WEB APIS & CLASSIFICATION PROJECT

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PROBLEM STATEMENT

- Hired by a leading plant-based delivery service who wants to understand through Natural Language Processing (NLP) the posts of two subreddit communities to gain insights for a more data-driven marketing campaign.

METHODOLOGY

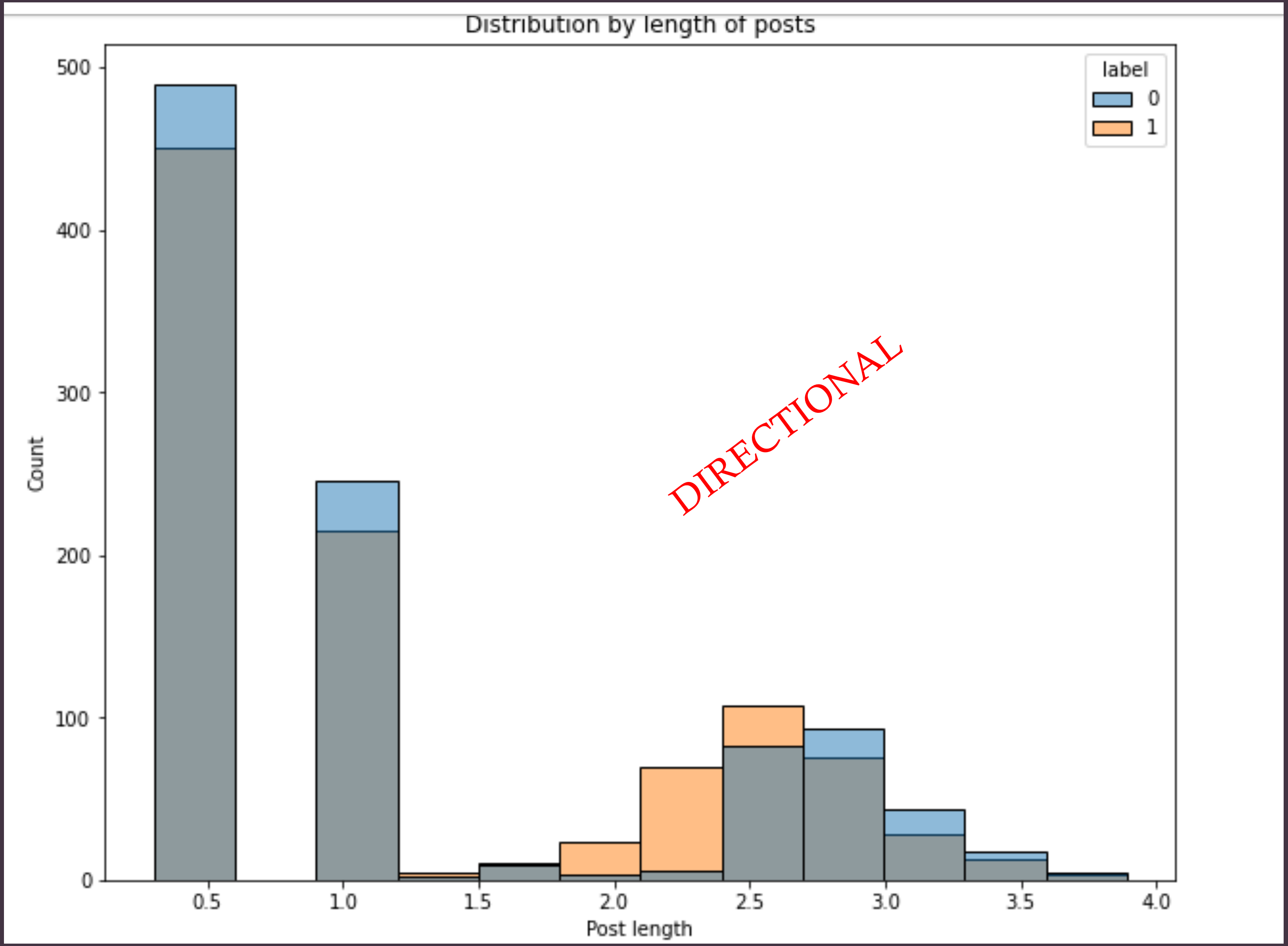
DATA COLLECTION / CLEANING / EDA

- Used Pushshift's API to collect posts from two subreddits (r/vegan and r/plant-based diet)
- Collected 1,000 posts from each subreddit
- Removed unnecessary columns and kept relevant columns including, posts, number of comments, and author
- Preliminary EDA showed many similarities between the two subreddits

PREPROCESSING / MODEL DEVELOPMENT

- Used Count Vectorizer and TFIDF Vectorizer to transform text to numerical features
- Removed stop words to focus on important words
- Developed/Evaluated Models
  - Split the data into training and testing for validation
  - Baseline Accuracy Score
  - Multinomial Naïve Bayes
  - Random Forest

