



# Iranian and Russian Propaganda Tweet Analysis

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# Introduction and Motivation

- Social media has eased spread of **fake news**
- **Twitter** is a popular platform for news sharing
- Many organizations use Twitter to **manipulate public opinion**
- Russian-sponsored tweets influenced 2016 U.S presidential election
- Identify characteristics of these accounts
- Important to understand propaganda **topics of focus**



# Problem statement

- Identifying content characterization of both Iranian and Russian-sponsored propaganda tweets and extracting the main topics of discussion.
- We compare and contrast the propaganda approaches and characterization of the two states.





# Summary of Contributions

By running k-means clustering on word embeddings obtained from hashtags and text of tweets, we extracted topics which Iranian and Russian states are propagating.

This is a step towards diminishing the harmful impacts of propaganda.

It also helps with having a better understanding of international politics.



# Related Work

- FireEye
  - Detected Iranian Twitter campaigns that promoted inauthentic news
  - Reason Twitter released propaganda sets
  - Does not share techniques
- Sentiment Analysis
  - Mapping the new's diffusion patterns
  - 81.7% Accuracy
- N-gram analysis
  - SVM classifier with Term Frequency-Inverted Document Frequency model
  - 90% Accuracy

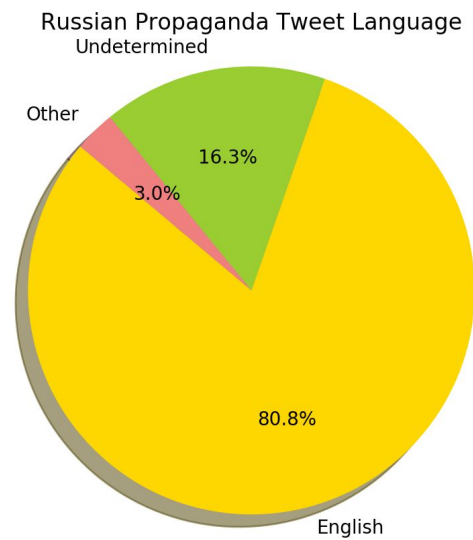
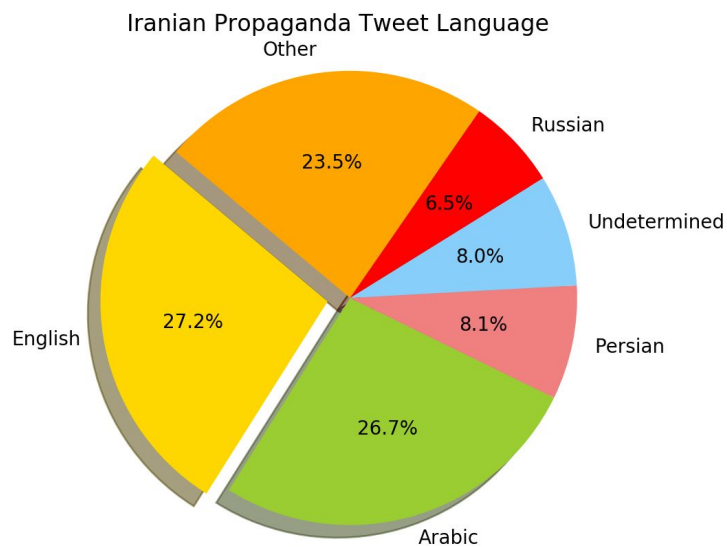


# Dataset

- Iran
  - User account dataset: 1670 x 10
  - Tweet information dataset: 1,969,410 x 31
- Russia
  - User account dataset: 416 x 10
  - Tweet information dataset: 920,761 x 31

We processed english language tweets only

Most accounts created in 2015 in both datasets



Language Distribution for Tweets









# Data Preprocessing

- Dropped all columns except for tweet\_text and hashtags
- Converted all texts to lowercase
- Removed urls
- Removed mentions
- Removed all non-alphanumeric characters
- Removed “rt” (appears at the start of retweets)
- Tokenized and segmented text



# Data Preprocessing

- Used Tfidf CountVectorizer to create embeddings for hashtags.
- Used word2vec to create embeddings for both hashtags and tweet text.
- Performed PCA dimensionality reduction on word2vec embeddings.



