Reddit: Analysis of Suspect Accounts

STAT 418 Project

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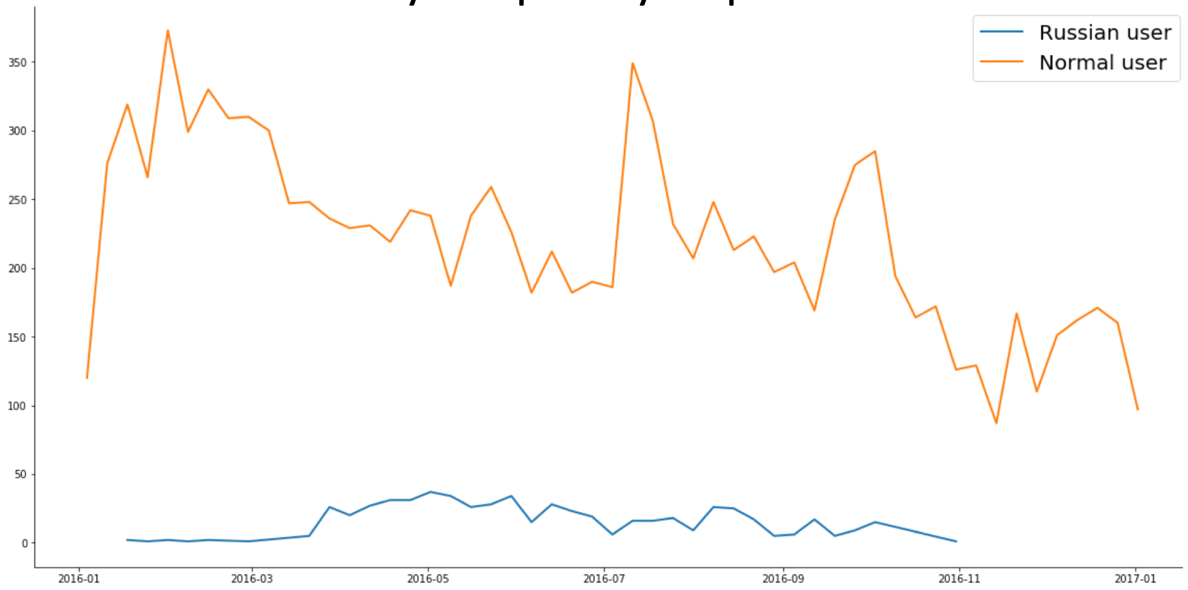
Background and Dataset

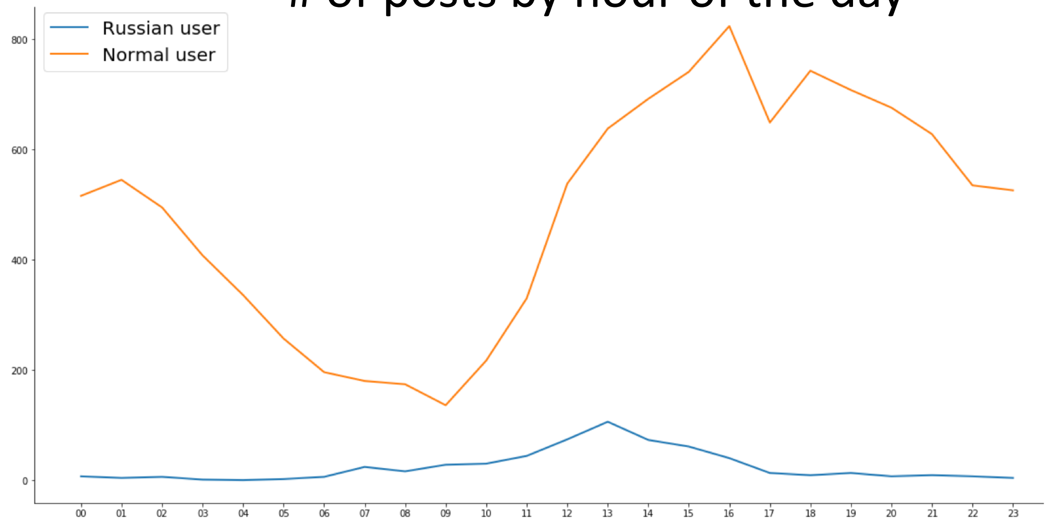
- Reddit’s 2017 transparency report: 944 accounts suspected to have originated from IRA
    - IRA employed fake accounts to influence the 2016 United States presidential elections
- Subreddit: Bad_Cop_No_Donut
    - Currently has 203k members
    - “Law enforcement abuse stories regarding: abuse of power, corruption, and other misfortunes in developing police states. ”
- Date range: January 1, 2016 – December 31, 2016
    - 12,272 posts: 11,688 from normal accounts; 584 from Russian accounts
- Submissions
    - id: ID of the submission
    - author
    - created_utc : time the submission was created, Unix Time
    - is_self: whether or not the submission is a selfpost
    - selftext: the submission’s selftext
    - title: the title of the submission
    - url: the URL the submission links to, or the permalink if a self post

