

- Since Covid-19 has been declared as pandemic by WHO, citizens in this public health crisis are going through a wide range of emotions, such as disbelief, concerns about health, fear about food supplies, anxiety, panic, etc., through experiencing the disease spreading. We present an approach to measure and monitor citizens' concern levels using public sentiments in Twitter data. Our approach shows temporal and geographic spread of citizens' concerns during this public health crisis.
- We used Twitter API to collect COVID-19 related Tweet data from 3/13 to 3/28, 2020. (President Trump declared State emergency on 3/13.)
 - 30000 Tweets on 3/13, 32% contain US state location info. 24463 Tweets from 3/14 to 3/21.
- Tweets for different government measures, 20000 for each respectively. Measures include test kit, self isolation, school closing, business closing, social distance, mask and ventilator.

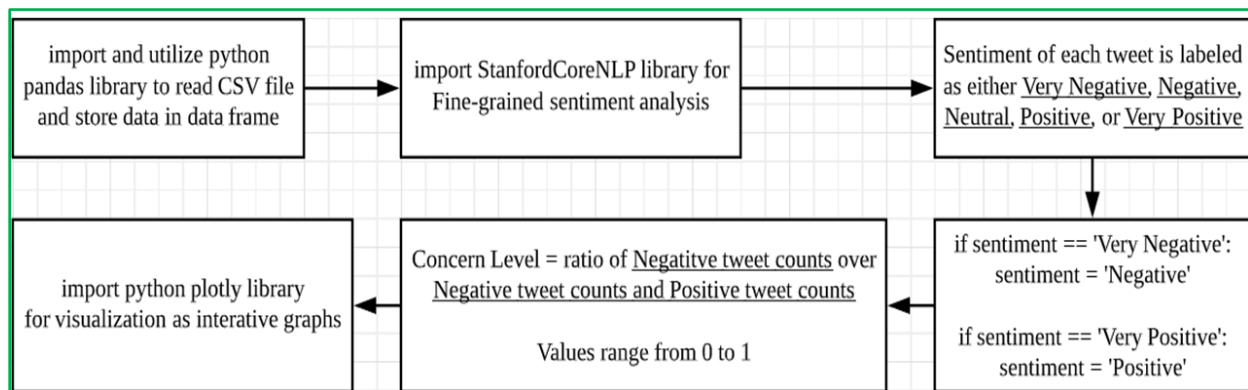


Figure 1: Flow chart of our approach.

