

# Sentiment Analysis

## on how Ukraine is perceived by the international scene during the Russian invasion of Ukraine

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By Group 5

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# Outline



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Q & A



# Problem Definition

# Effects of War



Ukrainian women and children have been forced to leave their country



The number of fatalities is rising rapidly, and there is a substantial risk of nuclear escalation from the Russian government as the conflict persists



Europe is currently experiencing its biggest refugee crisis since World War II due to the ongoing war





## Project Objectives

# Objectives



To analyze public sentiment on Twitter regarding the Russian invasion of Ukraine, starting from February 2022.



To assess the key factors that influence Ukraine's international reputation



To provide suggestions for communication strategies that the Ukrainian government and international NGOs can use to improve Ukraine's positive image.



**Mykhailo Fedorov** @Fedor... · 10h  
@elonmusk, while you try to colonize Mars — Russia try to occupy Ukraine! While your rockets successfully land from space — Russian rockets attack Ukrainian civil people! We ask you to provide Ukraine with Starlink stations and to address sane Russians to stand.

1,152 7,796 33.5K



**Elon Musk** @elonmusk · 18m  
Starlink service is now active in Ukraine. More terminals en route.

2,989 18.2K 64.3K



# Methodology

# Sentiment Analysis

An overview of the achieved accuracy by our ML algorithms

Model	Multinomial NAIVE BAYES	Random Forest	Linear Support Vector Machine	Logistic Regression
Training Accuracy	93.5%	95.7%	96.4%	96.6%
Test Accuracy	92.5%	92.9%	95.7%	95.8%

Positive



Brendan May @bmay · Mar 14, 2022

A woman has stormed into the main evening news bulletin in Russia to tell viewers they're being lied to. Sheer bravery.

#StandWithUkraine 🇺🇦



0:05 10.2M views

From Ярослав Конвой ✅

73

978

3,884



Negative



Luis @2536luis · 4h  
Footage from February 2023

A senseless death trigger by Russia's brutal invasion on false pretenses

The scars left behind, will takes decades to forget

Like what happened during World War II

Never forget

#UkraineRussiaWar #StandWithUkraine #UkraineWar #SlavaUkraini  
#Ukraine



0:20 195 views

Validation

Natural Language API

4



Google Cloud Platform

Alignment = 85 %

# Russian Propaganda

Positive



Make Peace Now; alternative ne... 🐾 @AlternatNe... · Oct 11, 2022 ...  
This is how the impressive Zelensky speeches are produced. Lots of green screens and nitech editing.

Hollywood is helping out. All that technology to make things appear real;



1,816

14.2K

33.6K

Negative



David Vance 🐾  
@DVATW

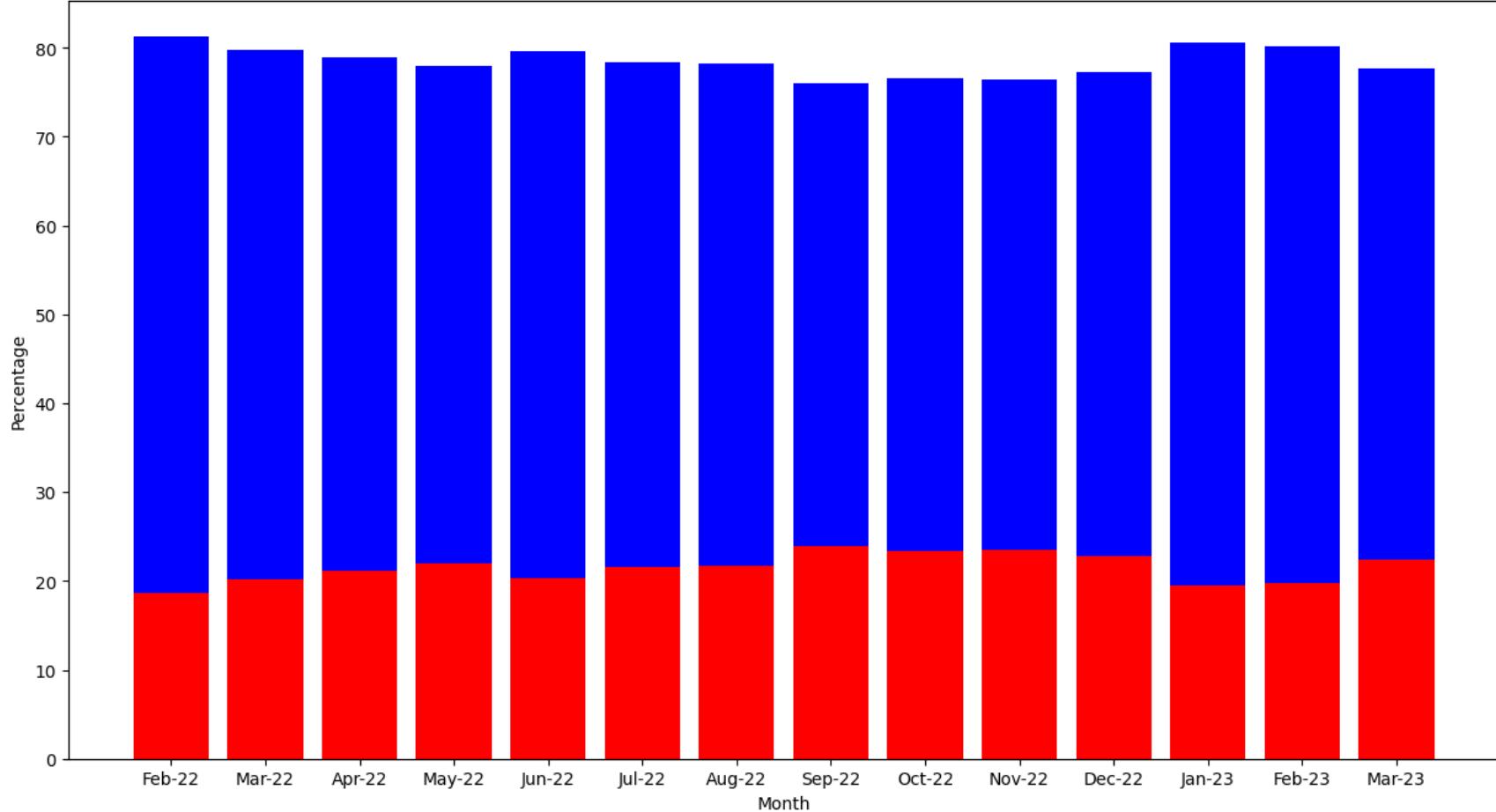
Zelensky says it is fine to **nuke** Moscow but Russia must not respond in kind.



