# COVID19 Vaccine Twitter Posts: Data Labeling and Text Classification

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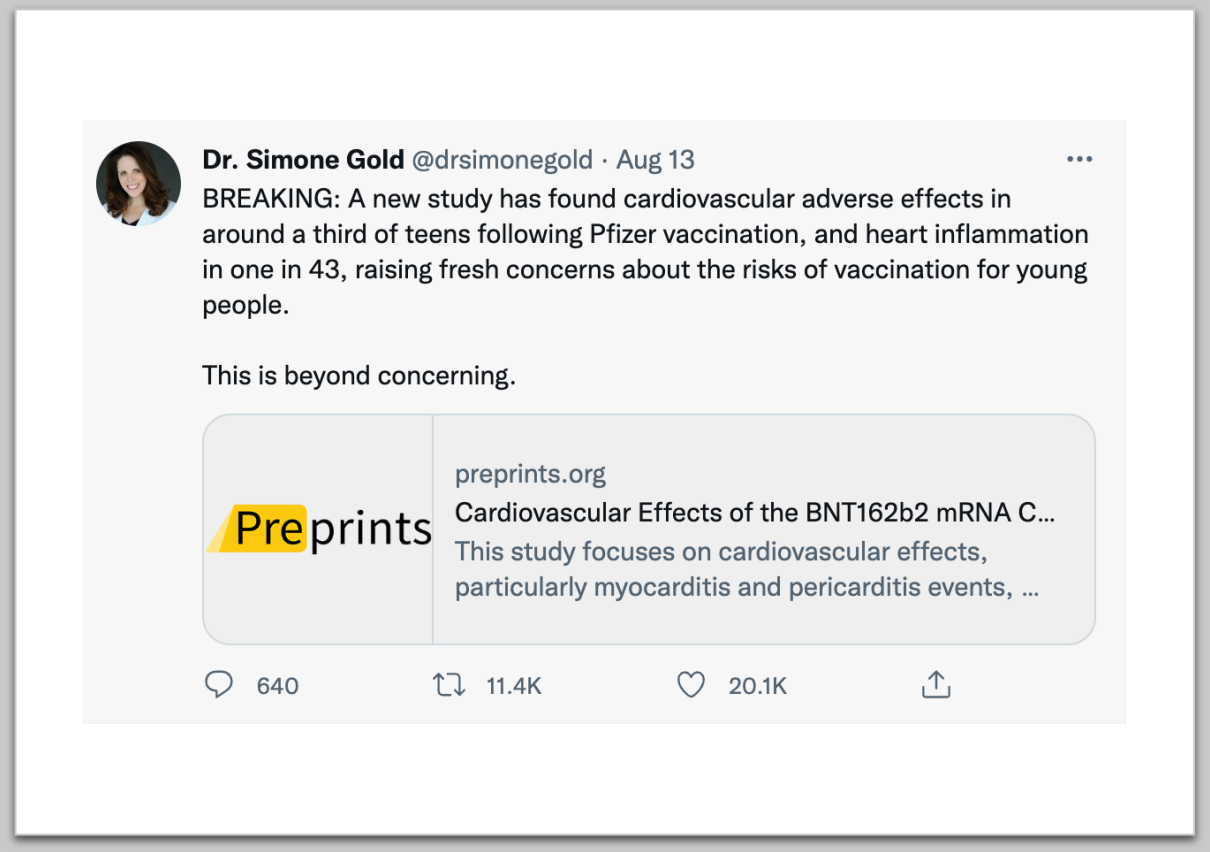
# Problem Statement

SNS data serve as great resources for public opinions on different topics, don't have necessary y-labels to predict on.

