Berkeley SCHOOL OF INFORMATION

Capstone
August 2022

TONE

Promoting empathy among Twitter Users, in order to reduce offensive content that harms the wellness of others.

Pitch

Presentation Overview

TONE

The Problem

Increasing Personal attacks

Created an environment on social media where others are targeted for their race, sexual orientation, disabilities, and much more.

Twitter tries to identify offensive content

but struggles to distinguish between the types of personal attacks, experimented with features

The Problem in Numbers

3.8 Million

Tweets removed for offensive content policy
July 2020-August 2020

1.1 Million

Twitter users disciplined for offensive content

Benefits to Solving This Problem

Less Attacks. More Empathy

Promote more empathy among twitter users by providing detailed feedback of their tweets

Stop Targeting to Stop Declining Mental Health

Reduce targeting online, which is tied to issues such as suicide and declining mental health

Expand Twitter's Current Stance

Expand Twitter’s current stance on offensive content to be more comprehensive

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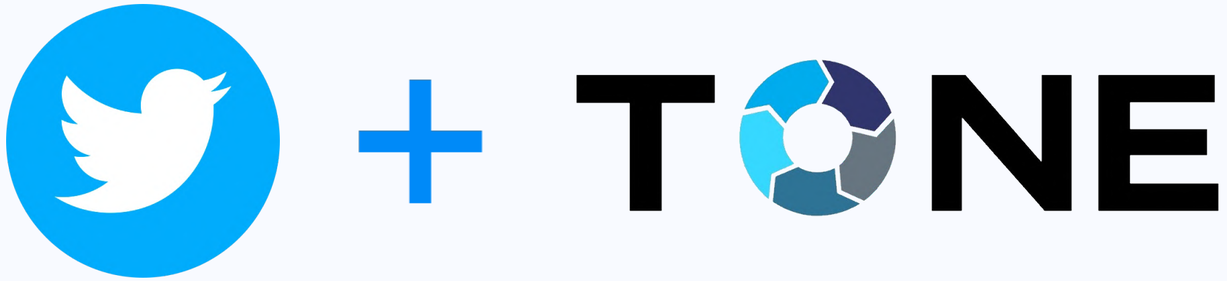
Twitter's Current Stance

“Healthy conversation is a shared responsibility. If your Tweet reply is identified as using potentially harmful or offensive language, we may ask you, via a prompt, if you want to review it before sending.”

A More Expansive Stance

Twitter and Tone work together to identify the specific type of harmful content you may be tweeting. You'll receive a breakdown of your tweet and the categories of offensive content present in your tweet.



Current and Future Impact

Social Media Beyond Twitter

Market size is not limited to just Twitter, but other social media outlets where this problem is prevalent.

Negative Tweets Still Growing

July 2020-August 2020, 3.8 million tweets removed for Twitter's offensive content policy.

Beta Feature to Edit Tweets

Twitter's current venture to edit offensive tweets shows movement and need for expansion regarding offensive content

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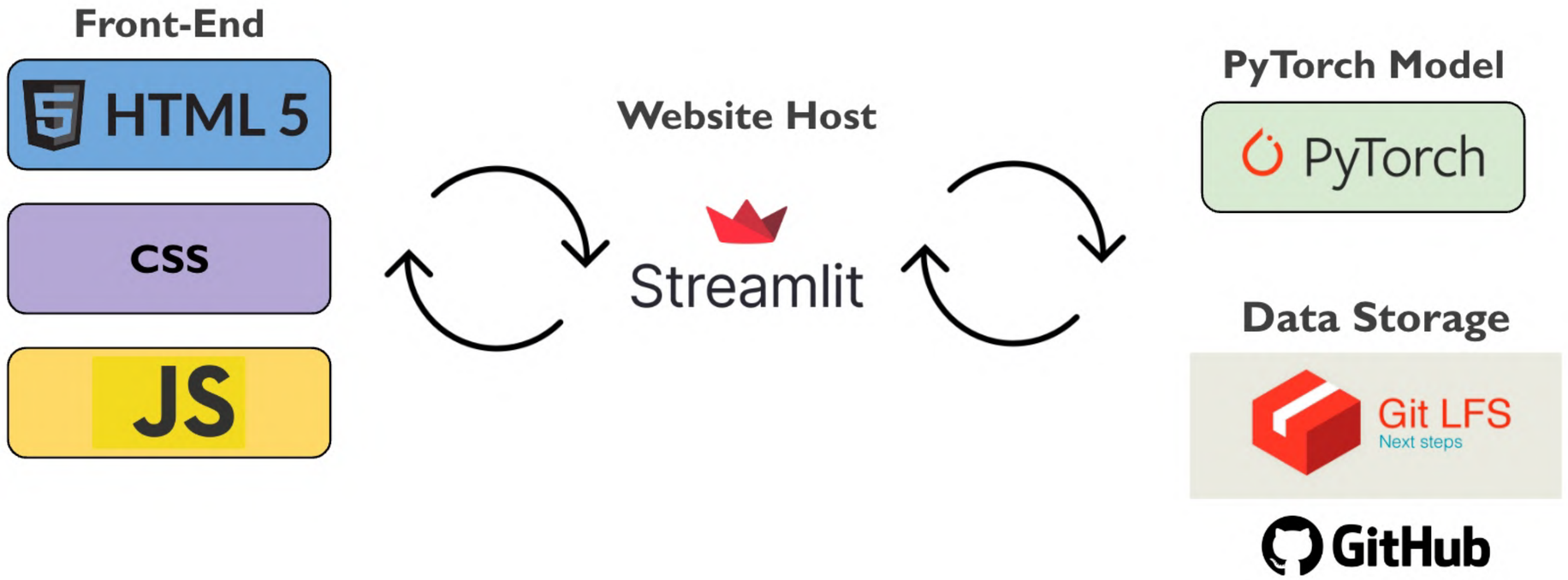
Our Product