# International Public Sentiment

Negative Sentiment      Positive Sentiment

Bar Chart of sentiment distribution for each month

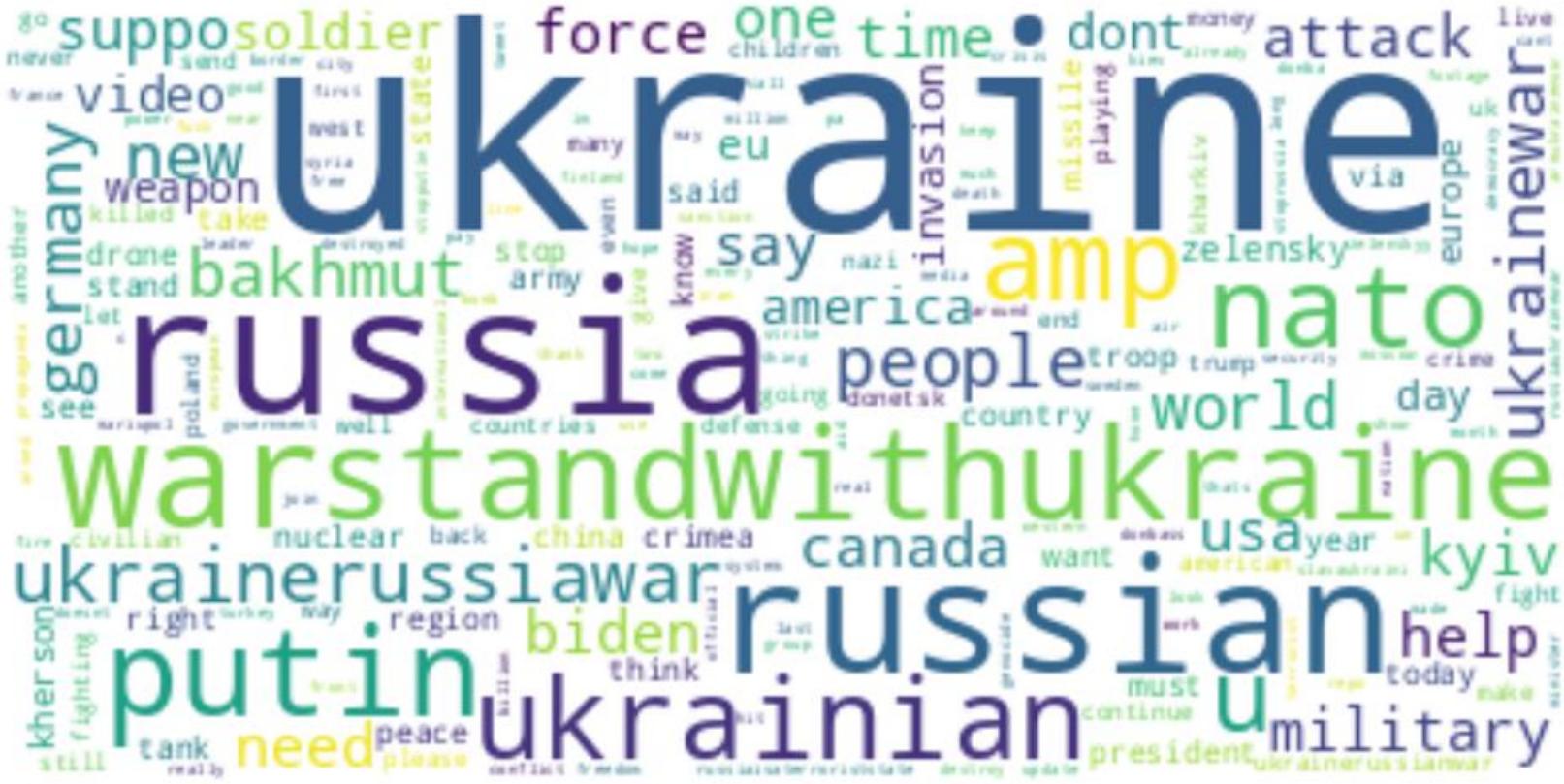


Monthly Progression of sentiment since the start of war



# International Public Sentiment

Negative



Word Cloud from Pro-Ukrainian Tweets (or Tweets with Negative Sentiment)