DATA OBSERVATIONS

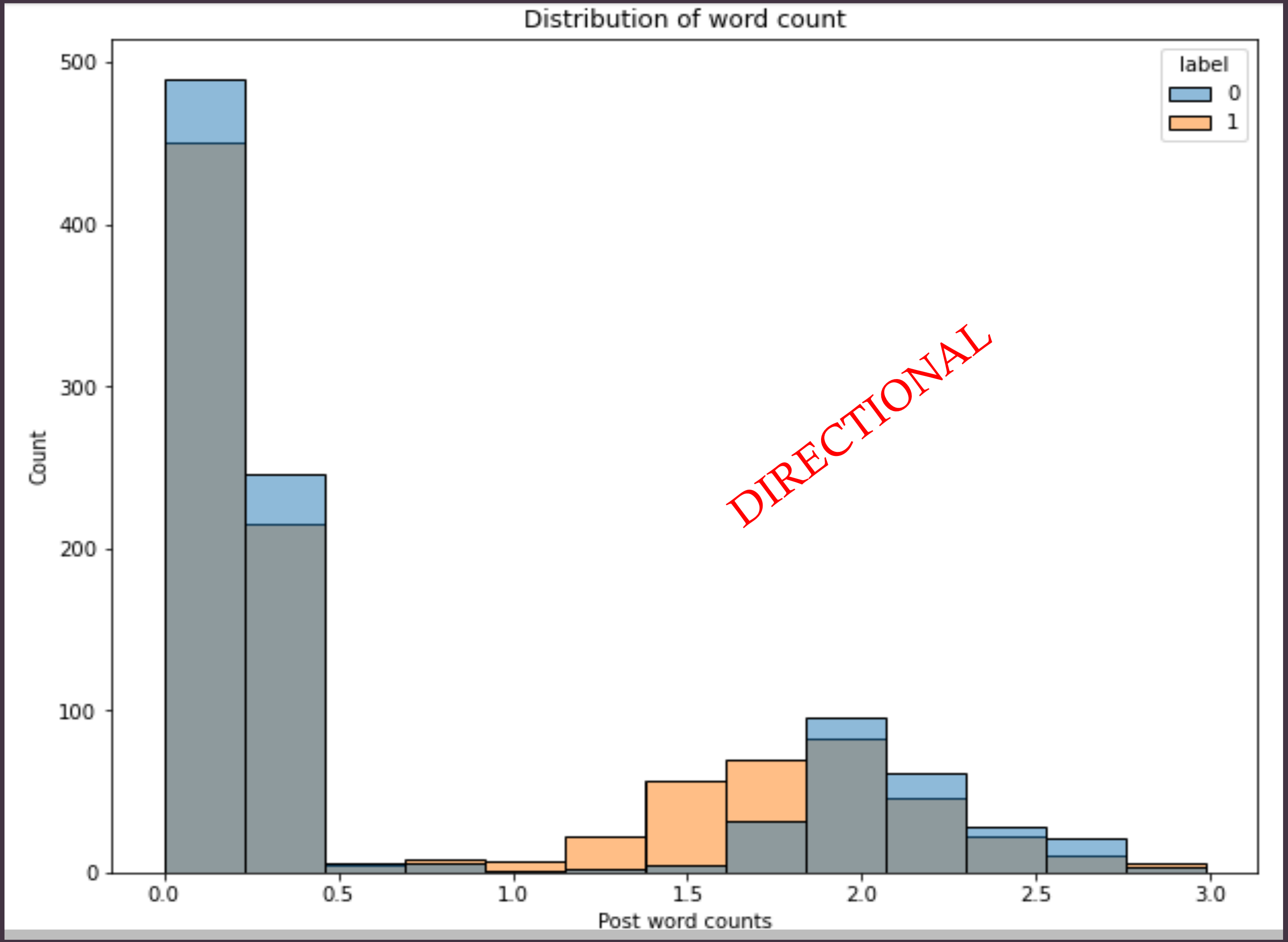


0: Vegan

1: Plant-based diet

DISTRIBUTION OF POSTS LENGTH

- Converted the data to a log scale because distribution was very skewed
- Majority of posts in both vegan and plant-based are not long posts.
- The posts that are longer tend to come from plant-based subreddit