TONE

Create a platform that identifies targeting tweets in the following categories as a proof of concept:

- Neutral
- General Criticism
- Disability Discrimination
- Racial Prejudice
- Sexism
- LGBTQ+ Phobia

Data Engineering Pipeline



Pre-Processing Data

Removal of duplicate tweets and NA values

- Deleted 836 tweets in total

Removal of URLs, hashtags, usernames, emojis, numbers, and RT

- https://~
- #...
- @...
- 1234...
- RT...
- 😂

Implemented a 90-5-5 train-validation-test split of our dataset

- Train size: 20,372 tweets
- Validation size: 1,132 tweets
- Test size: 1,132 tweets

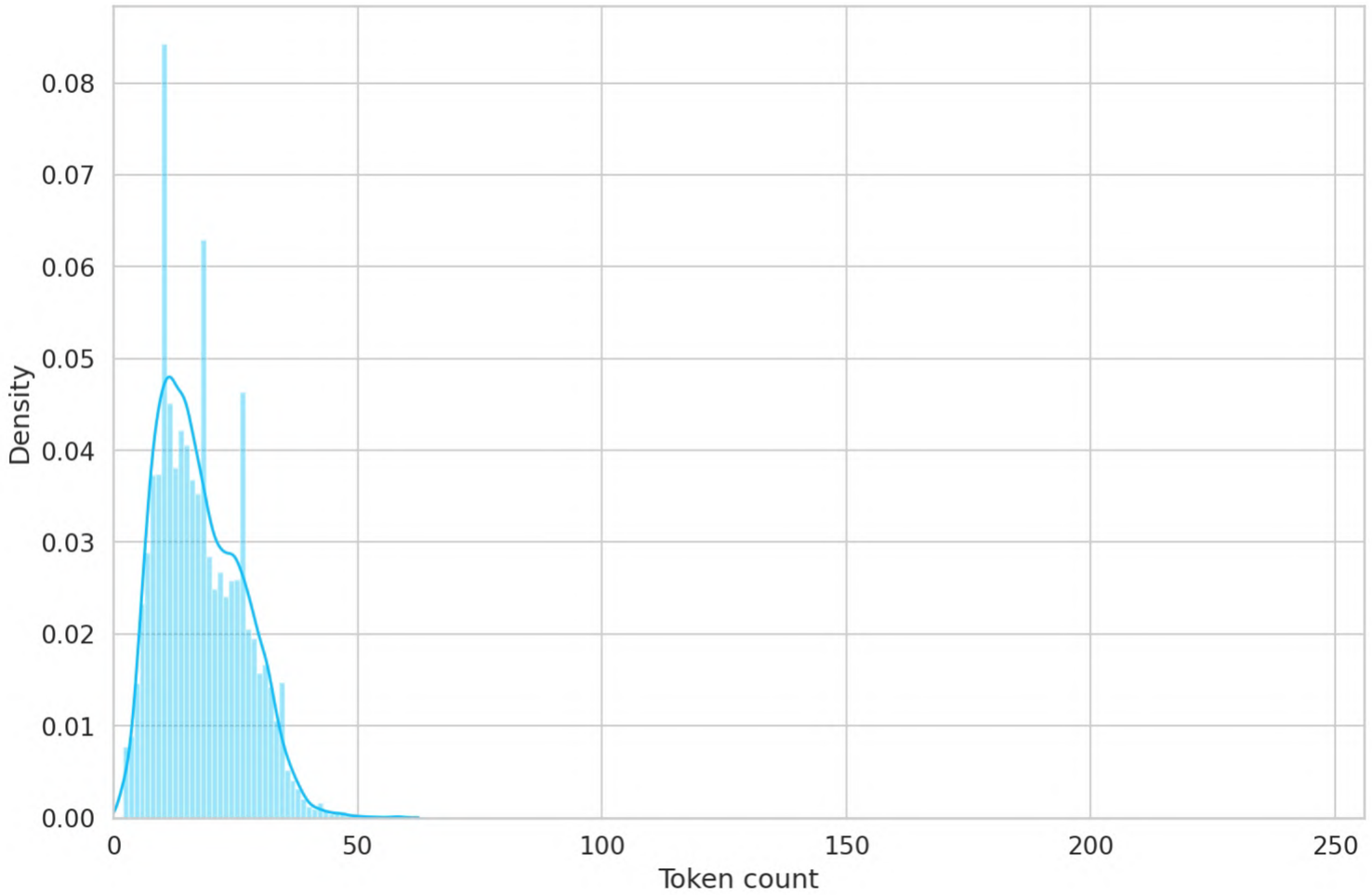
Tokenization (cased-BERT tokenizer)

