pandemic pulse

Understanding Global Trends During the Pandemic

COVID-19 changed the world in 2020 by affecting everyone's lives

82M — COVID 19 cases worldwide (as of 31 December 2020)[1]

2.5% — Increase in unemployment rate from 4.8% globally [2]

21% — Drop of S&P500 Index [3]

[1] Johns Hopkins University, COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. https://github.com/CSSEGISandData/COVID-19
[2] International Monetary Fund (2020). Unemployment Rates, IMF - Updated: October 2020. https://www.imf.org/external/datamapper/LUR@WEO/OEMDC/ADVEC/WEOWORLD
[3] Mazur, M.; Dang, M.; Vega, M. (2020). COVID-19 and the march 2020 stock market crash. Evidence from S&P1500 https://ycharts.com/indicators/sp_500_monthly_return
[4] Sundaram, A. (2020). Yelp data shows 60% of business closures due to the coronavirus pandemic are now permanent. https://www.cnbc.com/2020/09/16/yelp-data-shows-60percent-of-business-closures-due-to-the-coronavirus-pandemic-are-now-permanent.html

our motivation

What were the prominent pandemic news topics and how did they evolve in 2020?

- Aid companies identify new business opportunities by analysing news trends related to COVID-19
- Assist governments in identifying emerging public concerns (and indicators of social unrest) as everyone navigates the post-pandemic world. [1]

[1] The International Monetary Fund has concluded that “pandemics can set off a vicious cycle of economic despair, inequality and social unrest’

our method of attack

Our Data Science Methodology in a Big Data Framework

GDELT GKG data from Google Cloud

Global Knowledge Graph (GKG) data for 2020 was obtained from the **Global Database of Events, Languages, and Tone (GDELT)** hosted in **Google BigQuery**

Total Data Size: 182 GB
Total Entries: 45 Million

Identify COVID-19 Keywords

COVID-19 related **`THEMES`** were identified from the dataset and were used as a search query to the data

Total Data Size: 68 GB
Total Entries: 10 Million

Reconstruct articles using GKG columns

Using **`THEMES`** , **`ALL NAMES`** and **`ORGANIZATIONS`** in GKG, articles and events are reconstructed without the use the need for web scraping

Generate Topics using LDA

Topics per month were generated using a **Distributed Latent Dirichlet Allocation (LDA)** implementation in PySpark

Topics Found: 120 topics

Trace topic evolution sequences

Trace topic evolution sequences using **Jaccard Similarity** for all topics in every consecutive time splices. Factored crowd sentiment **using "TONE"**

