

Pulse

Enabling Institutions to better manage online presence and public perception in the digital age through Natural Language Processing.



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The world is more connected than ever.

4.7 billion people use Social Media [1].
147 minutes spent daily on Social Media [1].

Pulse uses state-of-the-art NLP techniques to analyze public opinion, and determine strategies to maximize positive sentiment.



Products

Hawkeye

Analyze Twitter data to identify main drivers of positive or negative public opinion.



ProofReader

Predict sentiment on future tweets, and tailor to maximize positive response.



Russo-Ukraine War

- Conflict beginning in 2014, escalating significantly in February 2022 with Russia's full-scale invasion of Ukraine.
- Social media has played a major role in coverage of the war.
- Online landscape is highly nebulous. Analyzing public sentiment and understanding what drives it is key.



@ZelenskyyUa
6.9M Followers



@Ukraine
2.2M Followers



@elonmusk
120M Followers

Product 1: Hawkeye



Objective

Feature 1: Analyze daily sentiment on Twitter regarding Ukraine and Russia.

Feature 2: Investigate causes and key topics on days with large changes in sentiment.



Methodology

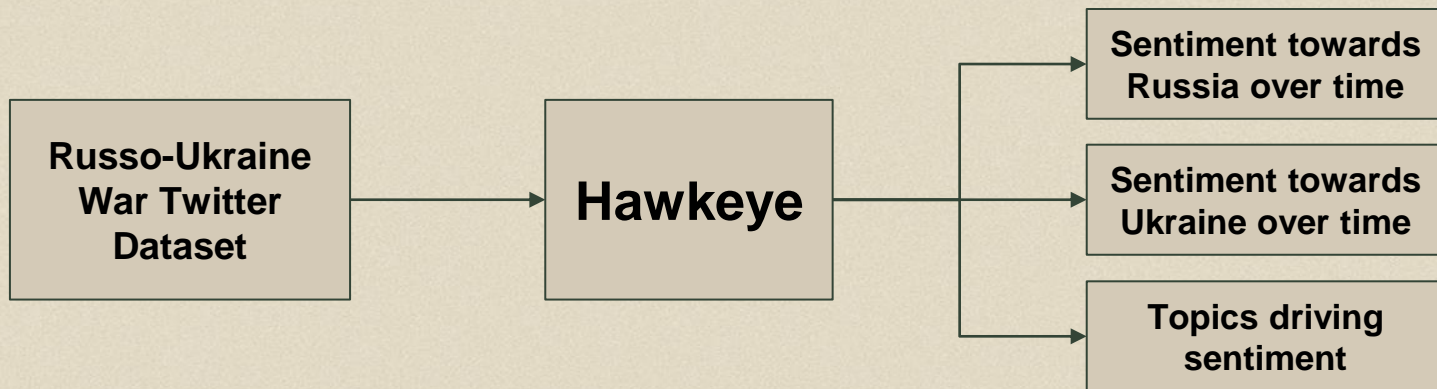
- Use entity-based sentiment analysis model on Twitter data and plot changes in sentiment over time.
- For days with large sentiment changes, perform topic modelling to identify key drivers of sentiment.

Product 1: Hawkeye



Output

- Analyze daily sentiment on Twitter regarding Ukraine and Russia.
- Investigate causes and key topics on days with large changes in sentiment.



Product 1: Hawkeye: Visualizations



Topics Classification

Topics are sorted with importance.