- **ex**: [‘[CLS]’, ‘For’, ‘the’, ‘record’, ‘No’, ‘##H’, ‘##omo’, ‘but’, ‘don’, ‘##t’, ‘care’, ‘who’, ‘is’, ‘unless’, ‘I’, ‘gotta’,]
- "bad" vs. "BAD"

Base Framework

Key Takeaways:

- Train for 4 epochs
- Batch = 32
- Learning rate = 2e-5 = 0.00002
- Maximum token length = 50

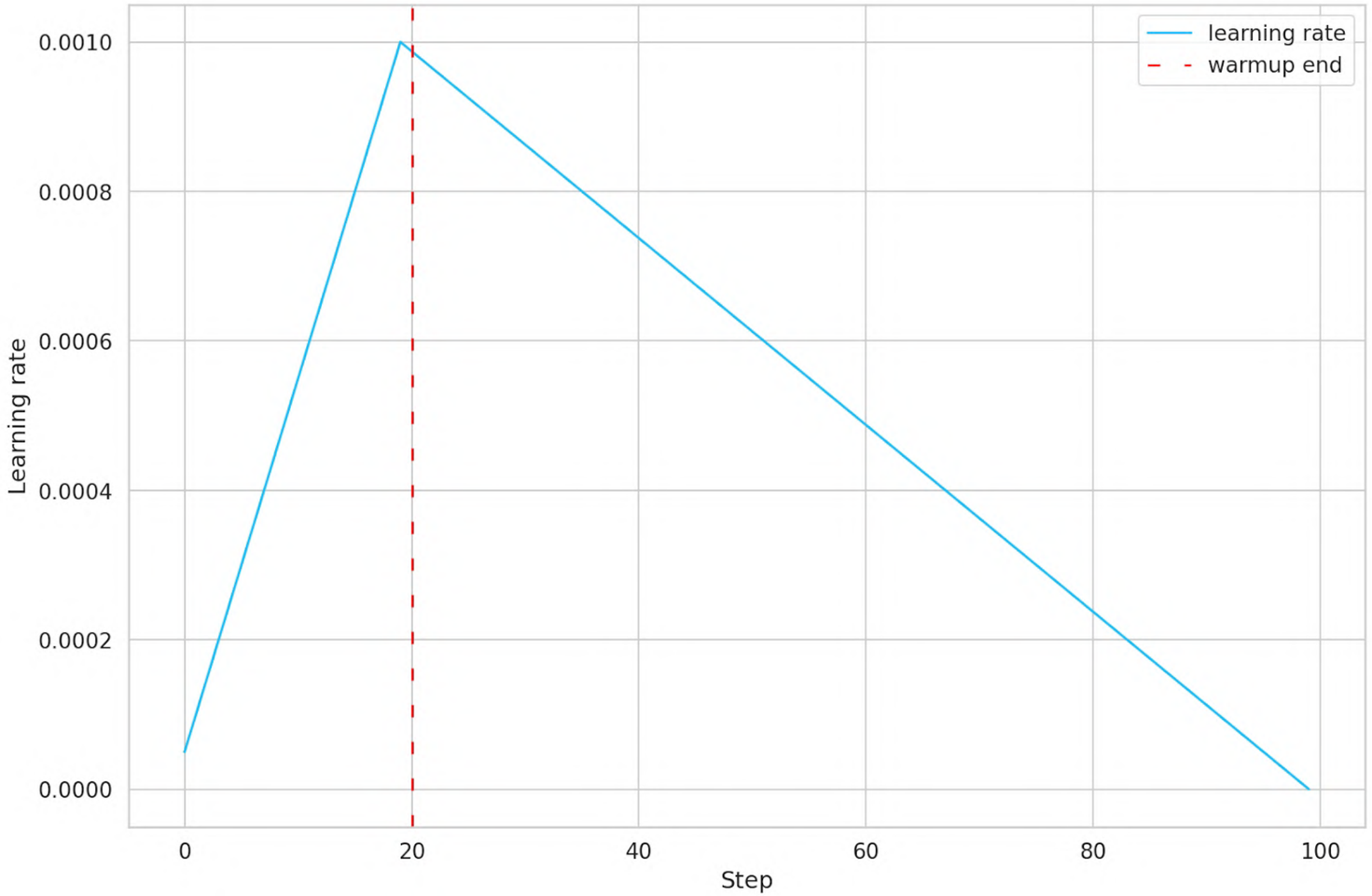


Token Length Distribution

Dynamism of our Model

PyTorch Lightning:

- ModelCheckpoint
- Simulate 100 training steps
- Optimal number of 2 epochs