**The goal of this project is to find out an optimal labeling method for twitter posts regarding COVID19 vaccines to classify them into "pro-vaccination" vs "anti-vaccination".**



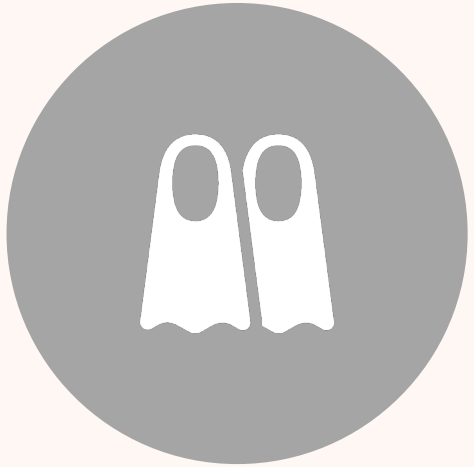


# Anti-vax vs Pro-vax

# Labeling Methods

HASHTAG –

CROWDSOURCING

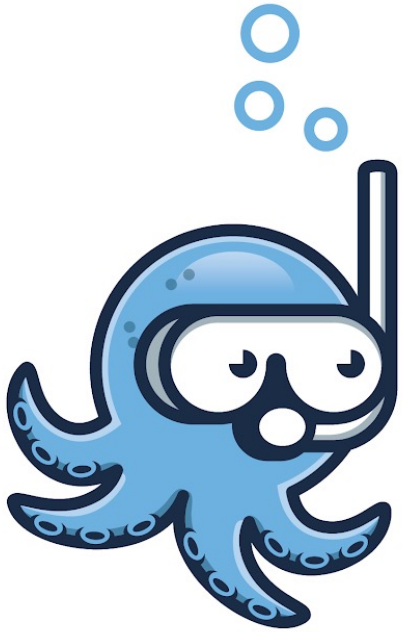


SNORKEL-

DATA LABELING PLATFORM

# Snorkel.ai

- Labeling tool for unlabeled data
- Sets of rough rules that help classify between the texts
- Take a vote on the majority!
- Takes weight into consideration