# Approach and Algorithm Implementation

- Unsupervised learning: **k-means** clustering on word embeddings

**Input:**  $k$  (the number of clusters),  
 $D$  (a set of lift ratios)

**Output:** a set of  $k$  clusters

**Method:**

Arbitrarily choose  $k$  objects from  $D$  as the initial cluster centers;

**Repeat:**

1. (re)assign each object to the cluster to which the object is the most similar, based on the mean value of the objects in the cluster;
2. Update the cluster means, i.e., calculate the mean value of the objects for each cluster

**Until** no change;



# Approach and Algorithm Implementation

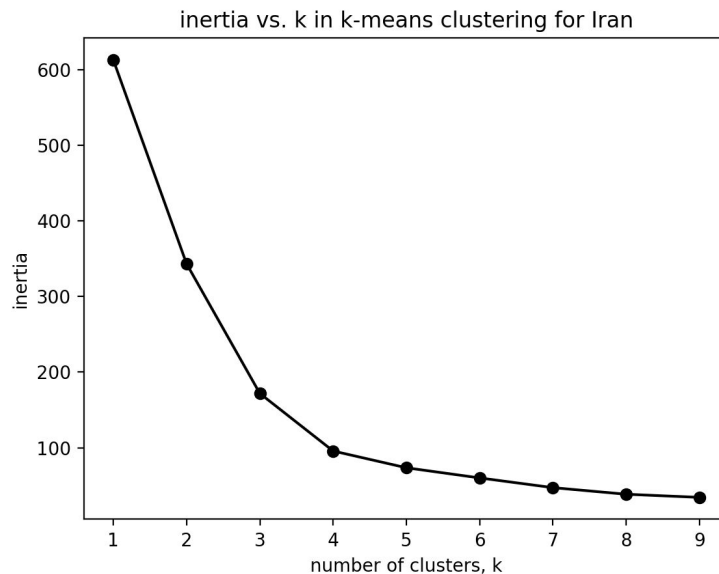
- Elbow method for obtaining optimum k
  - Graphing inertia vs number of clusters
  - $W_k$  (Inertia) gives a measure of compactness of a cluster
  - Inertia is sum of squared distances of samples to their closest cluster center.

$$D_k = \sum_{x_i \in C_k} \sum_{x_j \in C_k} \|x_i - x_j\|^2 = 2n_k \sum_{x_i \in C_k} \|x_i - \mu_k\|^2.$$

$$W_k = \sum_{k=1} \frac{1}{2n_k} D_k.$$

# Experiments

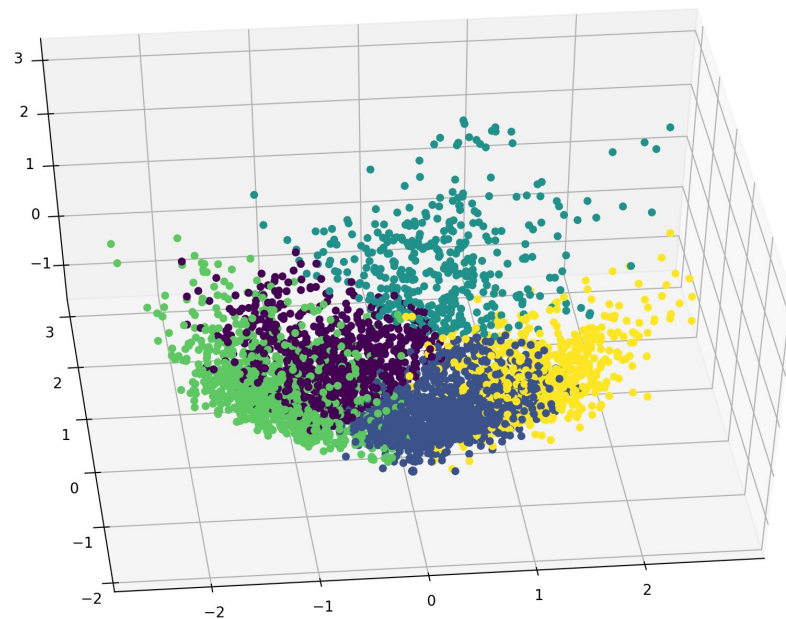
- Performed elbow method for finding the optimum number of clusters
- Experimented with different number of clusters in addition to optimum k
- Performed k-means clustering on hashtags
- Performed k-means clustering on tweet text