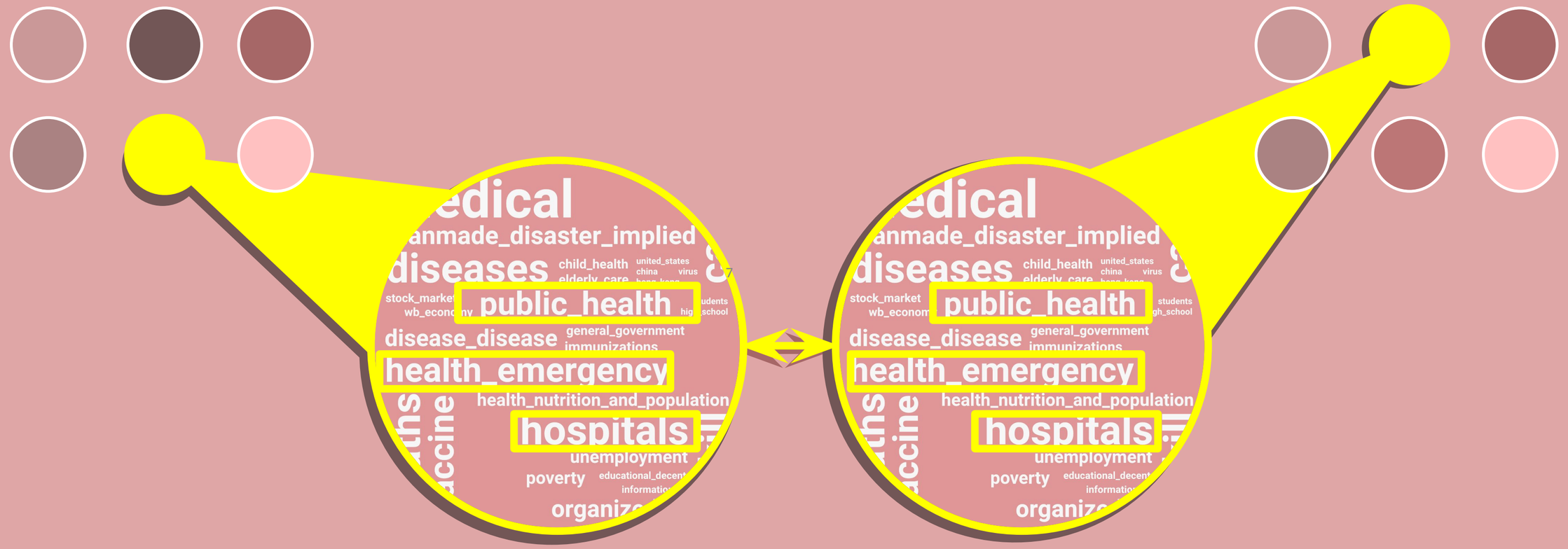
Total Topics Traced: 52 Topic Sequences

Tracking topic evolution requires similar topics to appear in consecutive time splices

Topics for Time Splice A
e.g. January

Consecutive Time Splices

Topics for Time Splice B
e.g. February

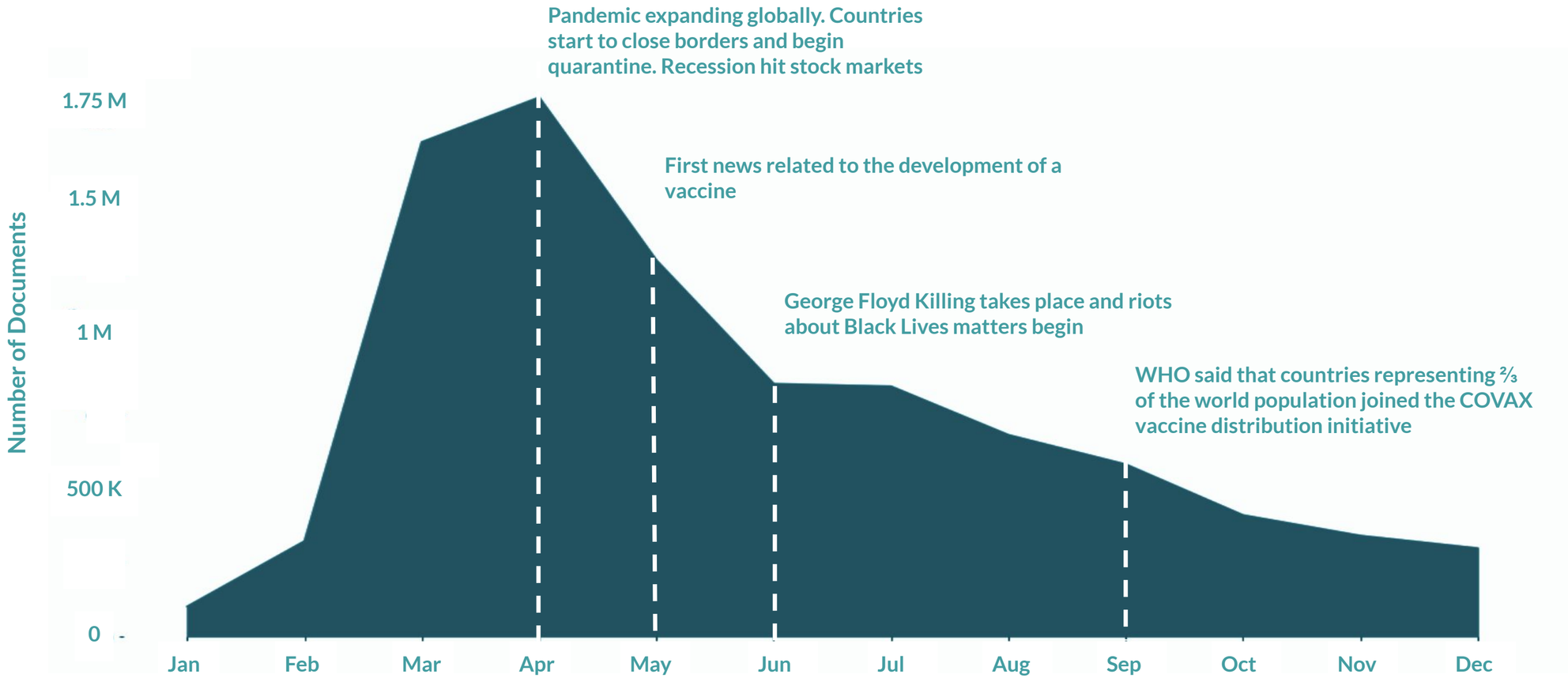


our insights

1

News related to COVID-19 had peaked in April 2020 and continuously declined since then