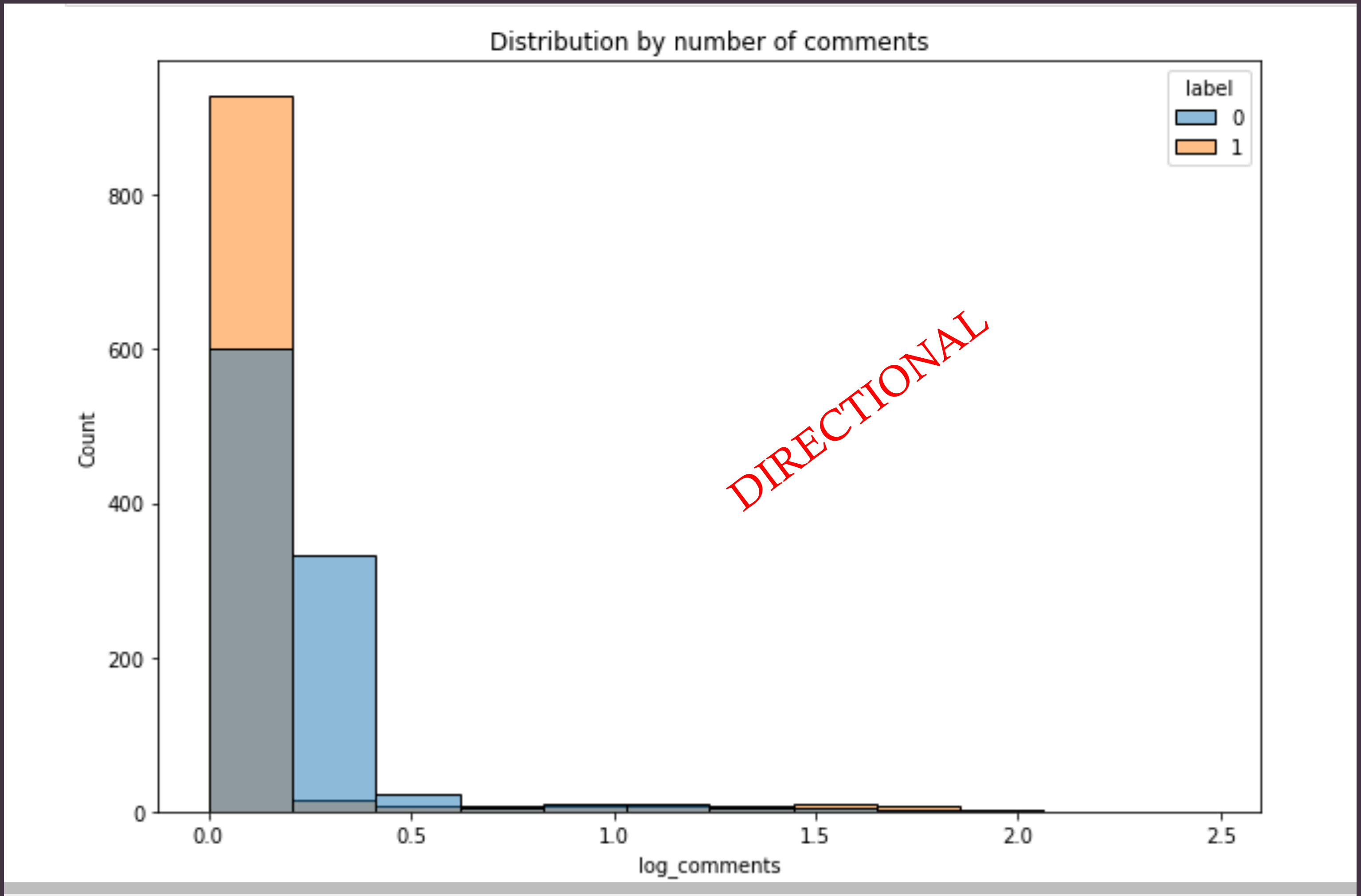


0: Vegan

1: Plant-based diet

DISTRIBUTION OF WORD COUNT

- Note: Data was converted to a log scale because distribution was very skewed.
- Posts on Reddit tend to be short so it’s not surprising that a majority of both vegan and plant-based tend to have fewer words.
- Where there are higher word count is coming mostly from the plant-based subreddit.



