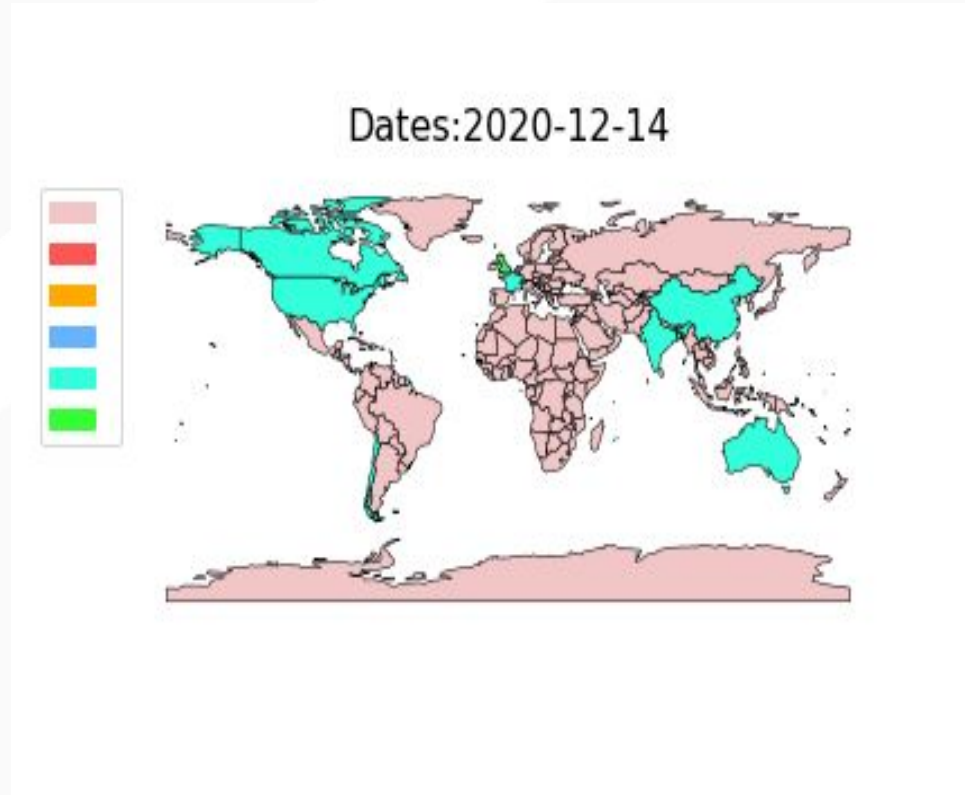# Healthcare Workers
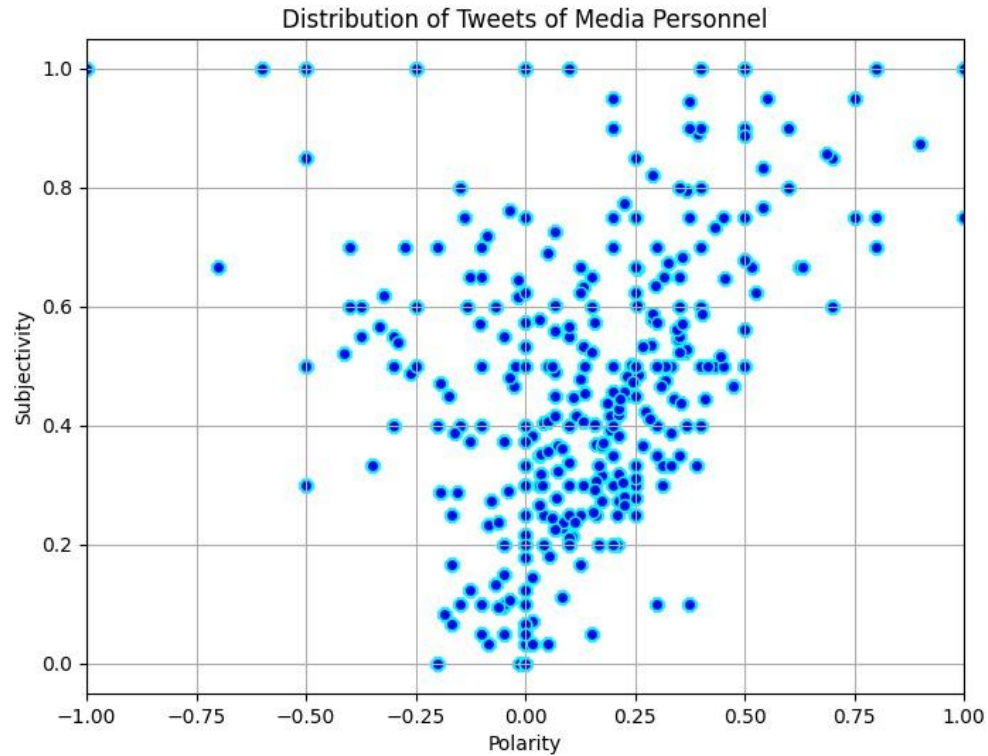
Distribution of Tweets of Healthcare Workers
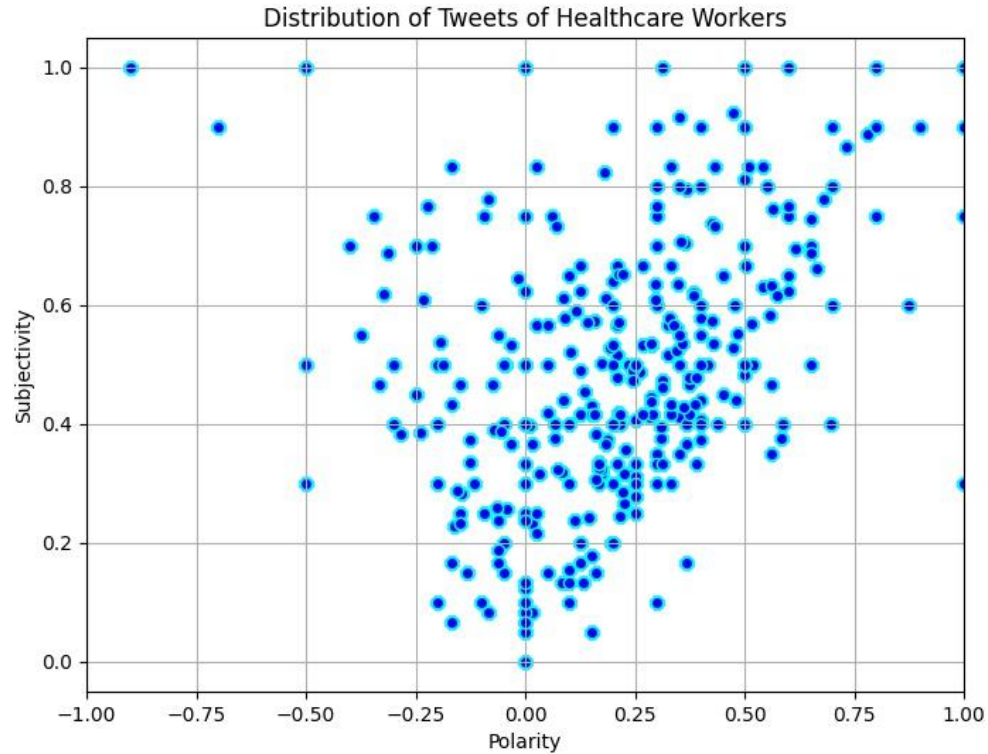
Spatial Distribution: Opinion by Country

Spatio-Temporal Distribution

Did they change their mind?

KEY INSIGHTS DERIVED

- Higher percentage of tweets are neutral because they are informative tweets given by news channels.
- Healthcare workers are majorly happy with the vaccine, because they were the first to receive it, and it mitigates their risk of contraction.
- The sentiment scores fluctuates for spatial and temporal distribution.
- China is more consistent than others.
- In USA, the sentiment gets more positive with time as more people are vaccinated.

Thank You

Group 7