Evolution of news related to COVID-19 in 2020



2

Several topics have persisted throughout the year at varying intensities

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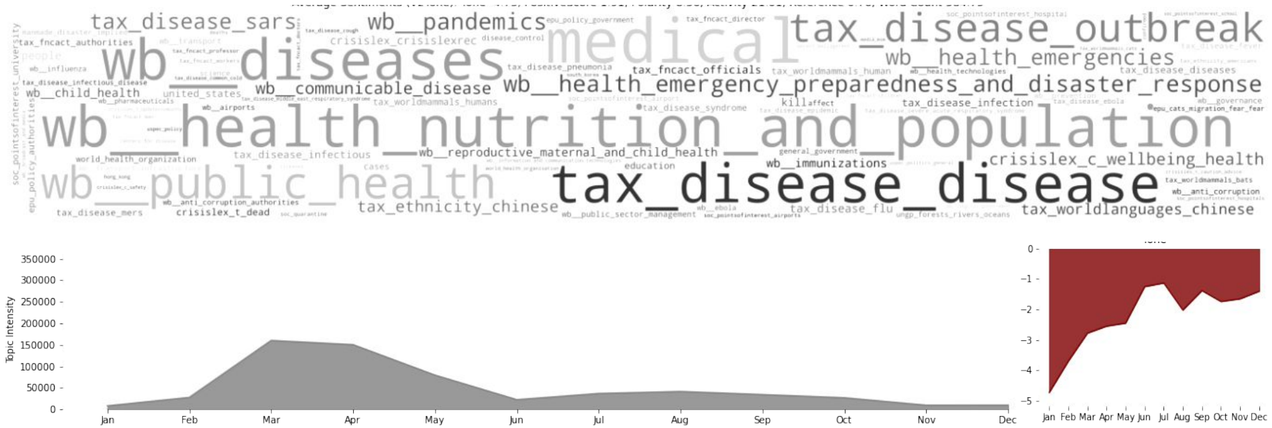


News about the **VACCINE** started showing in May 2020 slowly **appeasing public sentiment in the second half of the year**

News about **ORGANIZED CRIME** and how it will negatively impact vaccine distribution has negatively affect public sentiment

Topic Intensity (# of Documents)

Crowd Sentiment (Tone)

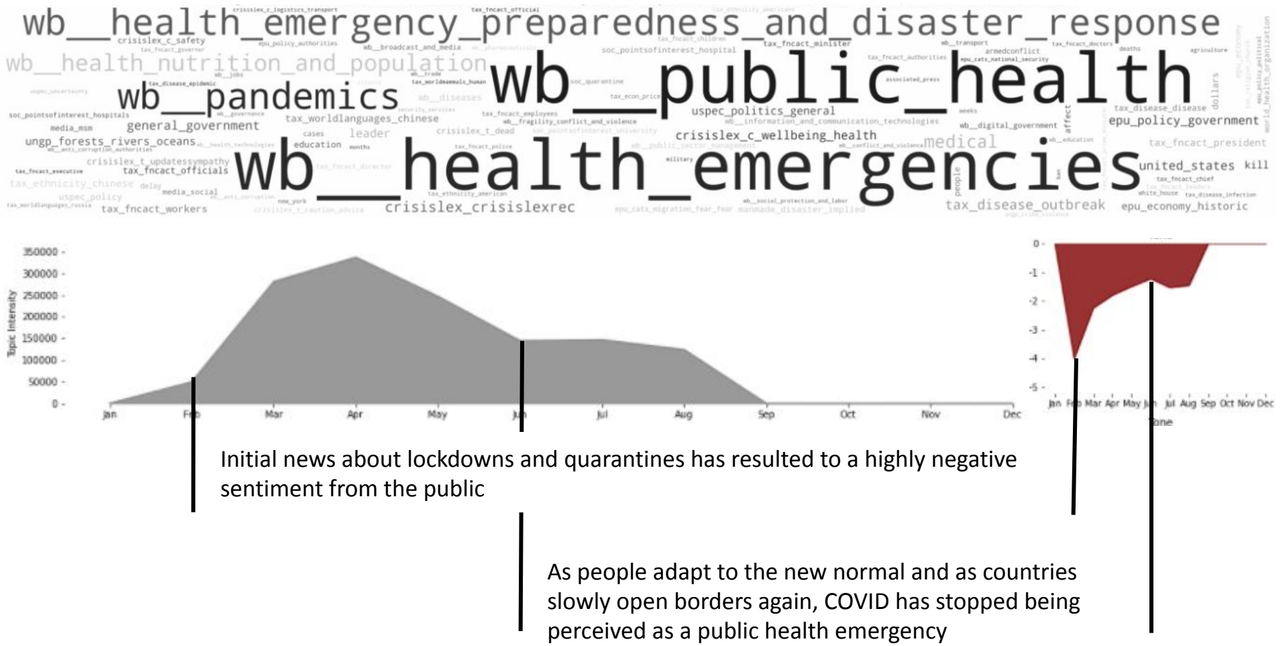
HEALTH CARE SYSTEM & HEALTH INFRASTRUCTURE

