How Presidential Candidates and Parties Tweeted During the 2018 Brazilian Election

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Brazilian Politics

- 2002 - 2016: PT (Workers' Party).
  - Lula's (corrupt) success in his two terms (2002-2010)
  - Dilma's failure and impeachment (2010-2016)
- 2018: Power shift to the right wing: Jair Bolsonaro.
  - Lula is prohibited from running, sets Haddad
- TV propaganda proportional to number of congressmen.
  - Bolsonaro had 8 seconds out of 12 minutes
  - Alckmin had almost half and got 4th place

Contributions

- Twitter dataset with tweets from the leading candidates and parties in the 2018 Brazilian Presidential Election.
- Analysis of similarity between candidates and parties' tweets.
- Study of main political characters in the election.
- Campaign strategy analysis.

Related Work

- Twitter has been used to predict stock market, measure user influence and social inequalities.
- In politics, Twitter studies address:
  - Correlation between offline events and tweets
  - Sentiment analysis as popularity measure
  - Prediction of election outcomes
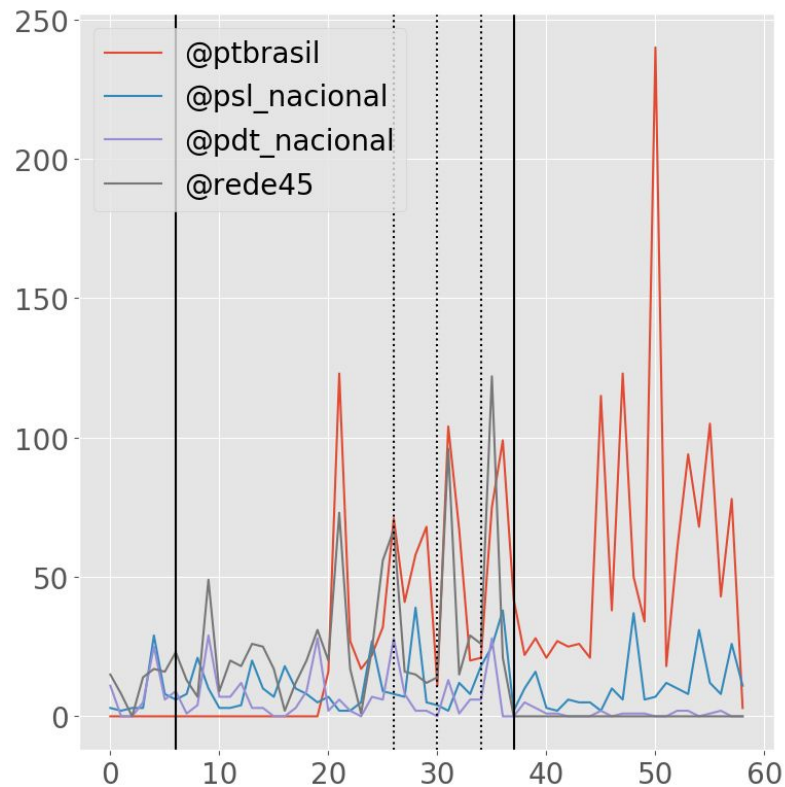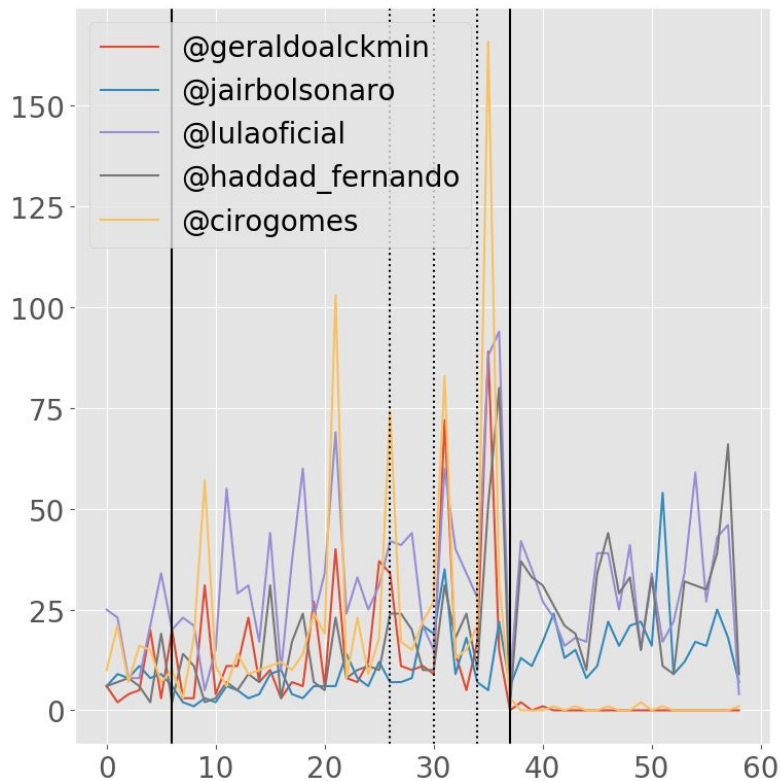 - Correlation between real world public opinion and tweets