Exploratory Data Analysis

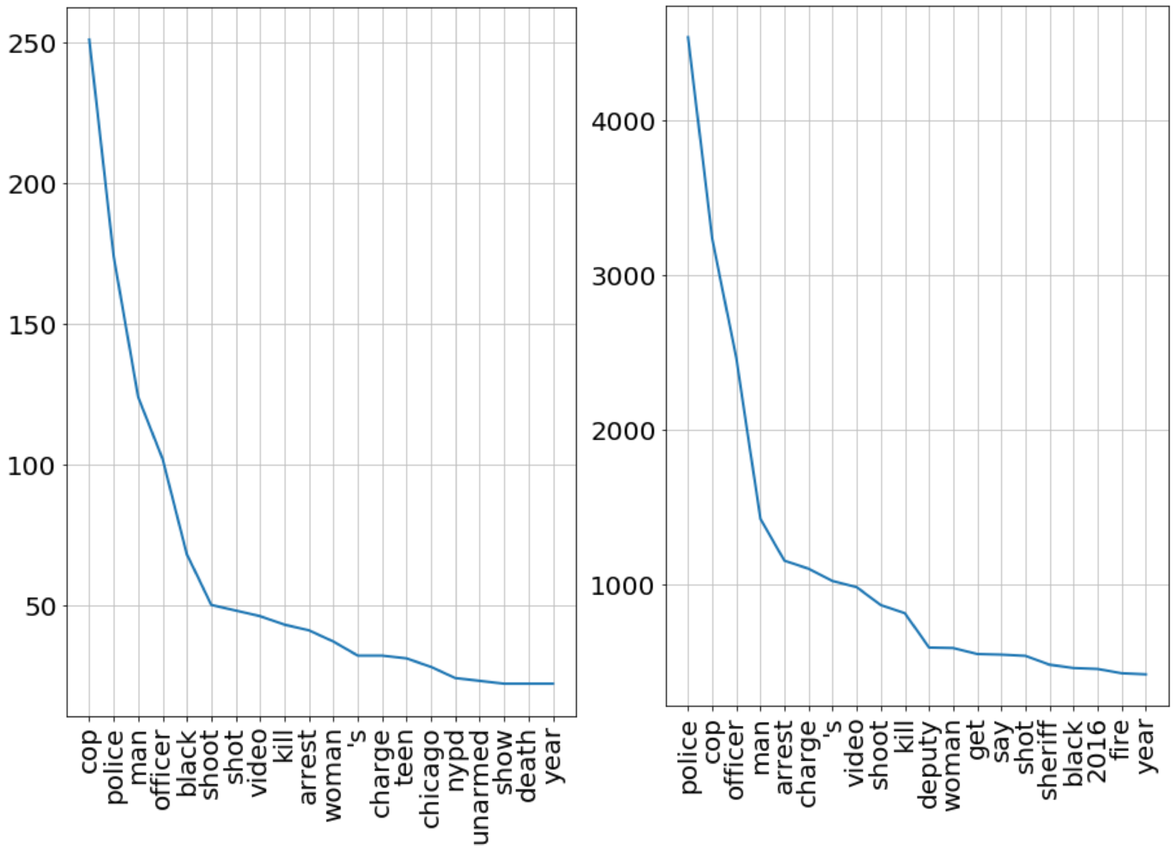
Weekly frequency of posts



# of posts by hour of the day



Top 20 most frequently used words in title



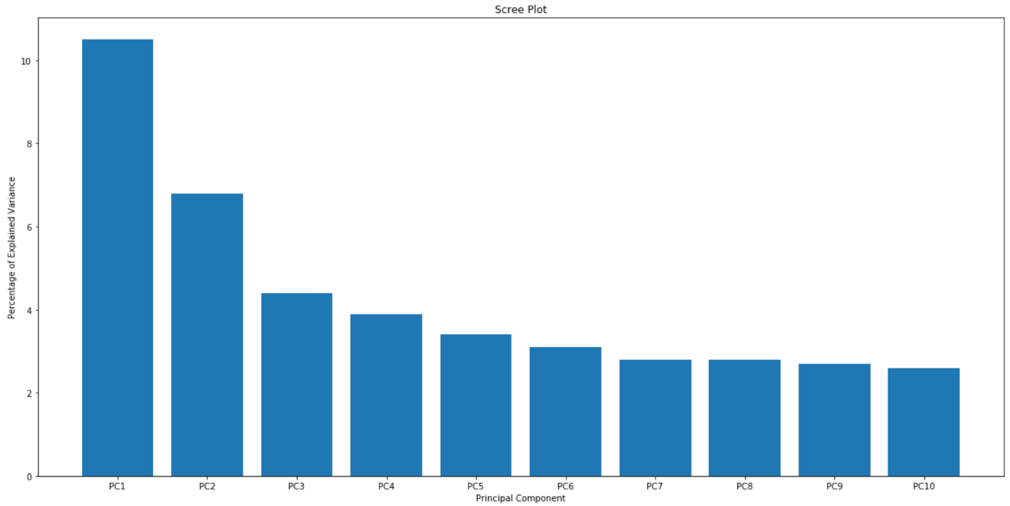
Russian users

Normal users

- Submission title was tokenize, removed punctuation and stop words, and lemmatized each word

Data Analysis

- Converted text to vector using Term Frequency – Inverse Document (TF-IDF)
  - TF: how often the word appears within a document
  - IDF: measure of how significant that word is in the whole corpus
- Split data into approx. 70/30 for training and testing set



- Logistic Regression Model
  - Model 1: -3.181 + 1.066 *PC1 + 0.489*PC2
    - PCA to reduce dimensionality of td-idf scores
  - Model 2: -3.573 + 1.279 *cop + 1.643*black + 1.306*man + 1.596*teen
  - Model 3: -3.88+ 6.41 *russian_prop + 0.038*black_man
    - russian_prop: indicator of if submission linked to Russian propaganda website(i.e. DoNotShoot.us and BlackMattersUS.com), https://www.thewrap.com/russian-propaganda-us-election-donald-trump-hillary-clinton-wikileaks-drudge-report-info-wars/
    - black_man: tf-idf score for the bigram “black man”

Model Evaluation and Dash App

Model 1

		predicted	
		0	1
actual	0	3246	201
	1	209	12

Model 2

		predicted	
		0	1
actual	0	3370	77
	1	195	26

Model 3

		predicted	
		0	1
actual	0	3433	14
	1	106	115

Sensitivity (TP/actual Y)	12/221 = 0.054	27/221 = 0.122	115/221 = 0.52
Precision (TP/predicted Y)	12/213= 0.056	26/113 = 0.23	115/119 = 0.96

- Dash app: http://18.236.183.235:8050

Next Steps

- Collect more submissions so that I can try other methods like doc2vec
- Try other subreddits or date range
- Analyze user comments
- Add more figures to my Dash app