COVID 19 is a manmade disaster that should be treated as a health emergency. Public confidence and sentiment has started to improve after the news of the vaccine arrived

Several topics have persisted throughout the year at varying intensities

Topic Intensity (# of Documents)

Crowd Sentiment (Tone)



PUBLIC HEALTH EMERGENCIES

Various effect of the global pandemic to the lives of people because of quarantines, lockdowns, lost of jobs, stock market crashes, and economic downturn.

Several topics have persisted throughout the year at varying intensities

Topic Intensity (# of Documents)

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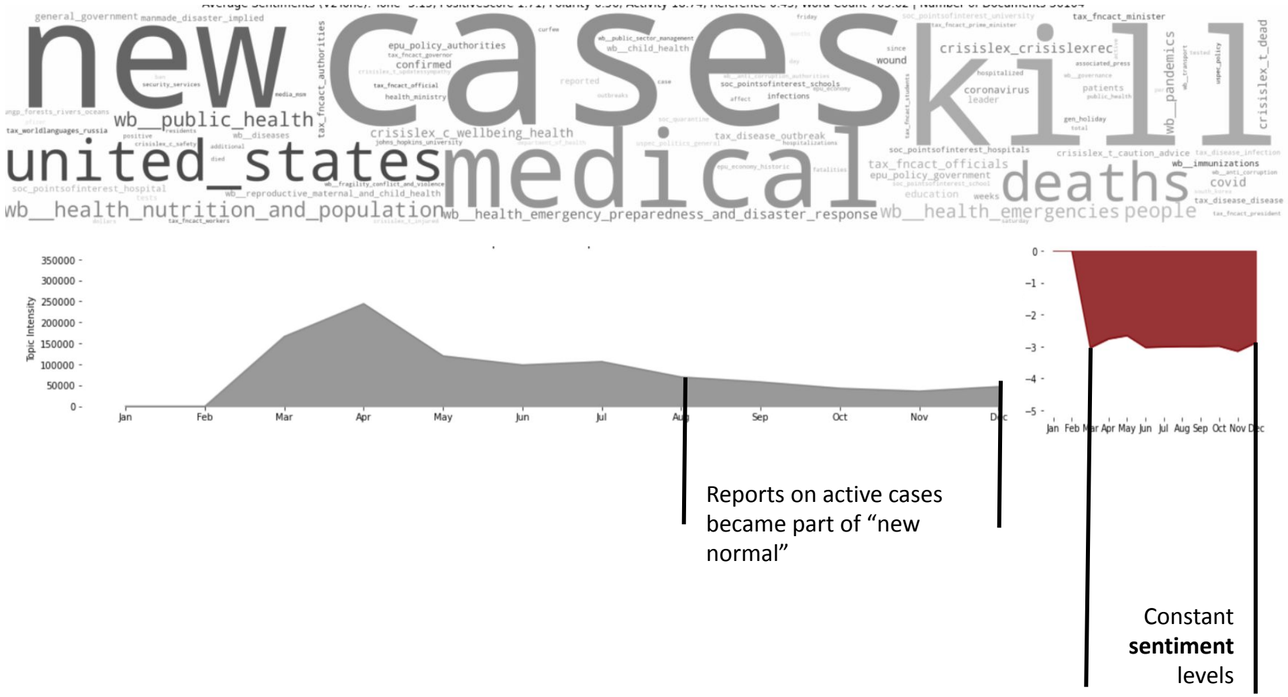
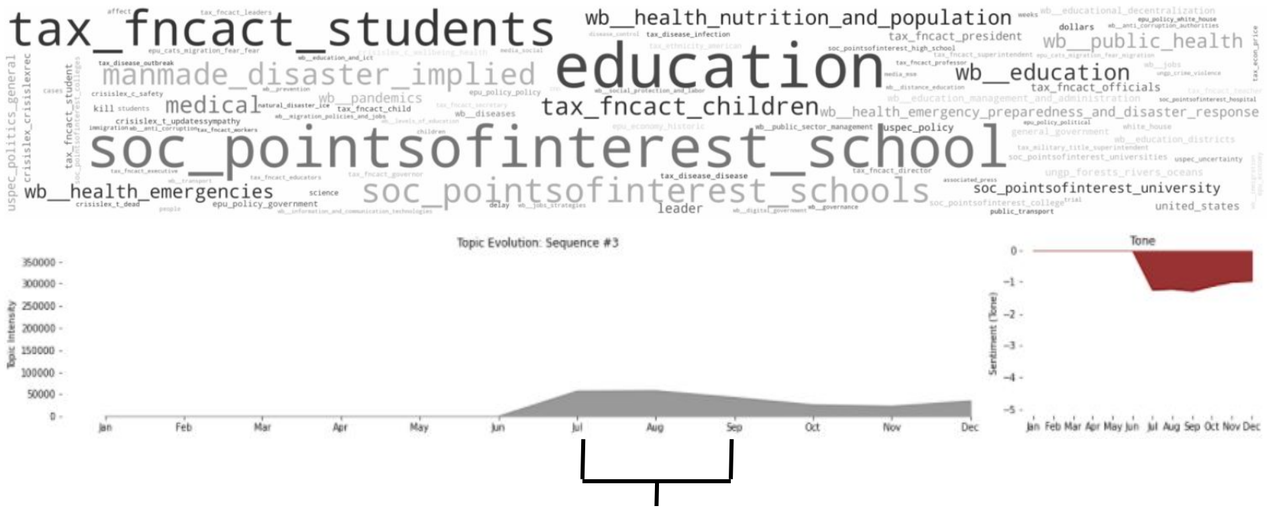