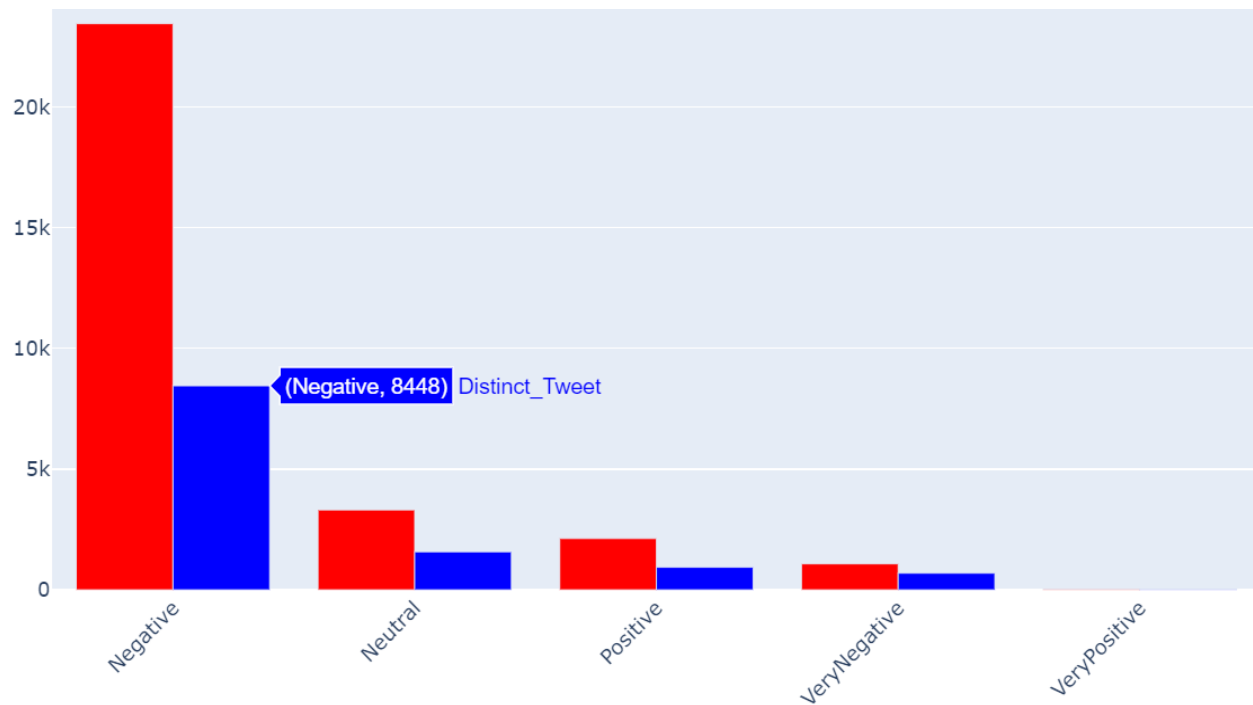


Figure 2: Red bars represent all 30000 tweets, including retweets, while blue bars represent unique tweets, around 40% out of all. Negative tweets account for over 70%.

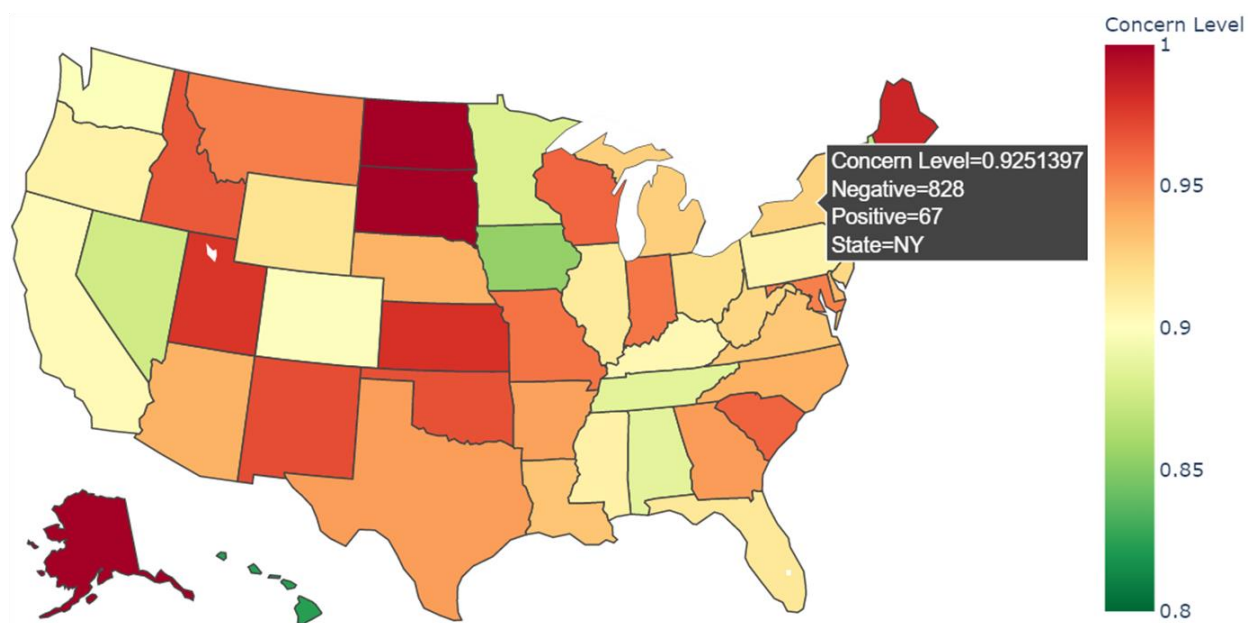


Figure 3: Concern Map. 32% out of 30K tweets on 3/13 include state info. Concern levels go from 0.8 to 1.0 and the color map is set accordingly.

