Russia Lago: Safeguarding Voters from State Sponsored Content

Clara Na, Siddharth Nanda, Dhyey Parikh, Dale Wilson

Project Themes

- Leidos: Detecting Sponsored Content with Machine Learning
  - Main Theme: Safety
    - Hotbed Issues: Predatory Marketing, Fake News
  - Consumers have protections (CFPB, BBB, etc)
  - Fake news resources are becoming available
  - State sponsored content on social media remains elusive
- Information is the enemy of propaganda
  - New Question: How do we collect and present information to a wider audience to help safeguard them from state sponsored content

Purpose/Problem Statement

- Comprehensively analyze state sponsored tweets and their features in order to visualize those features, and build Machine Learning driven classifiers to sort between authentic tweets from state sponsored
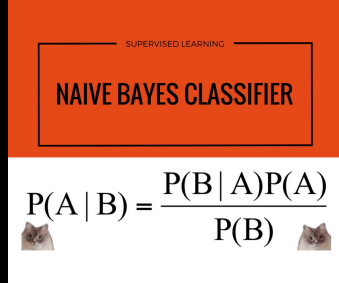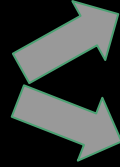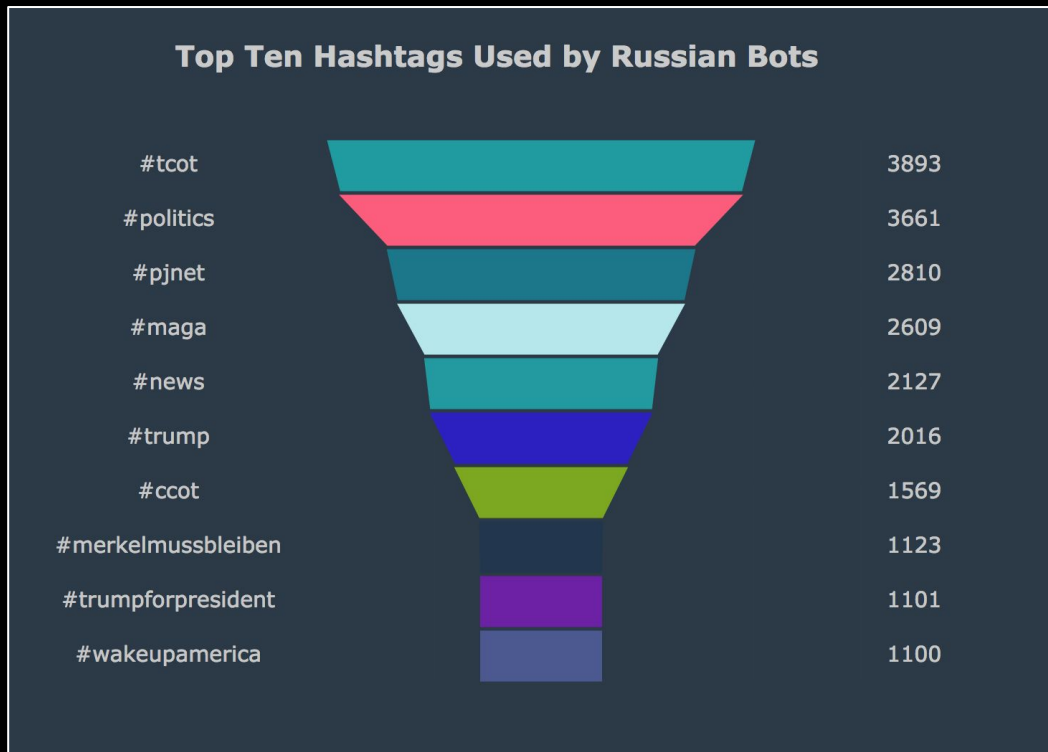
High Level Overview