Data

- 9332 tweets from August 31st 2018 to October 28th 2018.
- Twitter API and web scraping.
- Top candidates and parties:

Candidate	N	%	Party	N	%
Jair Bolsonaro	698	7.5	PSL	634	6.8
Fernando Haddad	1152	12.3	PT	2153	23.1
Geraldo Alckmin	606	6.5	PSDB	966	10.3
Ciro Gomes	960	10.3	PDT	301	3.2
Lula	1862	20	-	-	-

Total: 9332

Preprocessing

1. Transformed to lowercase.
2. Links, hashtags, mentions and emojis removed.
3. Every symbol other than letters and numbers removed.
4. Tokenization.
5. Stopwords and RT symbol removed.

- This preprocessing was not used when analyzing how much each candidate was cited by others.

Tweet Distribution over Time

Tweet Similarity

- Tweet embedding.
- Cosine similarity.
- Tukey HSD test between self similarity and similarity between users.
- p-value = 0.05

$$Tweet = \frac{1}{N} \sum_{i=1}^{N} embed(w_i)$$

Similarity Results

Candidate/Candidate	Alckmin	Bolsonaro	Lula	Haddad	Ciro
Alckmin	0.465	0.404	0.431	0.431	0.419
Bolsonaro	0.404	0.392	0.397	0.395	0.383
Lula	0.431	0.397	0.437	0.431	0.403
Haddad	0.431	0.395	0.431	0.429	0.405
Ciro	0.419	0.383	0.403	0.405	0.404

Table 2: Average similarity between each candidates' tweets. All values are statistically significant at p = 0.05.

Party/Party	PT	PSL	PDT	PSDB
PT	0.407	0.419	0.421	0.426
PSL	0.419	0.473	0.435	0.453
PDT	0.421	0.435	0.454	0.447
PSDB	0.426	0.453	0.447	0.474

Table 3: Average similarity between each parties' tweets. All values are statistical significant at p = 0.05.

Candidate/Party	PT	PSL	PDT	PSDB
Alckmin	0.417	0.454	0.436	0.466
Bolsonaro	0.386	0.419	0.397	0.406
Lula	0.418	0.433	0.434	0.439
Haddad	0.414	0.436	0.431	0.437
Ciro	0.393	0.426	0.417	0.421

Table 4: Average similarity between candidate's and party's tweets.

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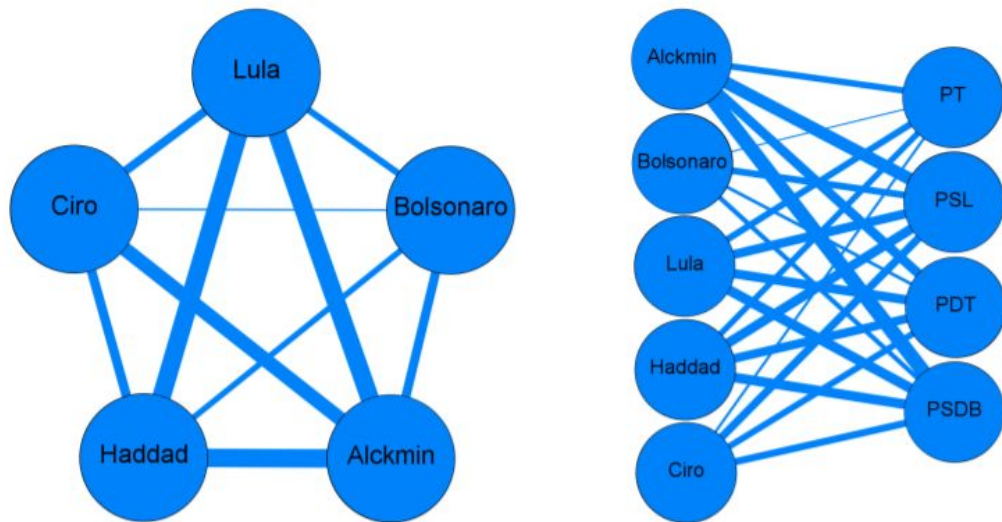
Similarity Results

Fig. 2: Similarity graph between candidates and parties. The thickness of each edge is proportional to the similarity between the nodes (candidates/parties). In the left image, note the high similarity in the Lula/Haddad/Alckmin triangle and the low similarity between Bolsonaro and other candidates. In the right image, note the low similarity between PT and all candidates.