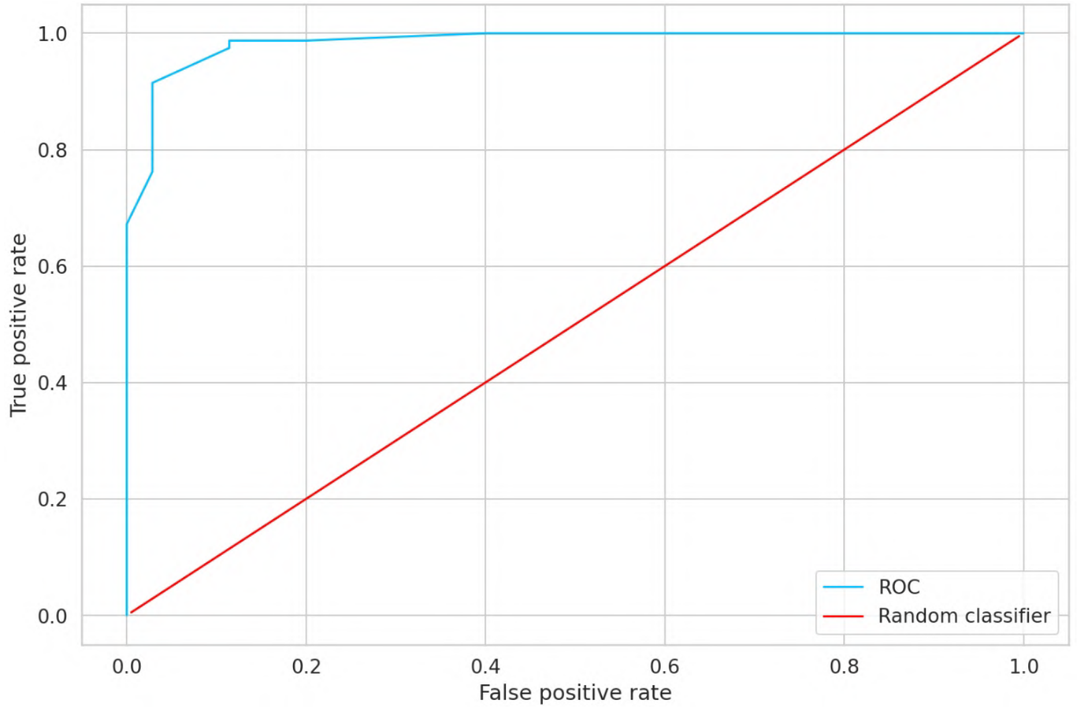


Learning Rate vs. Step per Epoch

Model Evaluation

Key Takeaways:

- 98.4% Accuracy
- Sigmoid, not Softmax Output Layer
- ROC fit depends on class balance



	precision	recall	f1-score	support
disability shaming	1.00	0.84	0.91	19
racial prejudice	0.99	0.99	0.99	97
sexism	1.00	1.00	1.00	747
lgbtq+ phobia	1.00	1.00	1.00	66
micro avg	1.00	0.99	1.00	929
macro avg	1.00	0.96	0.98	929
weighted avg	1.00	0.99	1.00	929
samples avg	0.72	0.71	0.72	929

What's Next for TONE?