snorkel

# Datasets

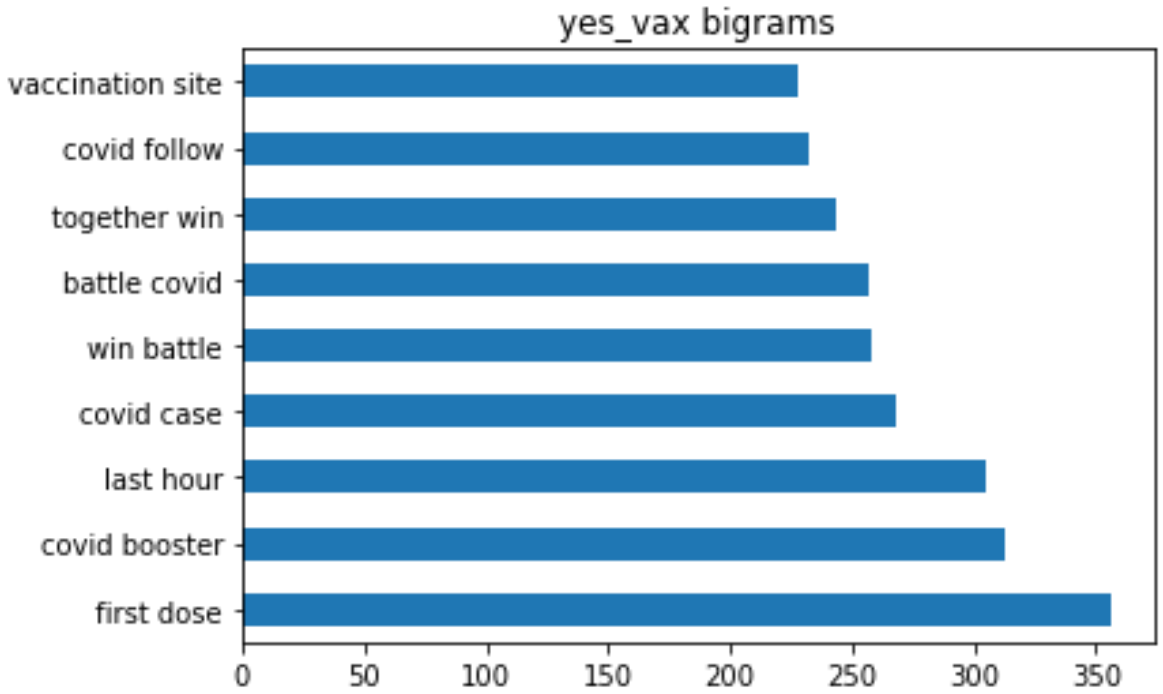
- SNScrape API
- 2 main datasets

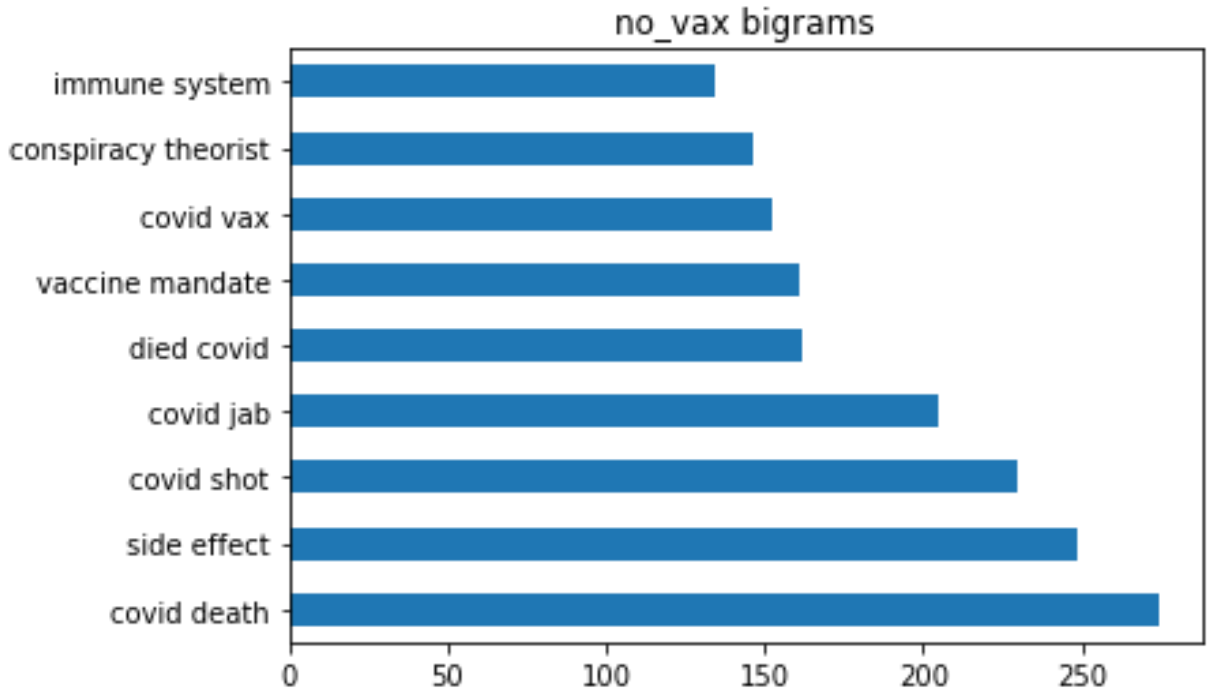
- Unlabeled ( data scraped just with general covid19 vaccine topic)

- Hashtag labeled (data scraped based on parameters

| Pro_Vax | n | Anti_Vax | n |
|---|---|---|---|
| Unite2FightCorona | 1060 | NoVaccineMandates | 1060 |
| StaySafe | 748 | InformedConsent | 748 |
| GetVaccinated | 545 | MyBodyChoice | 545 |
| Baccinated | 528 | NoVaccinePassports | 528 |
| LargestVaccinationDrive | 513 | VaccineSideEffects | 513 |
| healthcare | 503 | MedicalFreedom | 503 |
| COVIDisAirborne | 484 | IDoNotConsent | 484 |
| COVIDAppropriateBehaviour | 419 | VaccineInjury | 419 |