Word Clouds

Visualizing word clouds for each important topic



pyLDAvis

Interactive Topic Modelling
Exploration

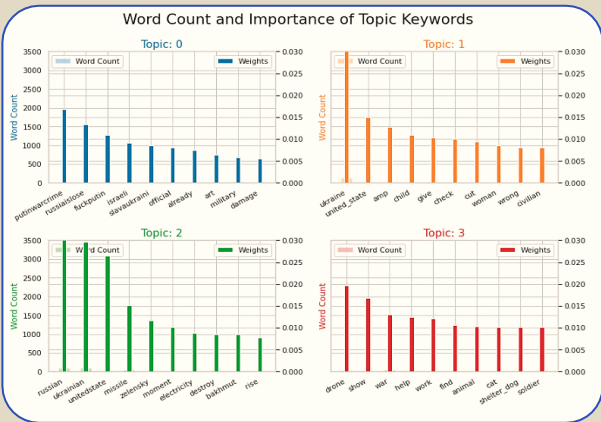
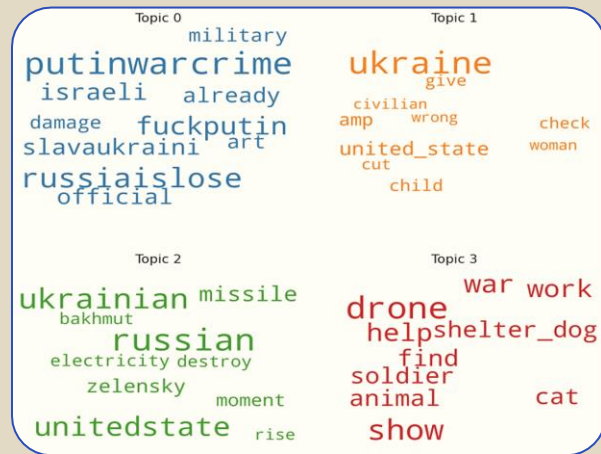
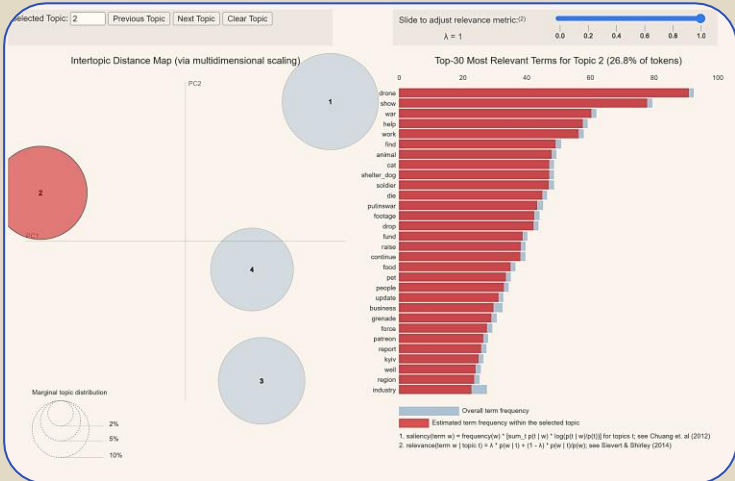


Keywords

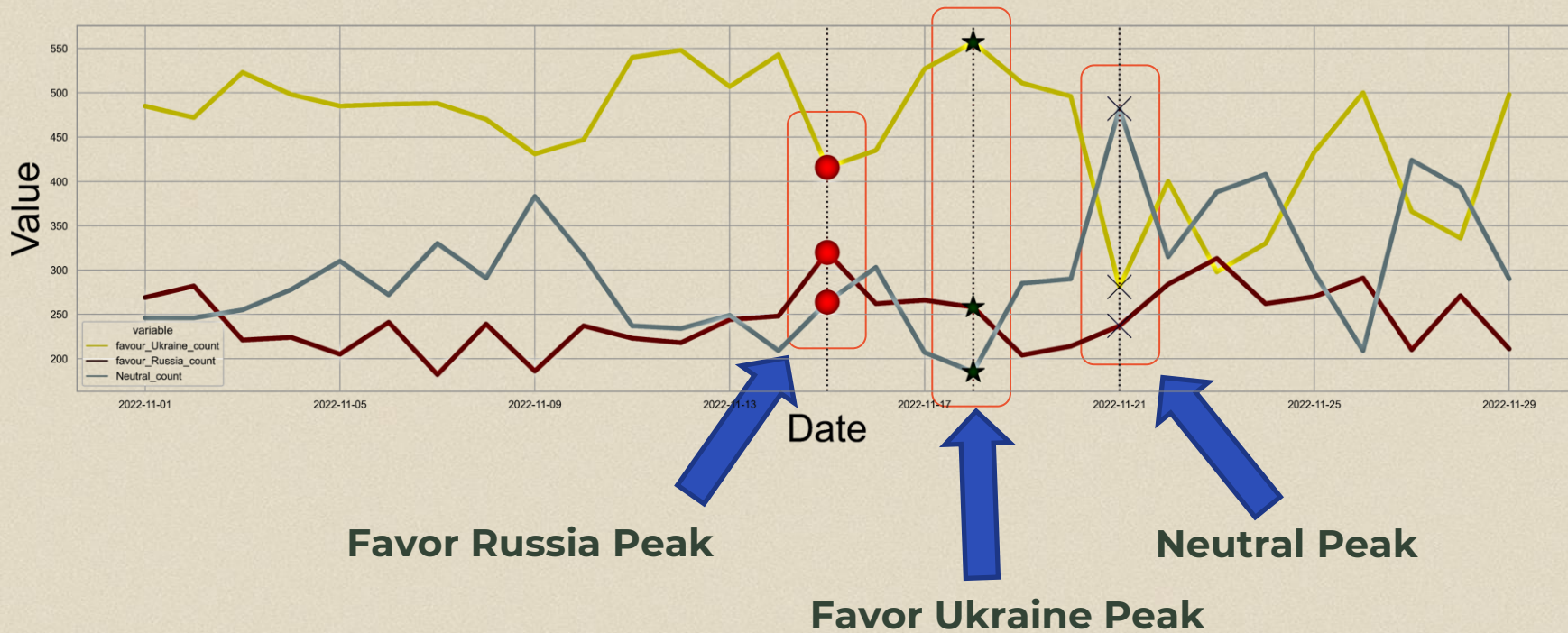
Visualizing the importance of
keywords for each topic