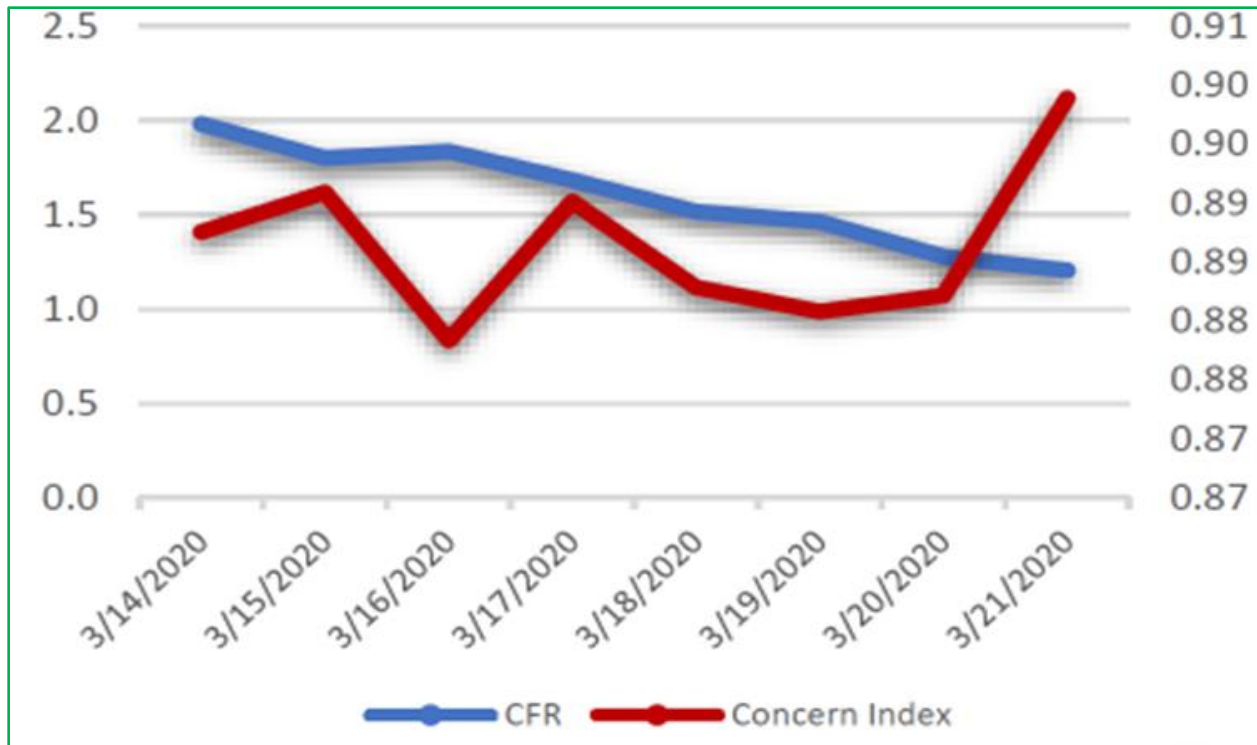


Figure 4: Concern index and case fatality rate by day.