# International Public Sentiment

Positive



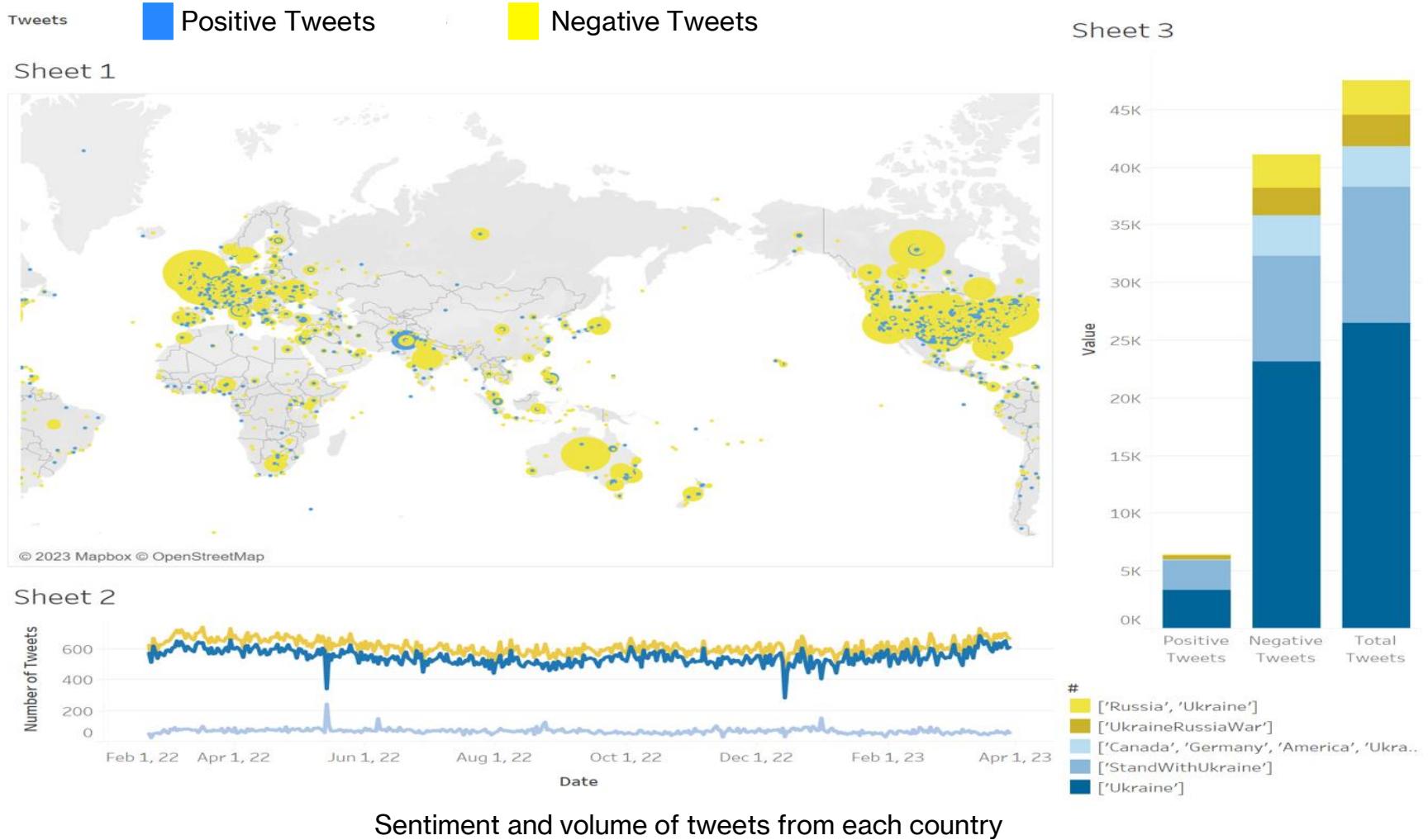
Word Cloud from Pro-Russian Tweets (or Tweets with Positive Sentiment)