Sentiment Analysis

- Scored words from a little under a quarter of a million tweets for use in sentiment analysis and classifier construction
- Utilized the SentimentIntensityAnalyser() from nltk.sentiment.vader tailored to a social media lexicon
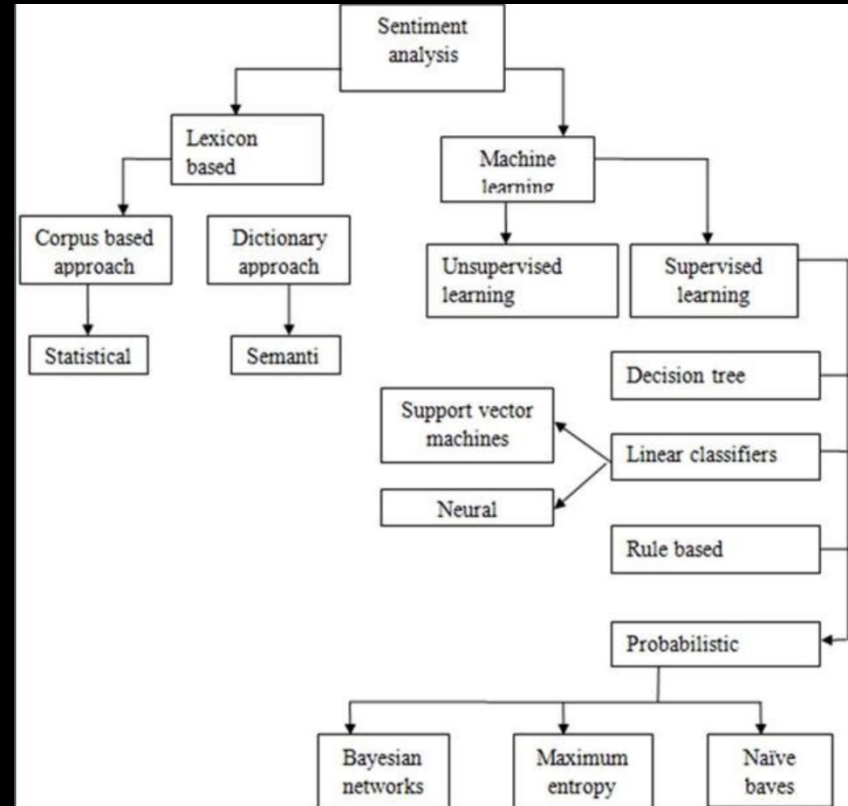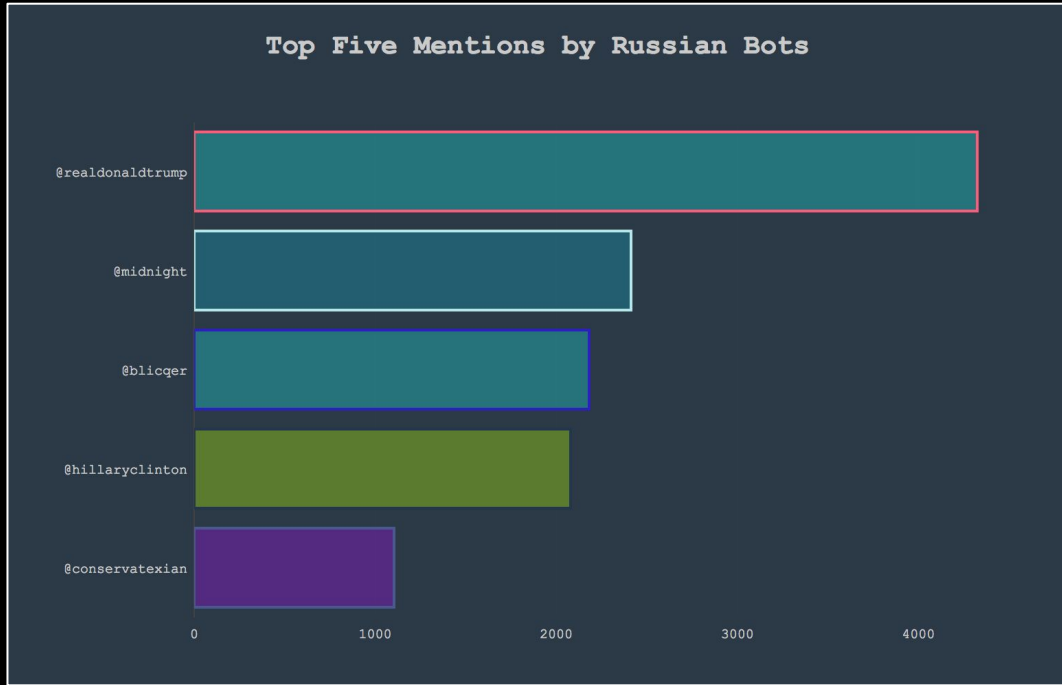
Plotly Visualizations

Top Ten Hashtags

- Funnel Representation of top ten hashtags
- Utilized NLTK and RegEx to parse through data to locate hashtags
- Visualization generated through Plotly

Top Ten Hashtags Used by Russian Bots

| Hashtag	Count
#tcot	3893
#politics	3661
#pjnet	2810
#maga	2609
#news	2127
#trump	2016
#ccot	1569
#merkelmussbleiben	1123
#trumpforpresident	1101
#wakeupamerica	1100