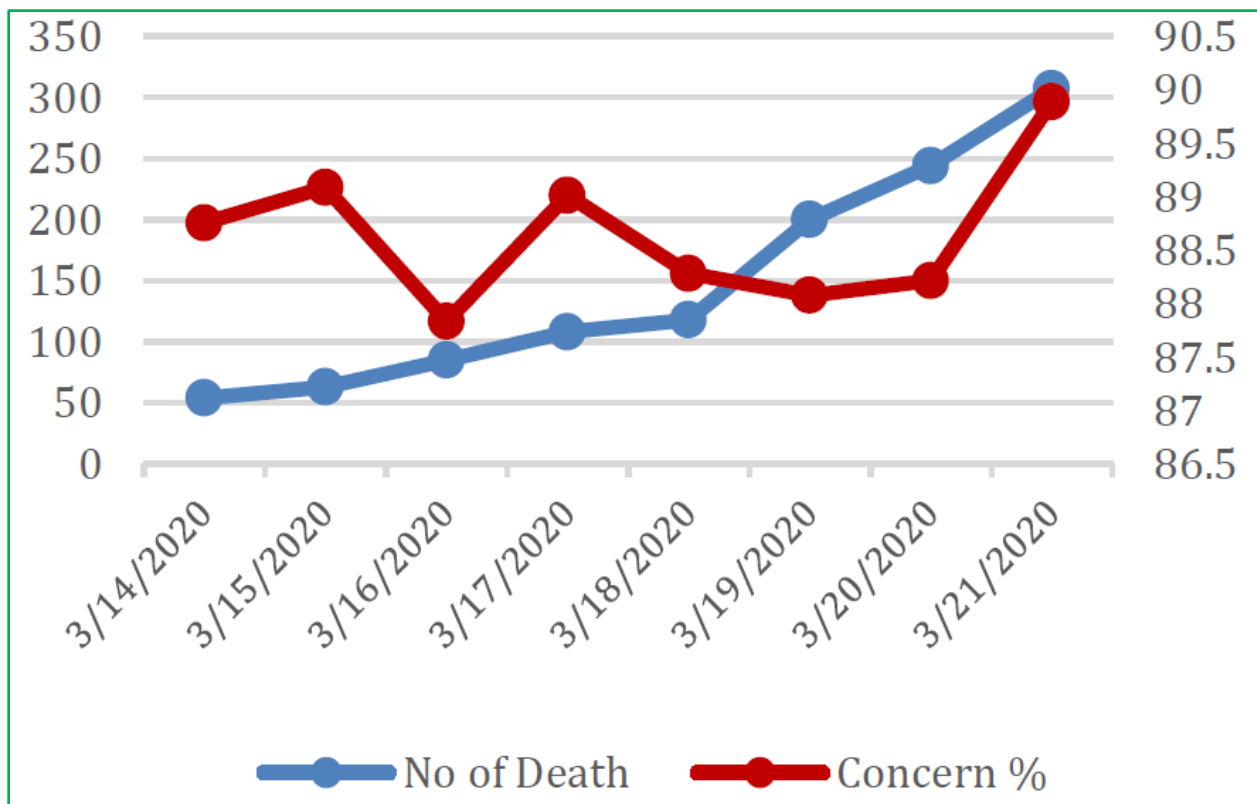


Figure 5: Concern index and case number by day.

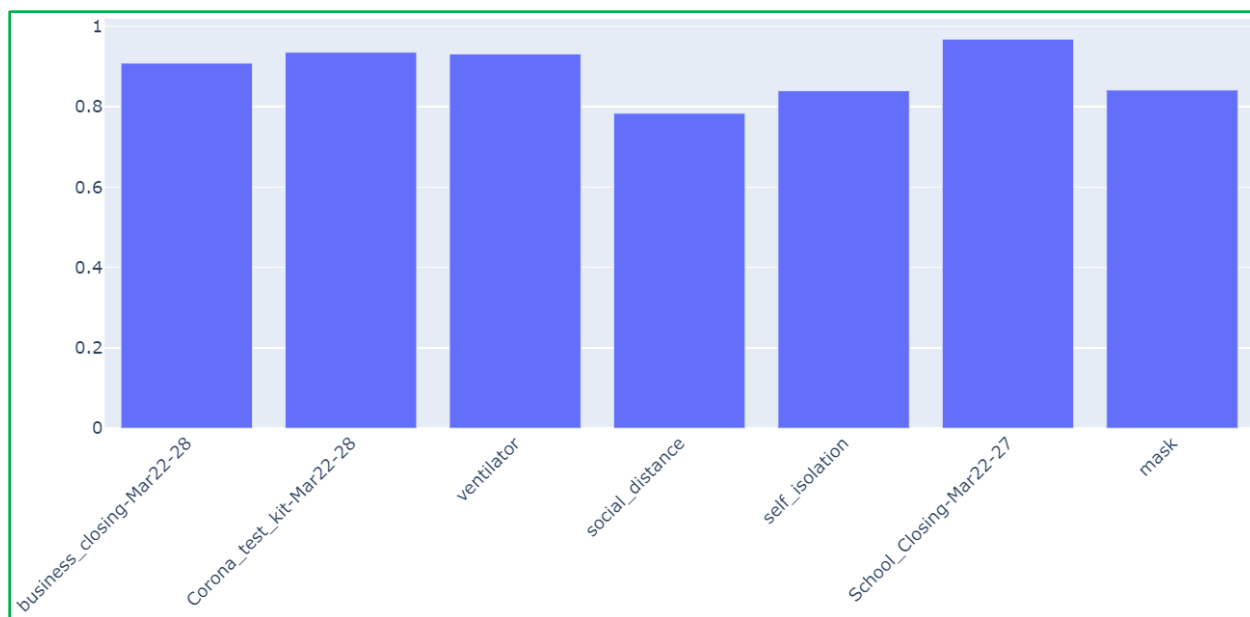


Figure 6: Tweets for different government measures, 20000 for each respectively.