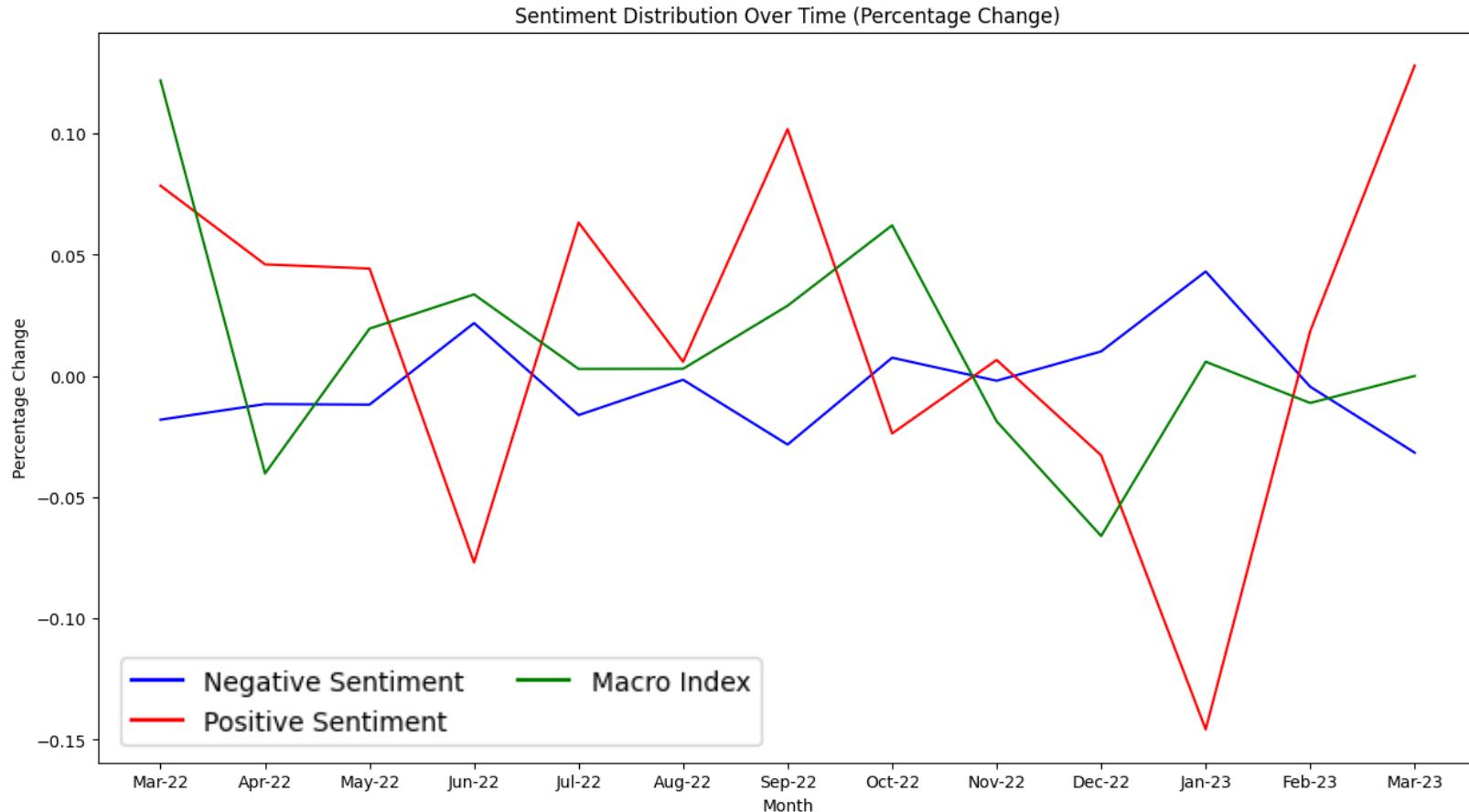


# Results

# Country Level Activity & Sentiment



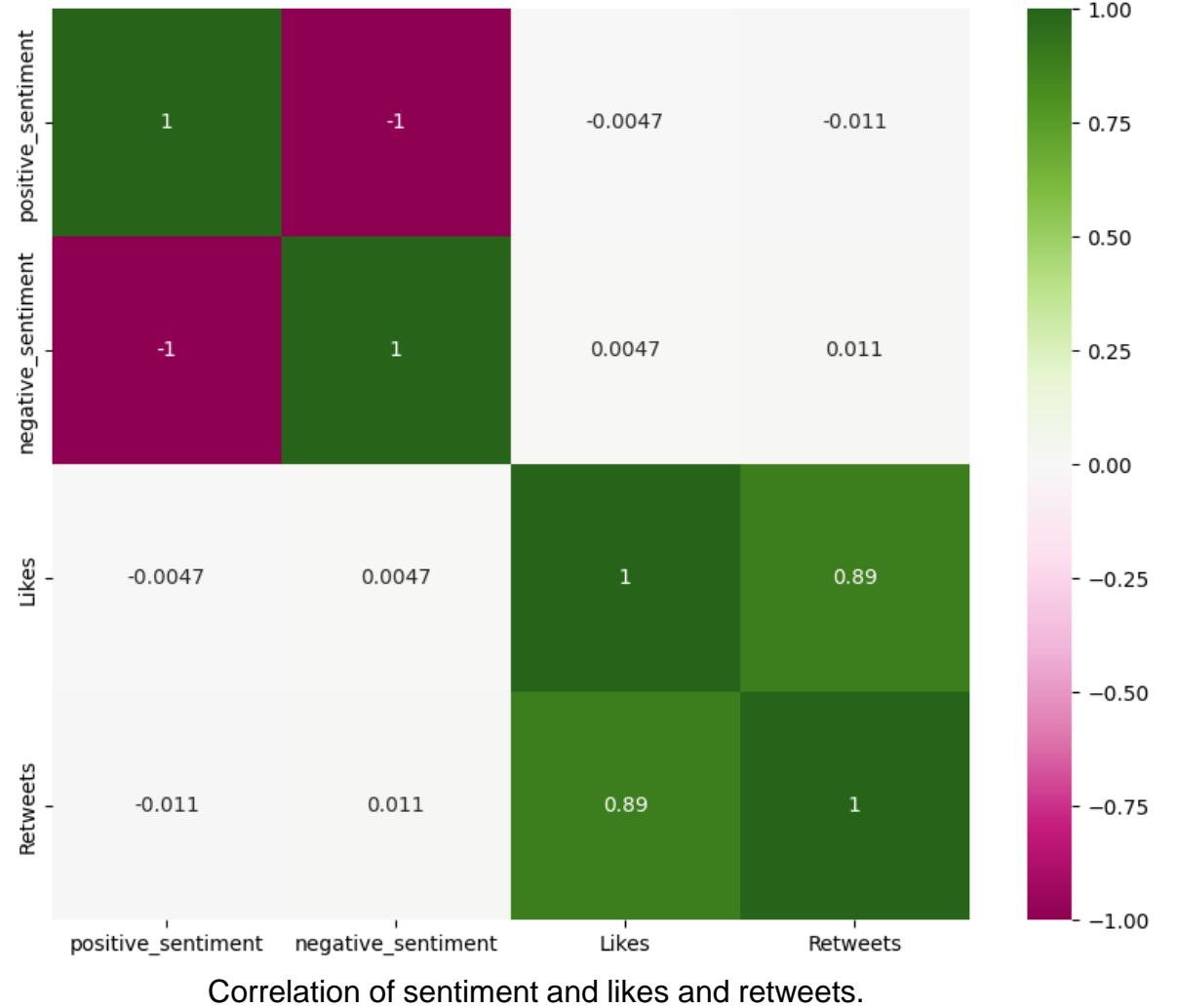
# International Public Sentiment & Europe Energy Index



EU Energy Consumer Price Index and tweet sentiments monthly percentage change since the start of war



# Sentiment Vs. Traction



# Twitter Sentiment During Major War Events

<p>Ukraine reclaims more territory, reports capturing many POWs</p> <p>Ukraine/Russia/ Standwithukraine/ Kharkiv/Kherson military/</p>	 <p>03 07</p>	<p>Russia says it's withdrawing from the key city of Kherson, but Ukraine is sceptical</p> <p>Ukraine/Russia/ Kherson/Ukrainewar/ Kiliningrad/ Unitedsatets/south</p>	 <p>07 03</p>	<p>The video of Ukrainian Soldier getting executed</p> <p>Ukraine/ Russia/ Ukrainerussiawar/ Russiaisaterroriststate, Donbas/ Bakhmut, War/dead/</p>
<p>Ukraine fetes Russian pullback from strategic Snake Island outpost</p> <p>Ukraine/ukrainewar Standwithukraine/ Nato/Island/ Snake/military</p>	 <p>30 06</p>	<p>Ukraine strikes another Russian air base</p> <p>Ukraine/Russia/ drone/Kursk/ Bakhmut/Zelensky/ Ukraininarmy</p>	 <p>06 12</p>	<p>Russian military under scrutiny after 89 soldiers were killed in single Ukraine artillery attack</p> <p>Ukraine/Russian/ Germany/Canada/ Kyiv/drone/tanks/ Soldiers/glory</p>
			 <p>04 01</p>	