# Results

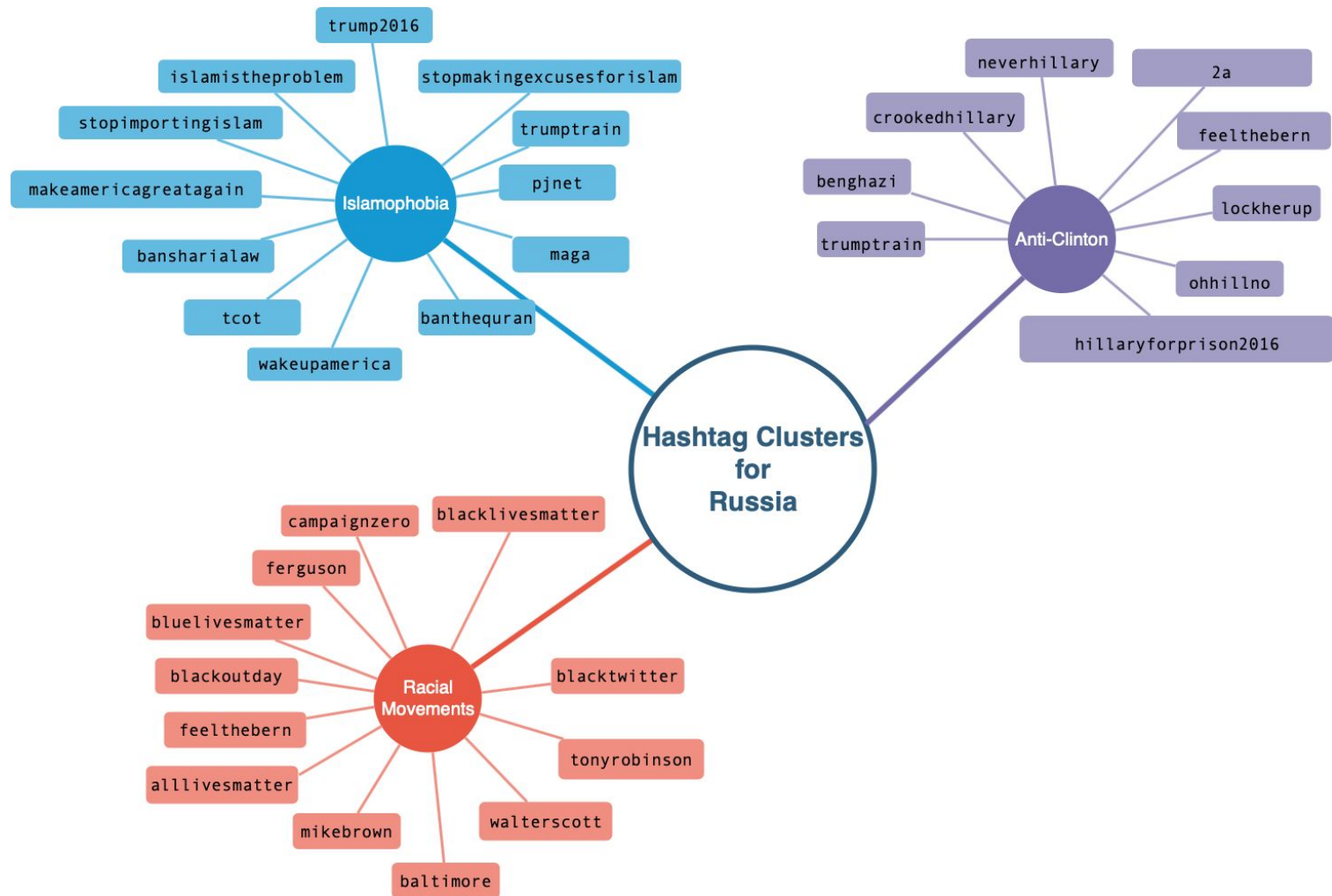
- Obtained 4 as the optimum number of clusters for Iran's hashtags
- Obtained 2 as the optimum number of clusters for Russia's hashtags
- Extracted 8 main topics in Iranian hashtags and tweet text
- Extracted 3 main topics in Russian hashtags and tweet text