Top Five Mentions

- Bar Chart Representation of top five mentions
- Utilized NLTK and RegEx to parse through data to locate mentions or '@'
- Visualization generated through Plotly

Sentiment Analysis

- Level percentages of polarizing, positive/negative content
- Links contribute to neutral, drive velocity of tweets to feed
- Consistent high level of polarization over time
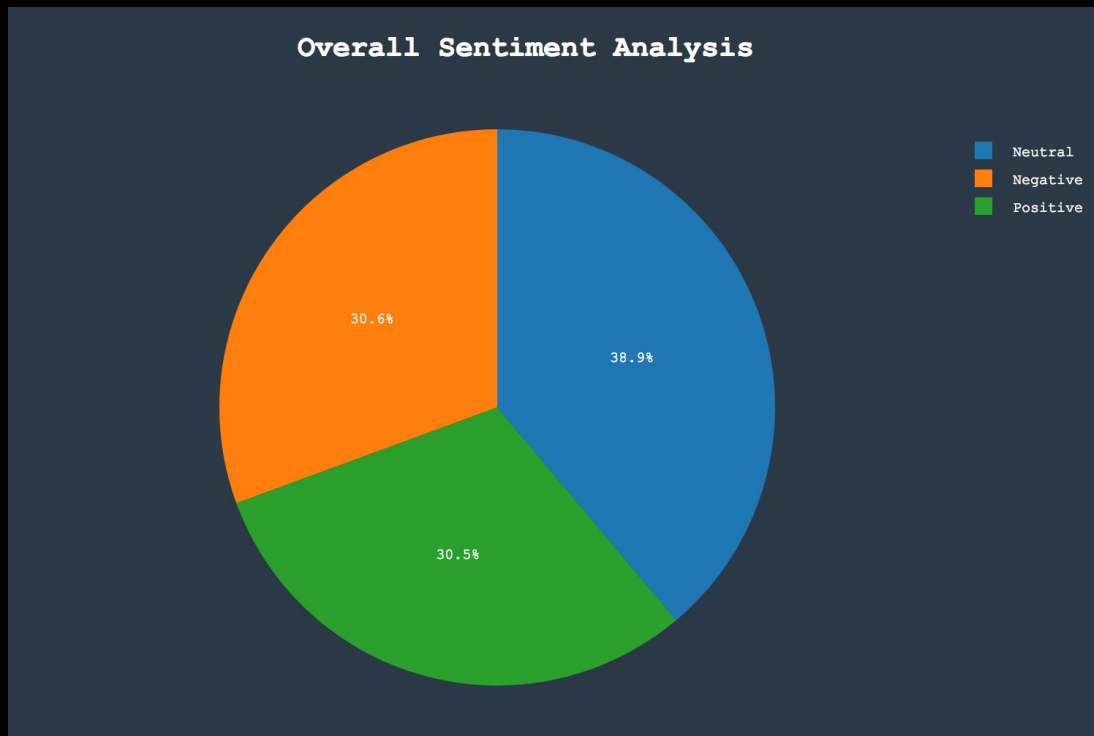
Classifier

- We used a Naive Bayesian to help determine whether a given tweet was sponsored by the Russian government
  - Bayes classifiers are useful for text analysis
  - Helps identify patterns in natural language
- We attempted three different Naive Bayesian models
  - Positive Naive Bayes Bag of Words model
    - Focused on frequency of events generated by multinomial...probability that the event occurs
  - Bernoulli NB model
    - Focused on Binary variables instead of frequencies
  - Bigram NB model
    - Separate language into bigrams (find most informative features)

Obstacles and Tradeoffs

- On-demand access to Twitter API
  - Compared pre-collected data instead
    - Ideal: Bot tweets vs human tweets
    - Reality: Bot tweets vs human, verified politicians' tweets
- Classifier Quirks
  - Specific formatting and cleaning needed that is incompatible with vis functions
  - Ideal: Clear data cleaning ➜ Build Classifier ➜ Test Models
  - Reality: Multiple rounds of data cleaning ➜ Partial classifier builds ➜ Test models

Breakdown of Responsibilities

Clara	Siddharth	Dhyey	Dale
Project Development	Project Management/Operational Synergy	Data Munging	Naive Bayes Machine Learning Algorithm
Operational Research	Data Munging	Style/Feature Analytics Characteristics	Probability Theory
Naive Bayes Machine Learning Algorithm	Sentiment Analysis	Plotly Visualizations	
	Data Visualization	Dash Web Applet	