Product 1: Hawkeye: Visualizations

Topic_Num	Topic_Perc_Contrib	Keywords	Representative Text
0	0.0	0.9394 putinwarcrime, russiaslose, fuckputin, israeli, slavaukraini, official, already, art, military,...	[otd, tdih, botd, pianist, pianoplayer, composer, classicalmusic, polishhistory, historyofpoland...
1	1.0	0.9421 ukraine, united_state, amp, child, give, check, cut, woman, wrong, civilian	[toute, journe, pour, permettre, deffectuer, leur, dmarche, vice, consul, sont, prsent, jusqu]
2	2.0	0.9464 russian, ukrainian, unitedstate, missile, zelensky, moment, electricity, destroy, bakhmut, rise	[panini, morant, timeless, moment, auto, case, bonus, card, unitedstate, auction, sportscard, wh...
3	3.0	0.9554 drone, show, war, help, work, find, animal, cat, shelter_dog, soldier	[drone, industry, growth, dispute, main, segment, enterprise, industry, agriculture, constructio...



Product 1, Hawkeye: Demo



Hawkeye: Demo – Russia Favor Peak

Word clouds

2022-11-15, a drop in Ukraine favour counts, and raise in Russia favour counts



What happened?

The Telegraph News World Cup Business Sport Opinion Ukraine Money Life Style Travel Culture Puzzles

Royal - UK news - Politics - World - Health Defence Science Education Environment Investigations - Global Health Ser

Ukraine-Russia war

Zelensky insists missile that hit Poland was Russian

17 November 2

KEY MOMENTS
Chosen by us to get you up to speed at a glance

- 5:17pm Zelensky says Ukrainian missile did not cause blast in Poland
- 12:30pm Nato says Poland blast likely caused by Ukrainian missile, but Moscow bears responsibility
- 11:27am Missile was likely Ukrainian, says Polish president
- 7:58am Zelensky tells G20 leaders rocket was 'true statement brought by Russia for the G20 summit'



Foreign leaders being told about the missile issue on Poland at the G20 London Summit

EUROPE POLITICS

Ukraine refuses to accept it was behind Poland missile strike, despite NATO forgiveness

PUBLISHED THU, NOV 17 2022-2:45 AM EST · UPDATED THU, NOV 17 2022-6:07 PM EST



Holly Ellyatt @hollyellyatt

SHARE f t i n

The New York Times

Russia-Ukraine War > Photos Maps Memories of Collective Trauma A 15,000-Mile Lifeline

Missiles for Poland Raise Questions on NATO Stance in Ukraine War

NATO is determined to help Ukraine battle Russia, but wants no direct part of the war. A new promise of air defense weapons for Poland may make that more complicated.