k-means clustering using 3 principal components for Iran  
k=5



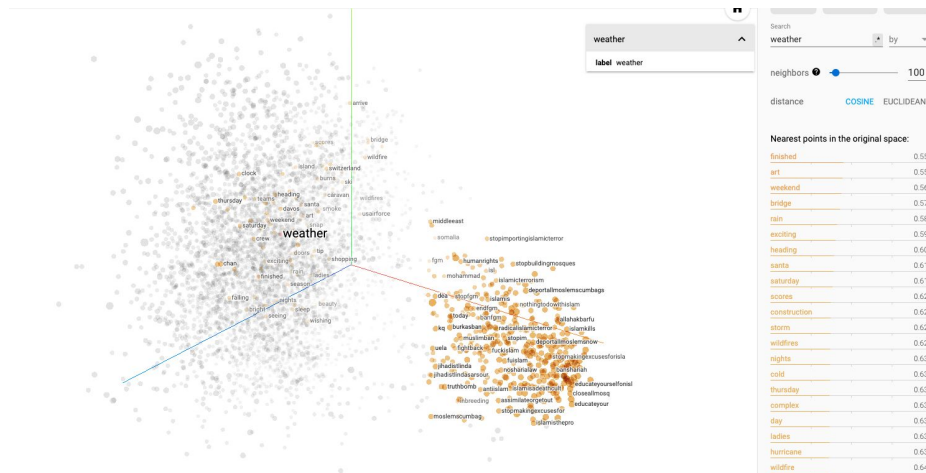






# Results

- Russian dataset contains two distinct clusters
  - Normal, non propaganda related words
  - Islamophobic phrases



weather

label weather

Search

weather

.

by

neighbors



100

distance

COSINE

EUCLIDEAN

Nearest points in the original space:

finished	0.551
art	0.555
weekend	0.563
bridge	0.570
rain	0.589
exciting	0.598
heading	0.607
santa	0.612
saturday	0.617
scores	0.626
construction	0.629
storm	0.629
wildfires	0.629
nights	0.631
cold	0.631
thursday	0.634
complex	0.635
day	0.635
ladies	0.636
hurricane	0.638
wildfire	0.644
afternoon	0.645

weather

shopping

mideeast

somalia

stopimportingislamicterror

fgm

mohammad

dea

kq

uel

ji

truthbomb

inbreeding

moslemscumbag

assimilateorgetout

stopmakingexcusesfor

islamisthepro

islamicterrorism

nothingtodowithislam

allahakbarfu

islamkills

stopim

deportallmoslemsnow

stopmakingexcusesforisla

banshariah

educateyourselfonisl

closeallmosq

educateyour



# Discussion

- Iranian propaganda
  - Focuses on wider issues
  - Masks itself with other content
  - Points of focus: Middle Eastern conflicts, Internal U.S issues, E.U issues
- Russian Propaganda
  - Narrowly focused
  - Mostly focused on English speaking world
  - Points of focus: U.S internal affairs
  - Islamophobia
  - Pro-Trump
  - Anti-Clinton
  - Black lives matter



# Conclusion

- Successfully found patterns in Russia dataset
  - Islamophobic
  - Right wing
- Extension
  - Use found patterns in known propaganda set
  - Classify new tweets as propaganda