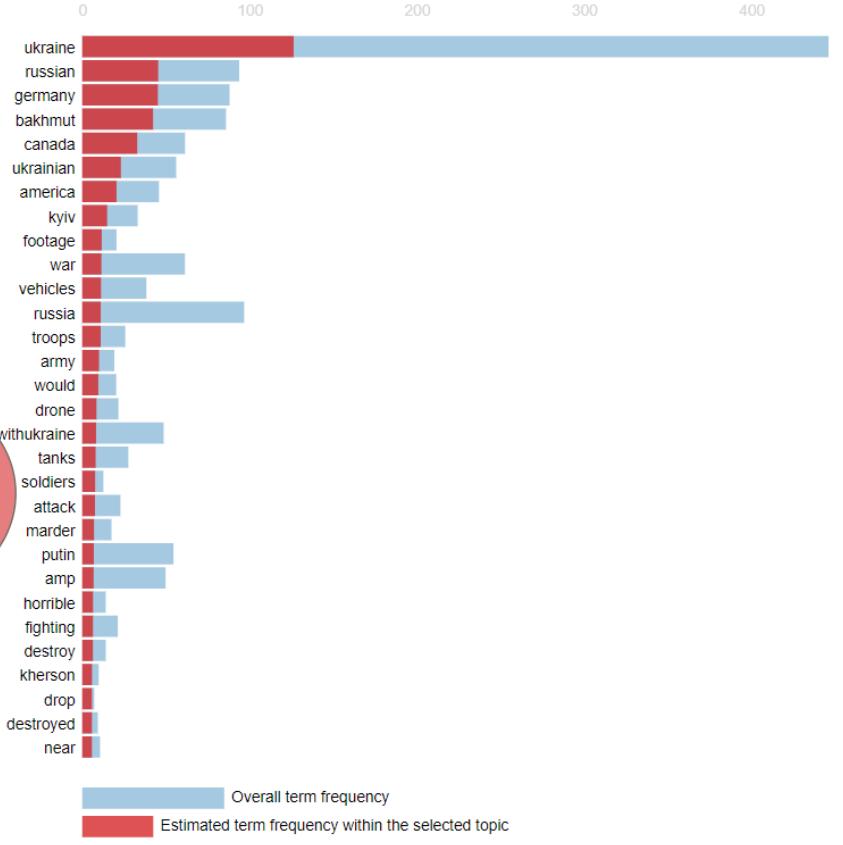
Chronological order of some of important events during the war and the associated key words

# Twitter Sentiment During Major War Events

Intertopic Distance Map (via multidimensional scaling)



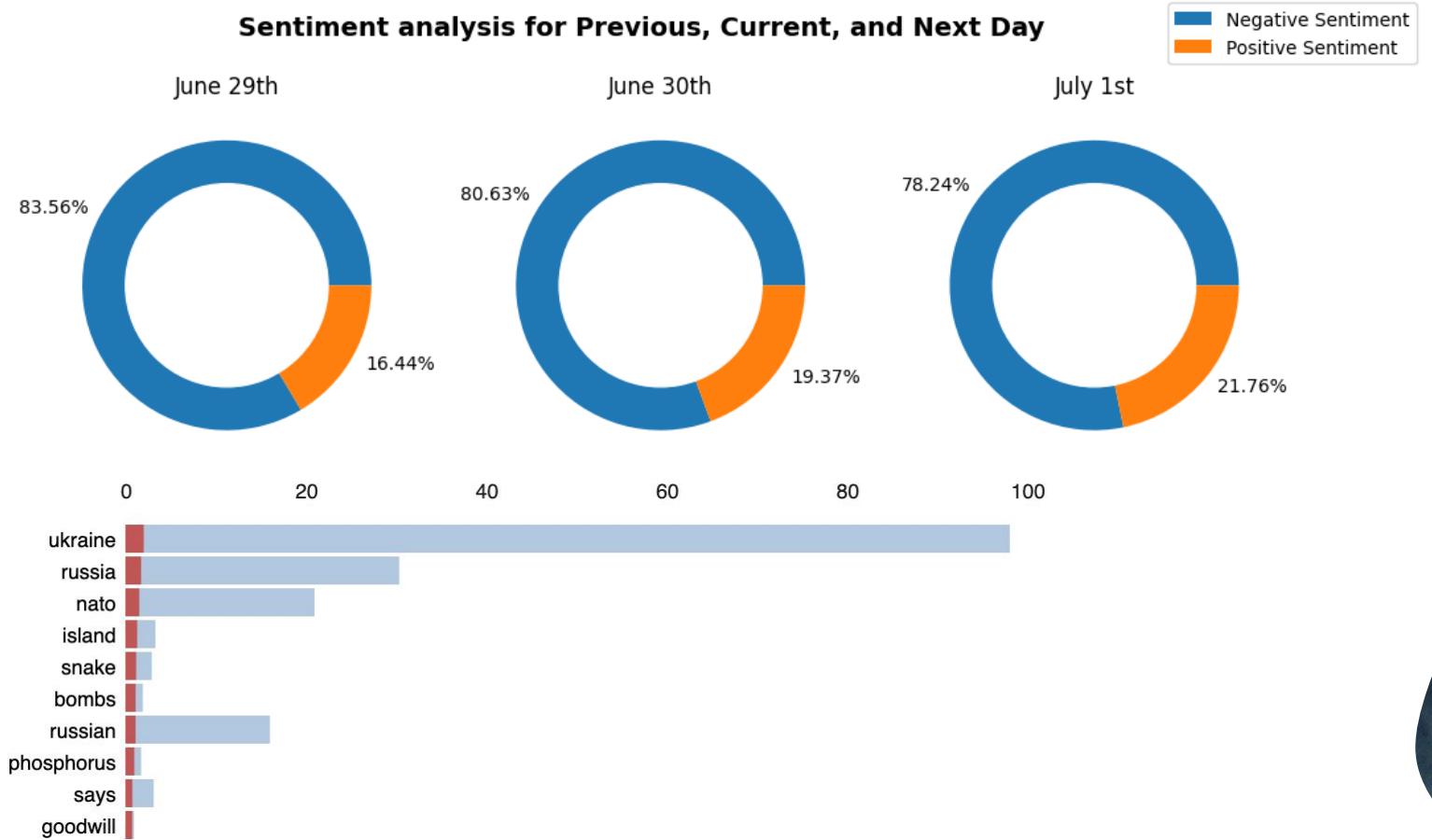
Top-30 Most Relevant Terms for Topic 1 (20.2% of tokens)



