Global evidence of expressed sentiment alterations during the COVID-19 pandemic

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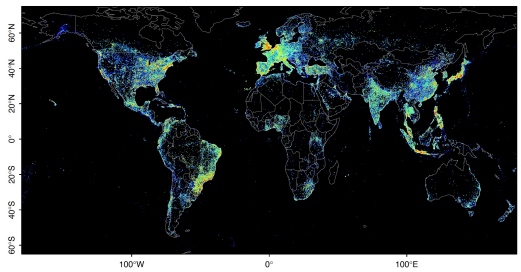
Introduction

The COVID-19 pandemic has created unprecedented burdens on people's physical health and subjective well-being. While countries worldwide have developed platforms to track the evolution of COVID-19 infections and deaths, **frequent global measurements of affective states** to gauge the emotional impacts of pandemic and related policy interventions remain scarce.

Methods

To quantify and track daily emotional well-being, we apply a state-of-the-art Natural Language Processing (NLP) technique called **Bidirectional Encoder Representations from Transformers (BERT)** on 654 million geotagged social media posts in over 100 countries. We train and predict sentiment on 104 different languages supported by Multilingual BERT to achieve global measurements.

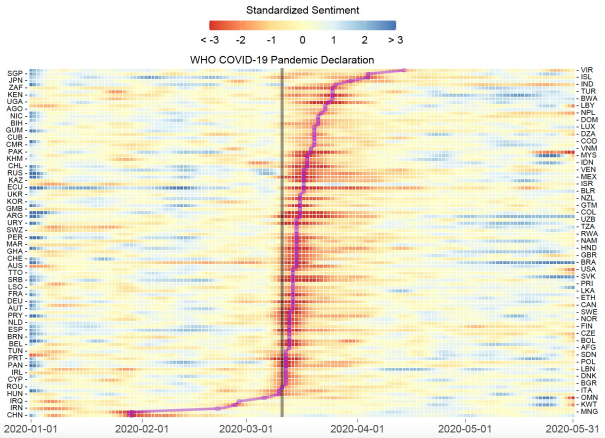


Based on the global sentiment database, we apply quasi-experimental designs, **Regression Discontinuity Design (RDD)** and **Synthetic Control Method (SCM)**, to quantity the sentiment shock and recovery time of COVID-19 pandemic and lockdown policies by country.

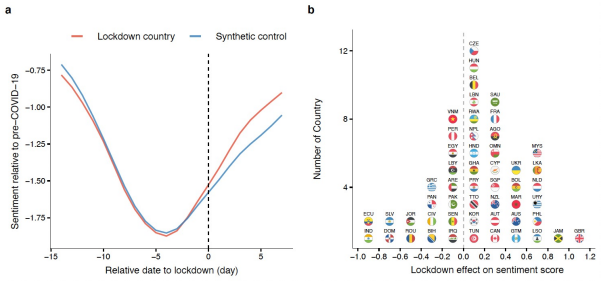
Contribution

This study shows how social media data, when coupled with machine learning techniques, can provide real-time measurements of affective states. We make our sentiment data available to support more valuable research in this domain: https://github.com/Jianghao/Sentiment_COVID-19

Results



All countries in our sample sequentially suffered sentiment alterations around the beginning of the pandemic, with varying magnitude and durations. The average **sentiment drop** is 0.85 standard deviation (SD) of a country's normal sentiment before COVID-19 (about 4.7 times the sentiment gap between Monday and Sunday). And according to our measured **recovery time**, 18% of countries have stabilized at a lower sentiment level and show no sign of recovery. COVID-19 severity, cultural tightness, and governance efficiency are important moderators of sentiment resilience.



On average, **lockdown policies** are followed by a small and positive sentiment change when comparing the average sentiment change across all locked-down countries with that of their synthetic controls in the first week of their implementation. Our results suggest that for countries with severe pandemic situations, letting the virus spread without imposing stringent anti-contagion policies would lead to similar or even larger emotional distress than lockdowns.

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