Increase Accuracy by 15%
Optimization + Collect More Training Data

Improve Front End Development
New Host + Improve User Experience

Optimize Data Pipeline Infrastructure
Leverage AWS for data streaming + storage

Conduct Usability Testing + Feedback
Collect user interviews, surveys, and focus groups

Implement New Highlight Feature
Highlighting / Detecting Hate Speech Words

Research Contextualization and Labeling
Communicating with experts to improve product

5 Key Takeaways

- Product Must Reflect the Source of the Data
- NLP + ML Model Development, Bias, and Optimization
- Conducting Research + Talking to Experts is Important
- How to Create a Startup + Its Components
- The 4 Cs: Consistent Communication, Contribution, and Collaboration

WE ARE TONE

Our Mission:

To promote empathy among Twitter Users, in order to reduce offensive content that harms the wellness of others.

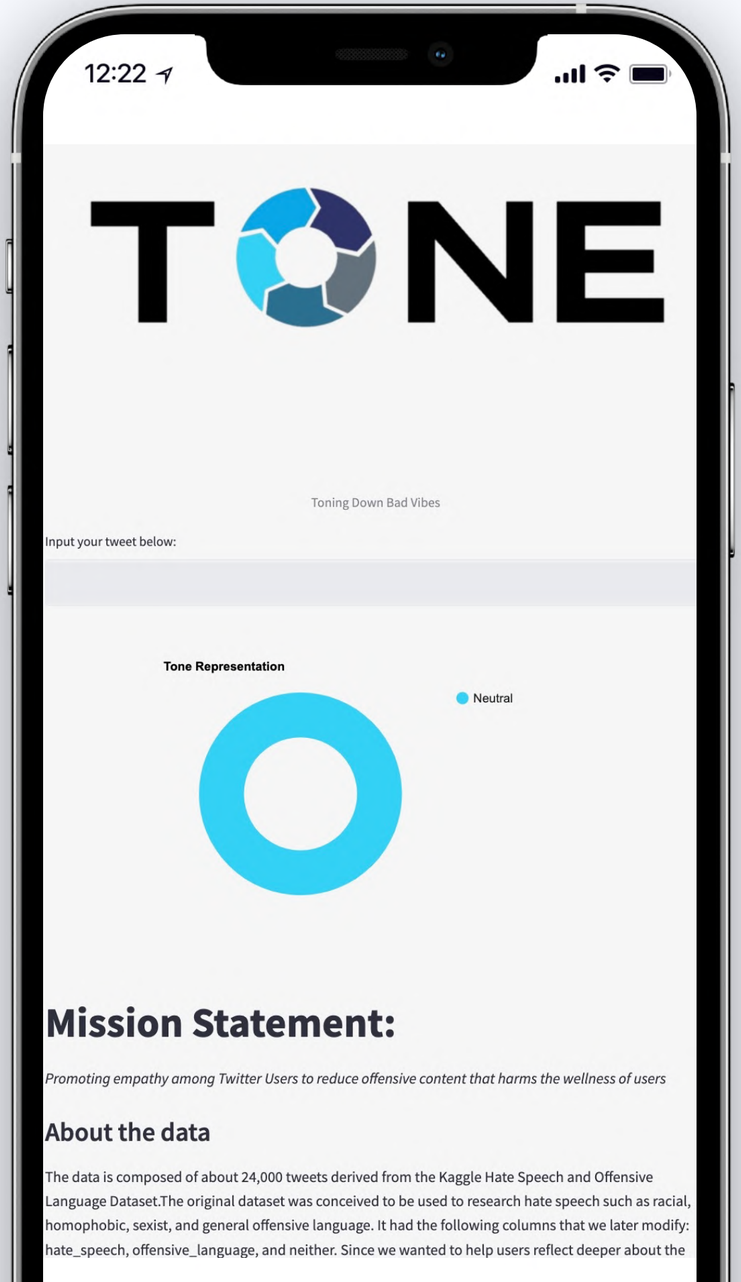
Company Name
Acme Inc

Date
August 2024

Contact
email@acme.com

Thank You!

Any Questions?



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