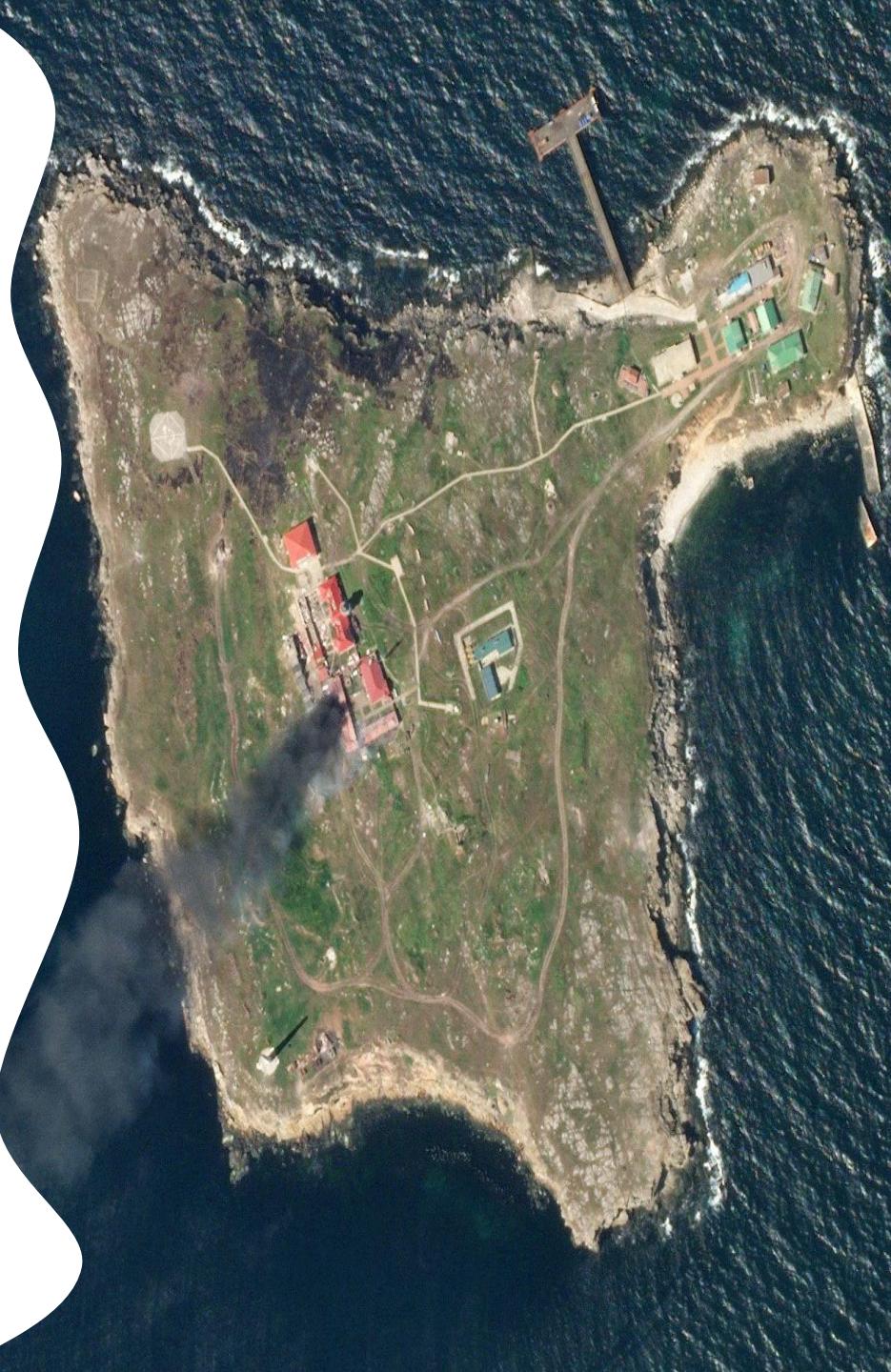
Intertopic distance map of events



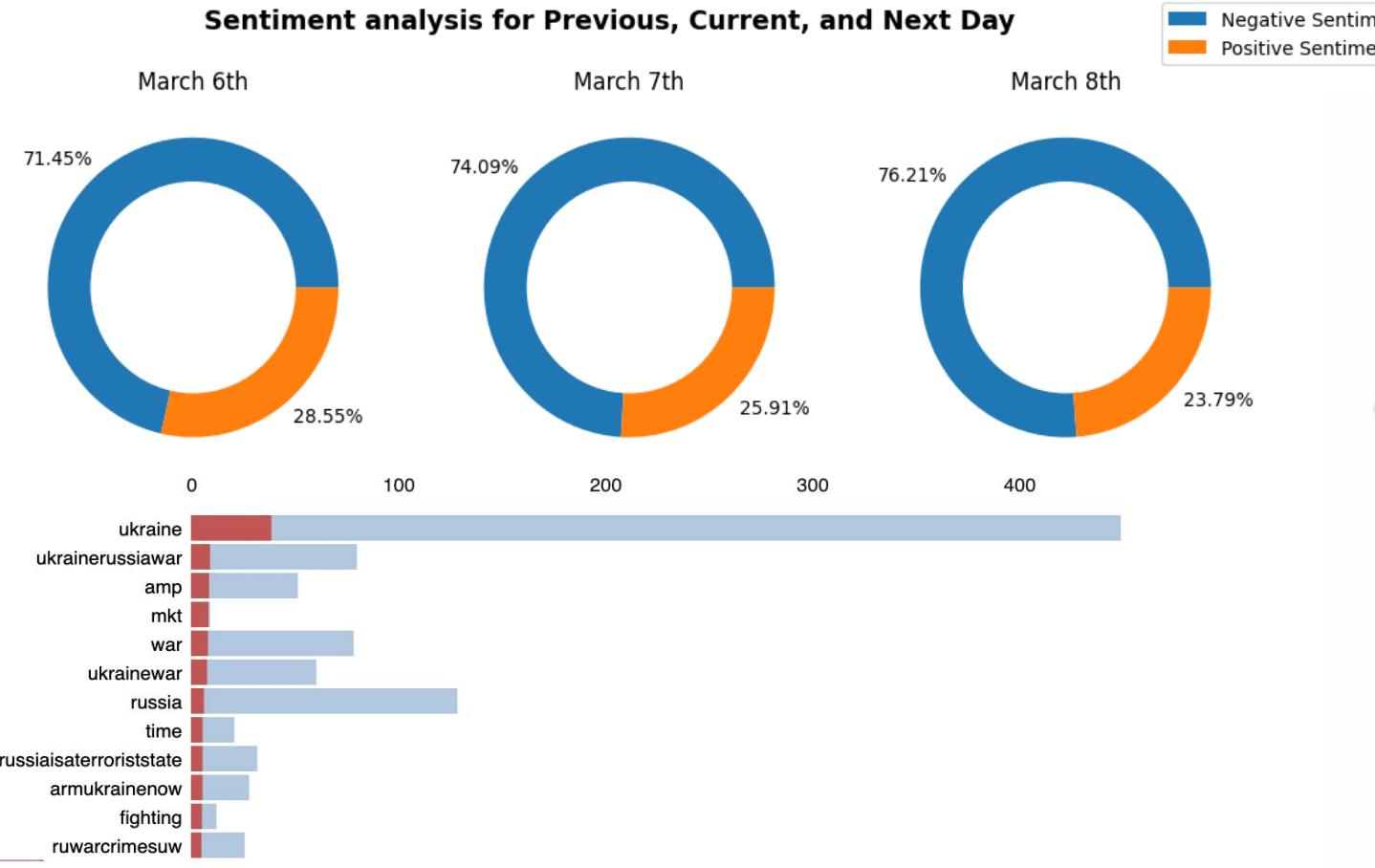
# Twitter Sentiment During Major War Events



Ukraine fetes Russian pullback from strategic Snake Island outpost