Hawkeye: Demo – Neutral Peak

Word cloud

2022-11-21, a drop in Ukraine favour counts, and raise in Neutral favour counts



What happened?



FIFA WORLD CUP
Qatar 2022



Product 2: ProofReader



Objective

Product 1/2, ProofReader for Officials/Influencers: Proofread drafted tweets to predict public reception. Different version for officials vs influencers.

Product 3, ProofReader Hints: Create word cloud correlated with positive sentiment results to aid in composing tweets.



Methodology

- Calculate sentiment response scores based on ratio of positive to negative replies.
- Link sentiment of replies to contents of the tweet via a regression model.

Product 2: ProofReader



Output

- Assist in drafting tweets, and proofreading before they are posted in order to maximize positive sentiment in its reception.



ProofReader: Visualizations



Tweets Analysis

Visualize best and worst tweets based on responses



Word Cloud

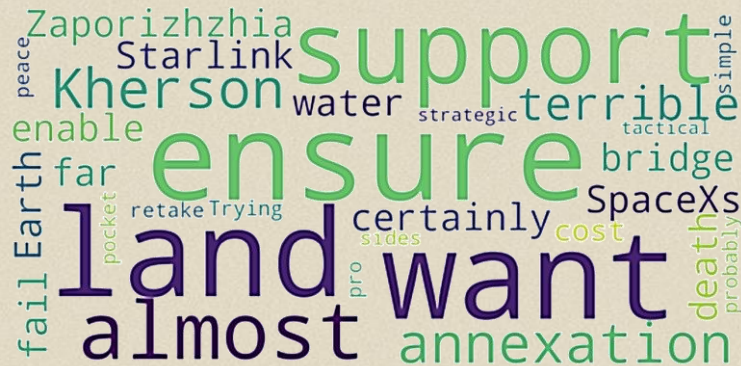
Provide wordclouds as a reference dictionary to use



Tweet Score Prediction

Predict favoriness score of a written tweet draft

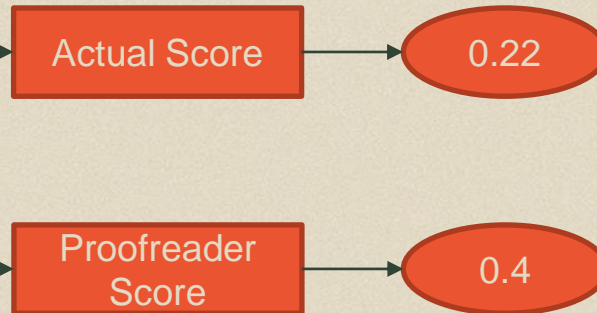
Negative Word Cloud



@elonmusk

Joined June 2009

136 Following 119.9M Followers



Recommendations: Ukraine



Hawkeye: Analysis indicates waning sentiment towards Ukraine regarding missile in Poland. Ukraine to mitigate negative press accordingly.

ProofReader: Model shows negative response when discussing Thanksgiving, America, and HIMARS. Many replies critical of US spending on Ukraine support. Recommend caution when discussing these topics on social media.



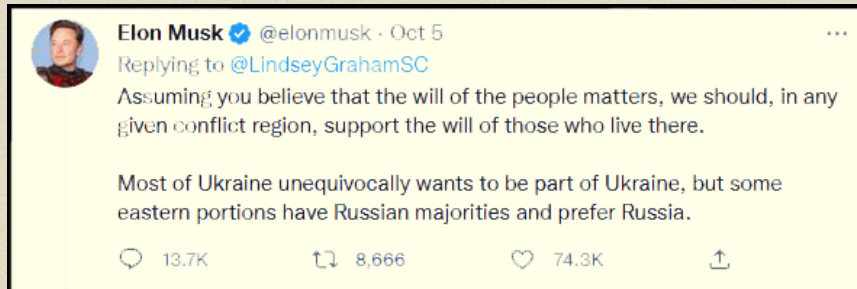
Recommendations: Elon Musk



ProofReader: Utilize to identify topics to avoid discussing on Social Media.

Models show negative response when attempting Neutrality or showing Russian sympathy

Recommend not discussing war from these angles.



Thank You

We are happy to answer any questions you may have.

