Changes in Mental Health of Twitter Users During COVID-19

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Motivation and Problems To Be Solved

The COVID-19 pandemic has impacted millions of people around the world. The disease, caused by a respiratory virus known as SARS-CoV-2, led to many countries enacting lockdowns and social isolation procedures throughout 2020. Even though the presence of COVID-19 is decreasing throughout the world, its impacts on mental health have not yet been fully explored.

In this work, we analyze the progression of mental health changes throughout the COVID-19 pandemic using a dataset of COVID-19 related tweets, as well as a subset of random tweets from the onset of COVID-19 to current day. We also perform a brief demographic analysis and discuss whether factors such as healthcare policies can have an impact on the mental health estimates of Twitter users. We hope that our results will highlight the impacts of COVID-19 on mental health and inspire mental health support procedures during and after a traumatic event such as COVID-19.

Data

COVID Tweets Dataset
The first dataset that we use on our model is an extensive collection of approximately 2M COVID-19 related tweets, ranging from March 20th, 2020 to April 1st, 2022. This dataset was made available online by Rabindra Lamsal on ieee.dataport.org.

Random Tweets Dataset
To truly analyze the impacts of COVID-19 on mental health of Twitter users, we also collected a subset of approximately 500 random English tweets per day from April 1st, 2020 to current day using the Twitter API. We hope that this dataset will supplement our opposing dataset and provide a more general view.

Methods

In this work, we perform two different aspects of analysis: Mental Health Analysis and Demographics Analysis.

For mental health analysis, we focus on the words and phrases that can be linguistic characteristics indicative of stress, such as "depression," "anxiety," and "I hate." In the meanwhile, we evaluate the degree of loneliness of each tweet. We use the weights of words and multiply the weight with the corresponding frequency to get the probability of loneliness expressions in each tweet.
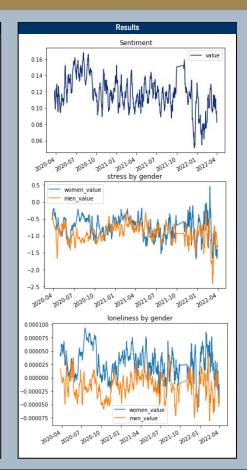
We evaluate each Twitter user for demographic analysis based on gender and geographic location. Especially, we examine gender and healthcare quality of each state.

Figure1: Words/Phrases more likely to be posted by Twitter users to indicate loneliness(Guntuku SC, 2019)

Figure2: Words/Phrases more likely to be posted by Twitter users to indicate Stress (Guntuku SC, 2019)

Results

Gender Analysis

From our results, it appears as though women are more likely than men to discuss mental health issues on Twitter, especially feelings of loneliness. This conclusion is in line with many prior works that reveal men are more hesitant to discuss feelings of loneliness or mental health, perhaps due to societal pressure or stigmas. Another hypothesis is that women in their adolescence and early adult years, Twitter's largest demographic group in terms of age, are more likely to experience feelings of loneliness than their male counterparts; however, there are conflicting results between self-reports and other experimental tests. Regardless, feelings of loneliness may have been perpetuated by social isolation during the pandemic, which leads to broader implications such as the need for mental health support protocol after these traumatic, worldly events.

Demographic Analysis By Country