# Twitter Sentiment During Major War Events



# Strategy Proposal



# Suggestions



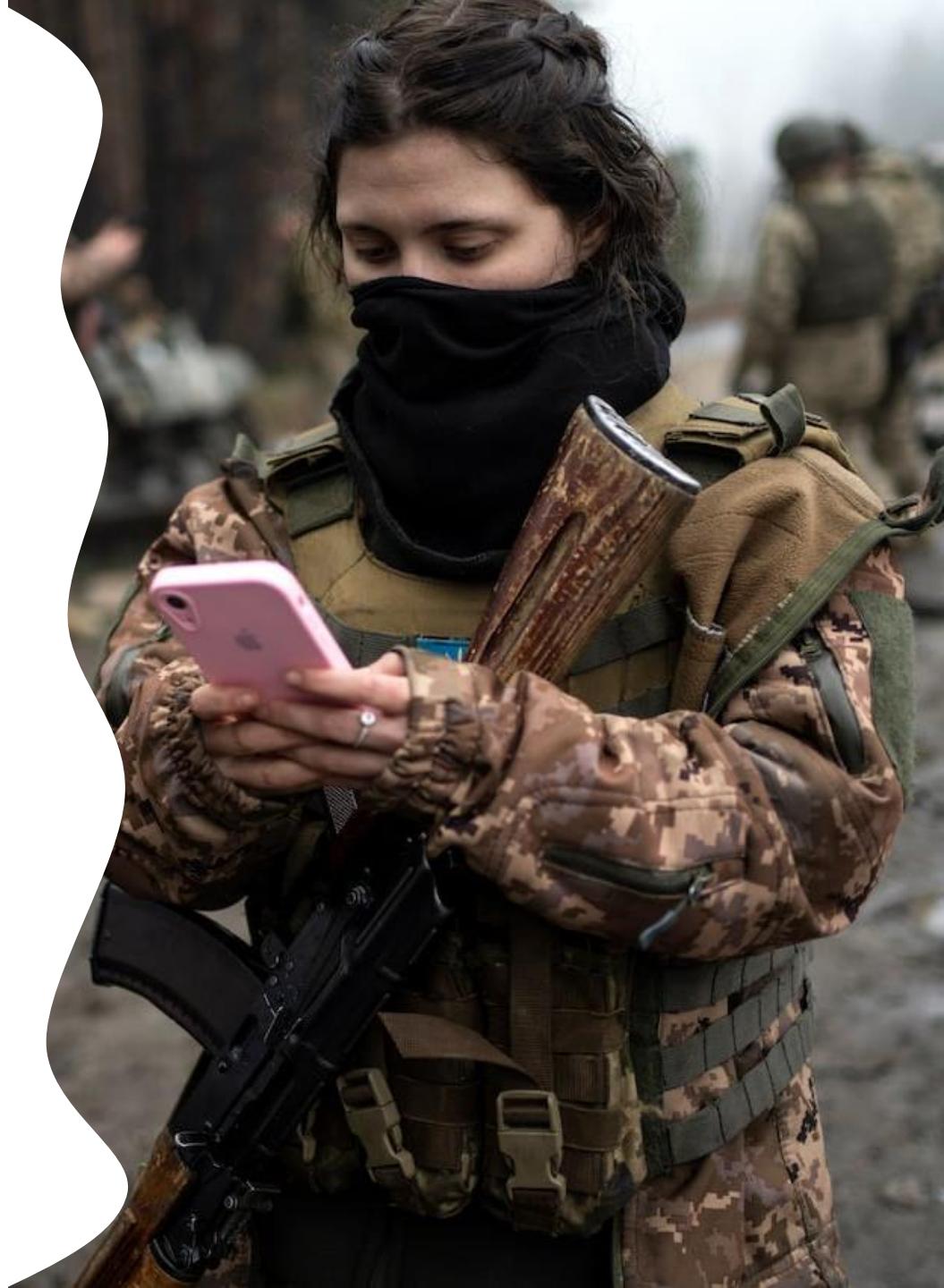
Continuous assessment of sentiment in tweets.