COVID 19 ACTIVE CASES, RECOVERIES, AND FATALITIES

Global news on active cases, deaths, and recoveries for COVID-19 including news about healthcare workers, the healthcare industry, and the government handling of the pandemic

3

Numerous topics have been emerging as the year ends



Start of classes for some countries.

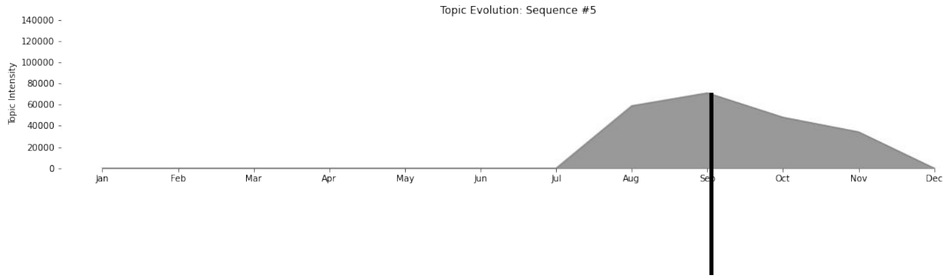
EDUCATION MANAGEMENT DECENTRALIZATION AND PROMULGATION OF VIRTUAL CLASSES IN THE NEW NORMAL

Usage of video-conferencing applications have grown as a new platform for the education system.

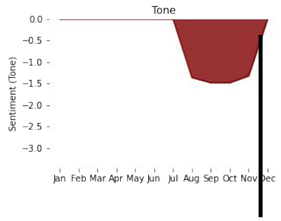
Numerous topics have been emerging as the year ends

Topic Intensity (# of Documents)

Crowd Sentiment (Tone)



A **15% YOY drop** in online recruitment in PH.



$900 billion COVID relief bill in U.S.