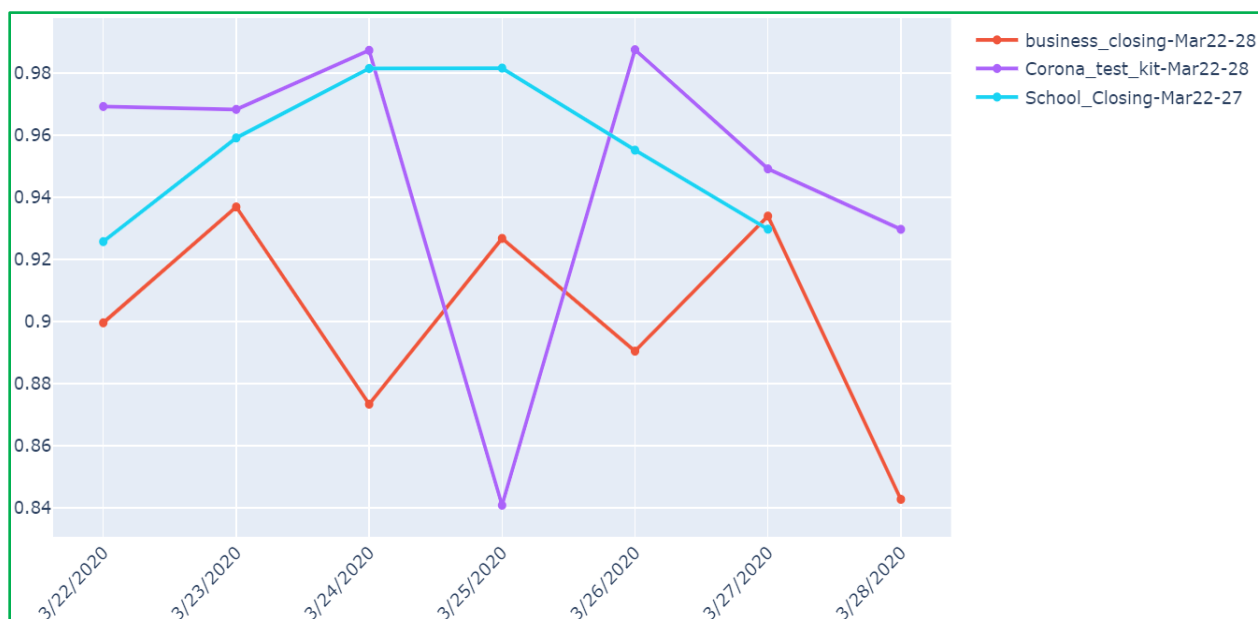


Figure 7: Topical areas of topmost concern expressed in tweets and their changes over several days.

Topics	Negative	Positive
School Closing	closing schools email parents received entitled stating informed school year	school closing schools year home high children kids covid see
Business Closing	closing business tomorrow essential close may Gauchin-Légal non stores corona	today business closing open people home stop even two told
Social Distance	social distance people distancing quarantine covid stay like feet keep	distance social stay home distancing people keep news
Self-isolation	self isolation day covid days time quarantine really going lockdown	self isolation one home stay taking day woman seriously british
Test-kit	ventilator test kit corona covid dyson trump live st hand	medical corona ventilator virus covid innovation may TRUE war fraternity
Ventilator	ventilator dyson trump new people days shortage severe one	ventilator covid coronavirus friend dont ventilators nyc prayer pneumonia ask

Figure 8: Top frequent terms in each policy.

- The sentiment-based monitoring will allow governments to understand the citizens' mental and emotional issues and hotspots to address them before the impact of disease anxiety level become damaging on its own.
- We are working on several extensions to improve the work, including the near-real-time surveillance through automation, and utilizing more diverse social media sources.