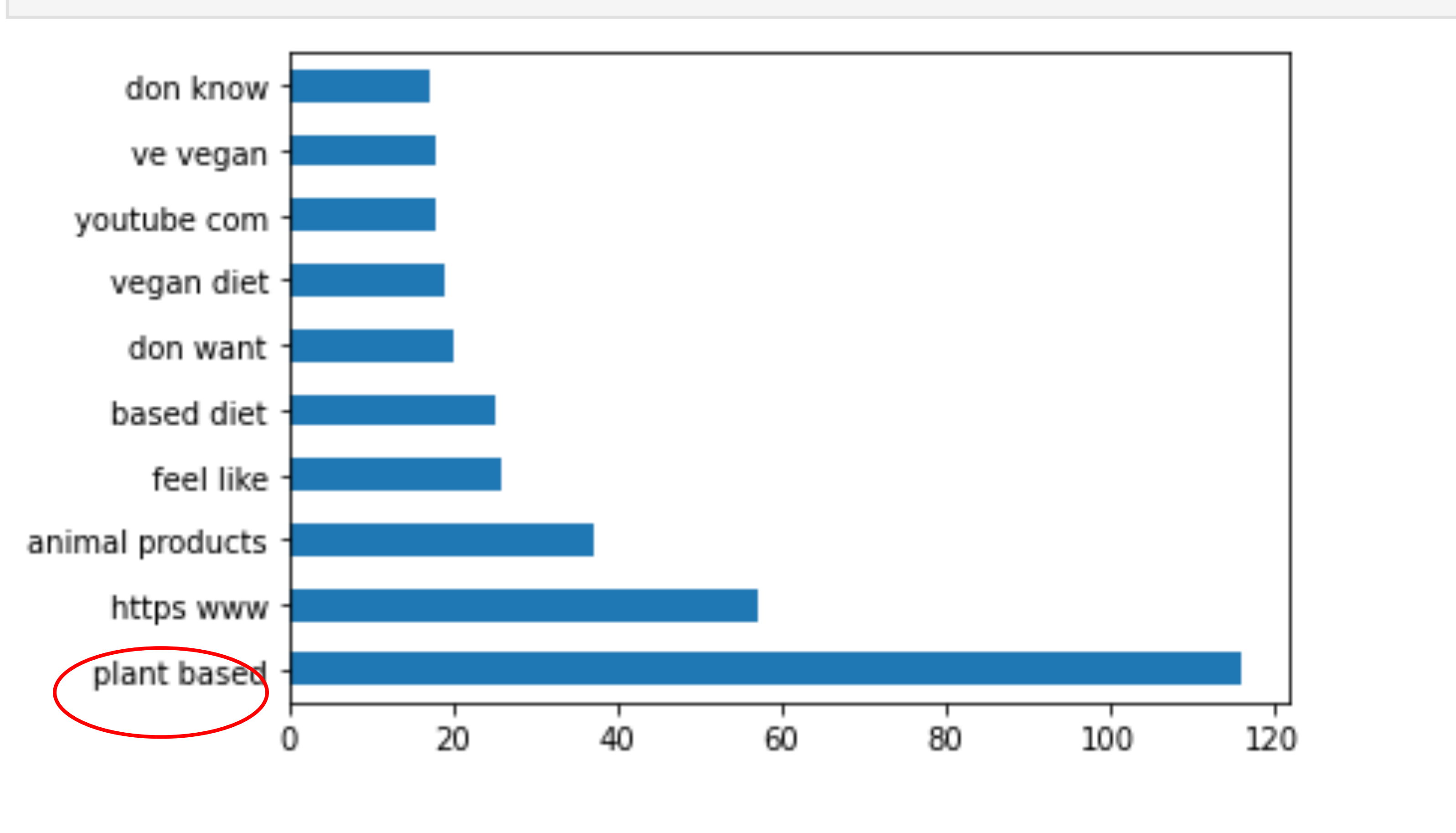
DIRECTIONAL

0: Vegan

1: Plant-based diet

DISTRIBUTION OF NUMBER OF COMMENTS

- Note: Data was converted to a log scale because distribution was very skewed.
- A key measure of engagement is number of comments, and you can see from the chart, both subreddits have relatively low comments and engagement



TOP 10 WORDS

- Even after using Bigram and StopWords features, the top 10 words are not particularly insightful

MODEL EVALUATION

KEY METRICS

VECTORIZER	MODEL	TRAIN SCORE	TEST SCORE	BEST PARAMETERS
NA	Baseline	0.50	NA	NA
CountVectorizer	Multinomial Naive Bayes	0.611	0.55	{'cvec__max_df': 0.9, 'cvec__max_features': 2500, 'cvec__min_df': 3, 'cvec__ngram_range': (1, 1)}
TfidfVectorizer	Multinomial Naive Bayes	0.632	0.584	{'tvec__max_features': 3000, 'tvec__ngram_range': (1, 1), 'tvec__stop_words': 'english'}
TfidfVectorizer	Random Forest	0.617	0.624	{'tvec__max_features': 1000, 'tvec__ngram_range': (1, 2), 'tvec__stop_words': 'english'}

- While all models, performed better than the baseline accuracy score of 0.50, the Random Forest model with TfidfVectorizer has the best predictive performance on this classification problem.
- Max_features as 1000 which is the smallest number among the max_features parameters tested for, and n_gram range as 1-2, which prefers up to two-words and the removal of stop words.oinations.

CONCLUSION / NEXT STEPS

- Measurable increase in the predictive performance of all models compared to the baseline accuracy.
- Similarities between vegan and plant-based subreddits were challenging for the models and resulted in relatively low accuracy scores.
- Next steps include, exploring other relevant subreddits; collecting more training data; doing more pre-processing (e.g., removing more stop words); conducting sentiment analysis; and trying additional models like boosting and K-Nearest Neighbors.