# Hashtag Labeled Data – Other Hashtags




# Hashtag Labeled - Bigrams

# Snorkel labeling function

- Keywords
- Sentiment
- subjectivity
- Hashtags
- Profanity words

# Snorkel Results

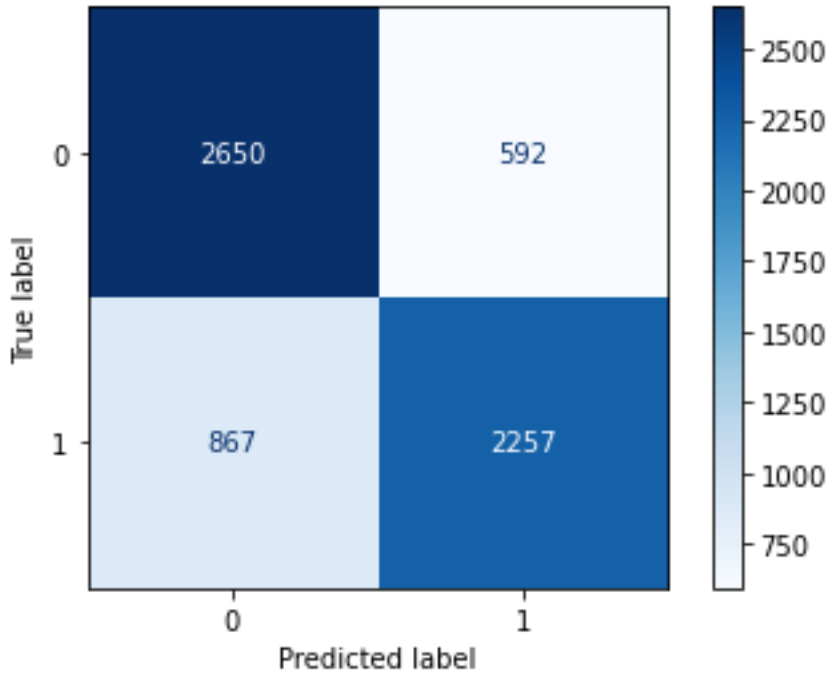
development set accuracy = 59.2%

hashtag subset accuracy = 61.5%

Coverage:
75,644 out of 111,959 rows

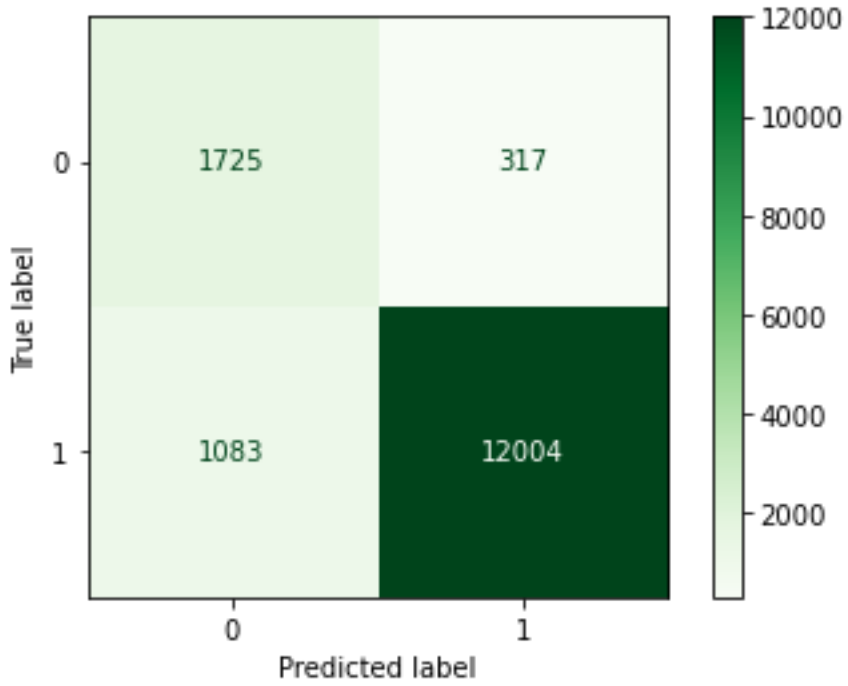
label distribution:
pro-vax (0.86), anti-vax (0.14)

# Model results – Hashtag Labeled




| precision | recall | f1-score | |
|---|---|---|---|
| 0 | 0.75 | 0.82 | 0.78 |
| 1 | 0.79 | 0.72 | 0.76 |
| accuracy | | | 0.77 |

# Model results – Snorkel Labeled




| precision | recall | f1-score | |
|---|---|---|---|
| 0 | 0.61 | 0.84 | 0.78 |
| 1 | 0.97 | 0.92 | 0.94 |
| accuracy | | | 0.91 |

# Conclusion & next steps

- Snorkel Labeled data is better in terms of accuracy, recall, and precision
- Snorkel model integrity could be questionable
- Hashtag labeling is easier, but limited
- **Next step:**
  - compare across the two models
  - Label against each other's model