

TWITTER SENTIMENT ANALYSIS: GLOBAL ATTITUDES TOWARDS COVID-19 POLICIES



BACKGROUND



Driving Question

How do people from different countries feel about COVID-19 mandates – specifically **vaccine policies** and **digital contact tracing (DCT)**?

Our Proposal:

Fine-tune a BERT model to classify the sentiment of global COVID-19 Twitter data related to specific policies.

METHODS

Baseline

RoBERTa model¹ pre-trained for sentiment analysis of Tweets

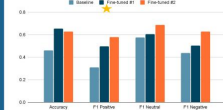
Fine-Tuning

- Selected and hydrated (using Twitter API) over 3,000 pre-labelled COVID-19 related Tweets^{2,3} and fine-tuned baseline on this domain
- Adjusted hyper-parameters such as training epochs, optimizer type and learning rate, and batch size to maximize dev set accuracy
- Evaluated two fully-trained models against baseline using multi-class F1 score and accuracy
- Scraped and filtered data with vaccine and DCT keywords from three English speaking countries to make real-world predictions



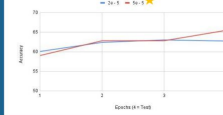
MODEL RESULTS

Accuracy and F1 Scores for Fully-Trained Models



	Baseline	Fine-tuned #1	Fine-tuned #2
Accuracy	0.46	0.6547	0.6274
F1 Positive	0.308	0.49536	0.57718
F1 Neutral	0.375	0.60377	0.68534
F1 Negative	0.436	0.50246	0.62766

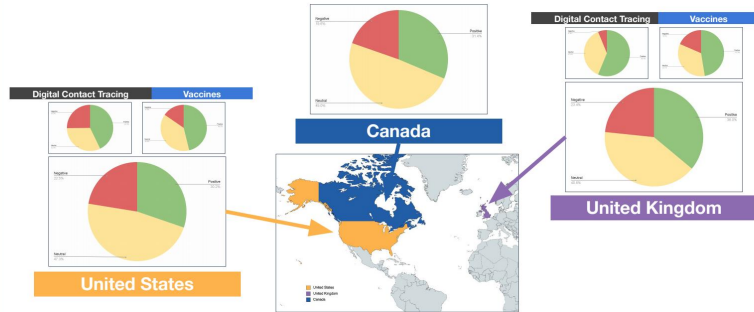
Fine-Tuning: Comparing Learning Rates on Full Dataset



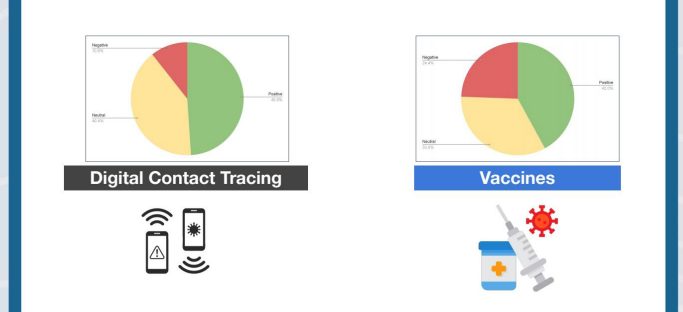
$$\text{Accuracy} = \frac{\text{Correct Predictions}}{\text{Total Predictions}}$$

$$\text{F1 Score} = 2 * \frac{\text{Precision} * \text{Recall}}{\text{Precision} + \text{Recall}}$$

SENTIMENT BY COUNTRY



SENTIMENT BY MANDATE



WORKS CITED

1. Francesco Barbieri, Jose Camacho-Collados, Luis Espinosa Anke, and Leonardo Neves, 2020, "TweetEval: Unified Benchmark and Comparative Evaluation for Tweet Classification," In Findings of the Association for Computational Linguistics: EMNLP 2020, Association for Computational Linguistics.
2. Izabela Kryszka, Tom Wójcicki, Agata Olejnik, Mikołaj Morzy, and Jan Piasiecki, 2021, "Be Careful Who You Follow: The Impact of the Initial Set of Friends on COVID-19 Vaccine Tweets," In Proceedings of the 2021 Workshop on Open Challenges in Online Social Networks (OASIS '21), Association for Computing Machinery, New York, NY, USA, 1–8. doi: <https://doi.org/10.1145/3472720.3483619>.
3. Rabindra Lamsal, March 13, 2020, "Coronavirus (COVID-19) Tweets Dataset", IEEE Dataport, doi: <https://dx.doi.org/10.21227/781w-e842>.