Random sampling of tweets from each sentiment group to understand the level of support for Ukraine and opposition to it.



Establishing constant monitoring of tweet sentiments for any sudden shift in one sentiment direction, enables the detection of the event causing this shift.





# Conclusion

# Conclusion



There is a substantial amount of negative sentiment towards Russia's aggression against Ukraine

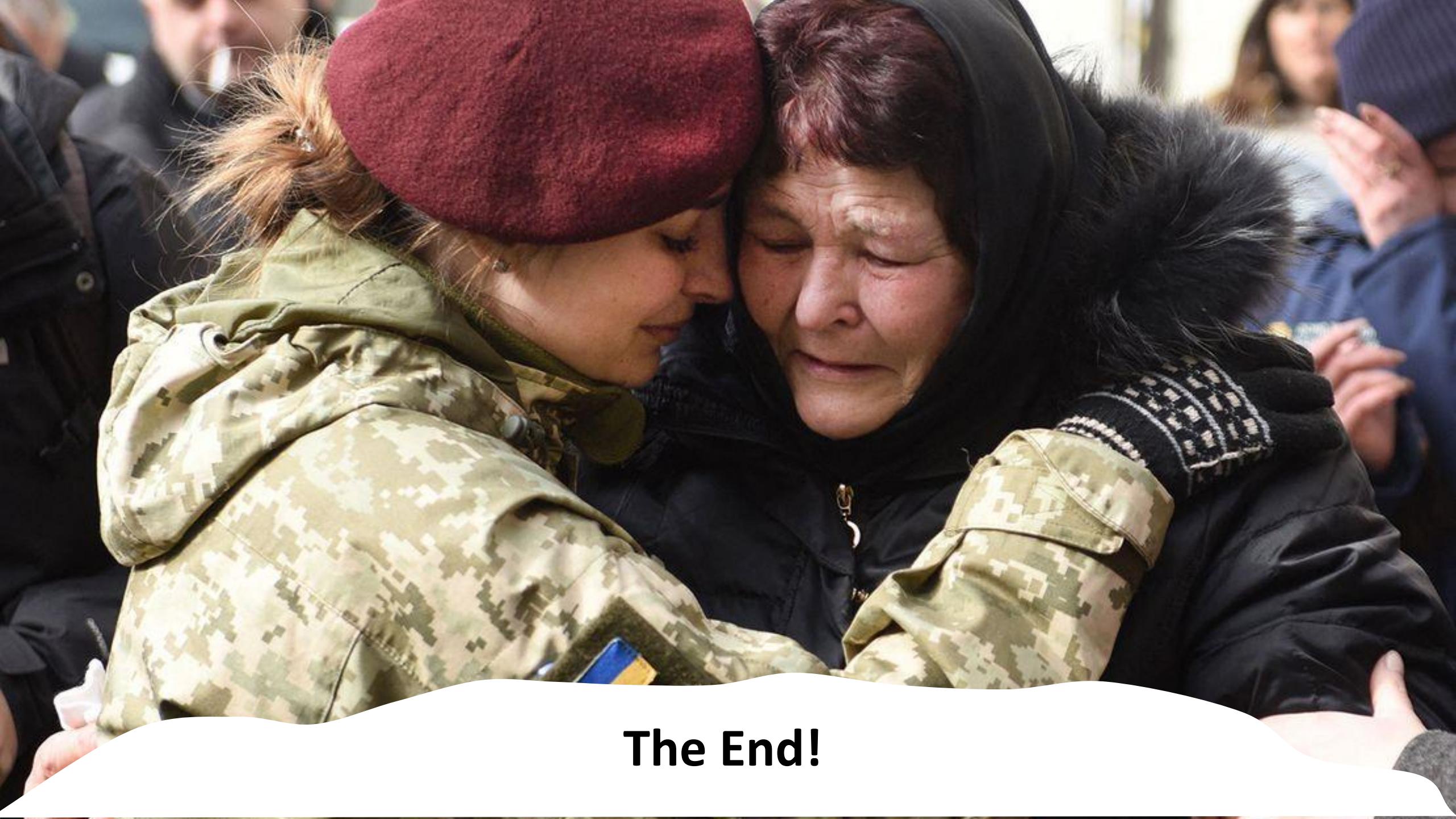


Strategic messaging surrounding topics such as Ukraine's commitment to sovereignty, stability, and democracy could help improve Ukraine's international reputation and increase its prominence on the global stage



By leveraging machine learning algorithms and contextualized datasets, we can gain valuable insights into public sentiment and develop effective communication strategies that promote a more accurate understanding of complex geopolitical issues.





The End!



## References:

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