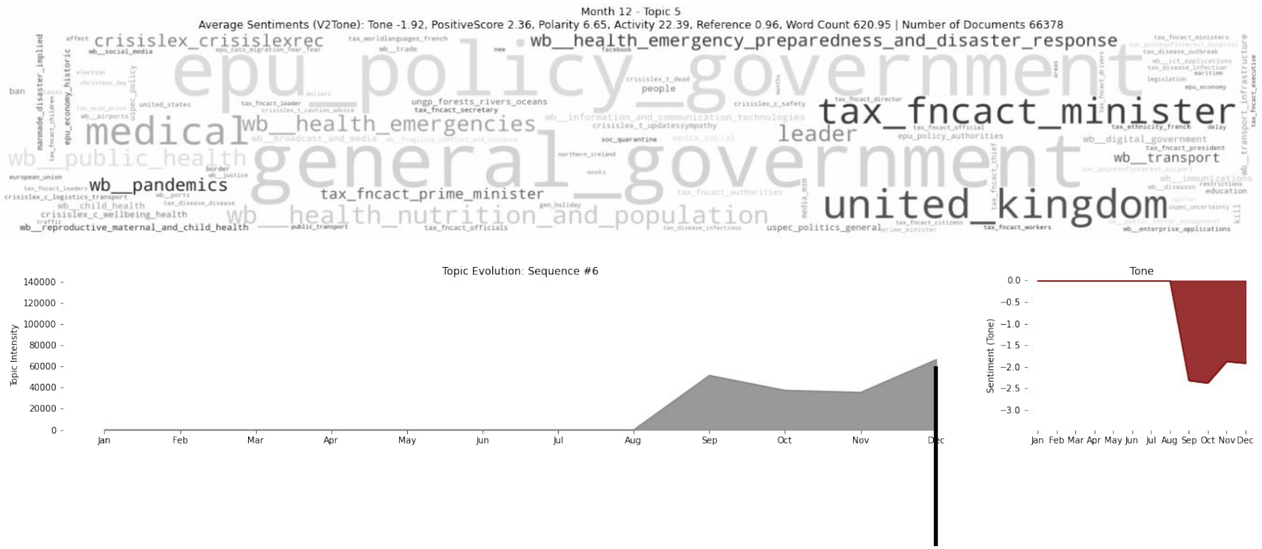
WORSENING UNEMPLOYMENT DUE TO LAYOFFS. SUPPORTING AND UPSKILLING THOSE WITHOUT WORK

COVID affected several businesses resulting to massive layoffs. It is only until the 2nd half of the year when lockdowns have loosened allowing businesses to re-open.

Numerous topics have been emerging as the year ends

Topic Intensity (# of Documents)

Crowd Sentiment (Tone)



Surge of **anti-vaxxers** causing concerns in UK

DIFFERENT NATIONS HAVE BEEN EXPERIENCING VARIOUS CHALLENGES BROUGHT UPON BY COVID

Countries will have to face the growing debt in the future years which have been accumulated in the past months while they support their constituents.

Numerous topics have been emerging as the year ends

Topic Intensity (# of Documents)

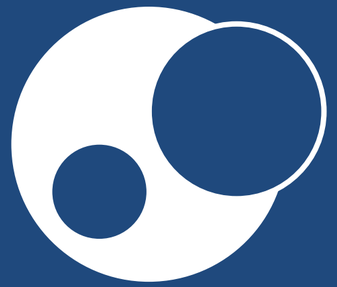
Crowd Sentiment (Tone)

our concluding thoughts

Global news related to the pandemic has started to die down as economies slowly open and embrace the new normal; however, new trends emerge that may pose new challenges

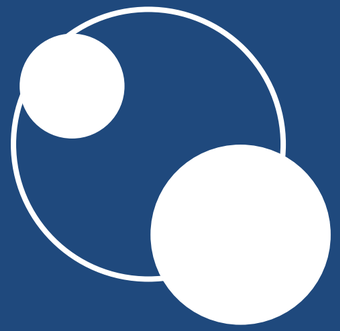
Business Conclusions

Public Health and COVID-19 related news are now deeply integrated into our daily lives



New discussions focus on how people will live in the post-pandemic world

Technical Recommendations/ Future Work



Capture semantic relationship of words by looking at term co-occurrences

Conduct a more detailed analysis per country and determine how each one adapts to the new normal

Get to know more about us by connecting on LinkedIn!

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thanks!

You may visit us in our parallel session by going to **bit.ly/pandemicpulse-aim**