Citations between Candidates and Parties

By/Who	Alckmin	Bolsonaro	Lula	Haddad	Ciro
Alckmin	159 (26.2%)	53 (8.7%)	20 (3.3%)	16 (2.6%)	7 (1.2%)
Bolsonaro	3 (0.4%)	169 (24.2%)	6 (0.9%)	18 (2.6%)	1 (0.1%)
Lula	2 (0.1%)	202 (10.8%)	870 (46.7%)	987 (53.0%)	3 (0.2%)
Haddad	1 (0.1%)	136 (11.8%)	265 (23.0%)	565 (49.0%)	5 (0.4%)
Ciro	2 (0.2%)	11 (1.1%)	4 (0.4%)	0 (0.0%)	806 (84.0%)

Table 5: Absolute number and percentage of times a candidate was cited by each candidate.

Candidate	Number of Citations
Alckmin	8
Bolsonaro	402
Lula	30
Haddad	34
Ciro	16

Table 6: Absolute number of times a candidate was cited by each candidate that was not in his own party.

By/Who	PT	PSL	PDT	PSDB
Alckmin	106 (17.5%)	0 (0.0%)	0 (0.0%)	7 (1.2%)
Bolsonaro	92 (13.2%)	4 (0.6%)	0 (0.0%)	5 (0.7%)
Lula	155 (8.3%)	3 (0.2%)	0 (0.0%)	9 (0.5%)
Haddad	54 (4.7%)	2 (0.2%)	0 (0.0%)	5 (0.4%)
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Table 7: Number and percentage of times a party was cited by each candidate.

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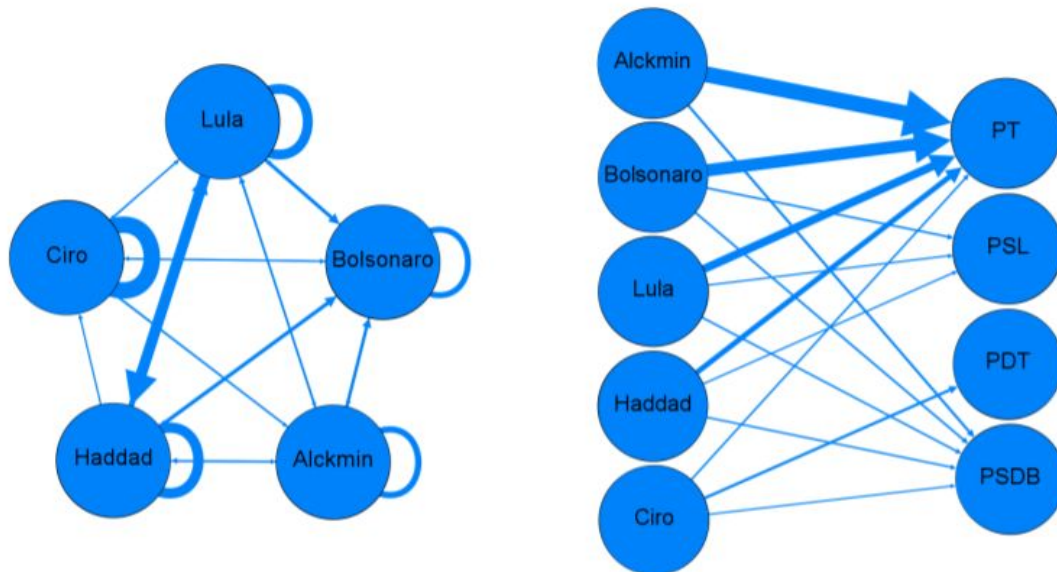
Citations between Candidates and Parties

Fig. 3: Conversation graph between candidates and candidates/party. The thickness of the edges are proportional to the percentage of times the candidate cited the user. The direction of the edges is from the writer to the cited user. Note the thick edges between Lula and Haddad and the edges toward PT.

Frequent Words

User	Words
Alckmin	brazil, pt, country, bolsonaro, geraldo, alckmin, paulo, state, round
Bolsonaro	brazil, bolsonaro, thank you, pt, hug, jair, support, against
Lula	lula, haddad, brazil, people, fernando, country, president, bolsonaro, democracy
Haddad	haddad, brazil, fernando, lula, people, bolsonaro, country, democracy, president
Ciro	ciro, brazil, country, thank you, change, support, people, debate, proposals
PT	haddad, brazil, bolsonaro, people, lula, education, country, president, democracy
PSL	bolsonaro, brazil, jair, captain, country, thank you, pt
PDT	ciro, brazil, gomes, question, debate, proposals, country, pdt, president, block
PSDB	brasil, pt, country, candidate, congressman, federal, paulo, state, health, bolsonaro

Table 8: Relevant frequent words by candidate and party translated to English. Note that "obrigado" was translated to "thank you", two words.

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Conclusion

- Increase in the importance of social media.
- Bolsonaro and PT as main characters of this election.
- Bolsonaro had success with more personal tweets.
- PT used Lula's image to boost Haddad, which was partially successful.
  - Haddad jumped from 4% to 29% after Lula was prohibited from running and started supporting him
  - 44.87% of the votes in the second round