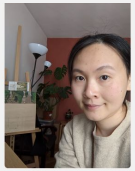
Comparison of opinions expressed in Twitter with ANES aggregated data

Evgeniya Korotchenko
Federico Zimmerman
Shufan Jiang
Sudhang Shankar

Sudhang Shankar participant

I'm a Senior Software Engineer at ION Trading and concurrently pursuing an MSc. in Computational Social Systems at the Technische Universität Graz.



Shufan JIANG participant

Shufan Jiang is a doctoral student in Natural Language Processing and Knowledge Management at the University of Reims Champagne-Ardenne and at ISEP Paris. Her research interests include crowdsensing, social media, text mining for farmer-centric smart agriculture applications. Methodologically, she is very interested in using pretrained language models as explicit knowledge base for domain-specific textual data integration. Prior to beginning her PhD, Shufan worked as a chatbot developer at BNP Paribas Securities Services.

Federico Zimmerman participant

Federico Zimmerman is a PhD candidate at Universidad Torcuato Di Tella, Argentina. His current research focuses on the psychological underpinnings of affective polarization and political segregation. By performing behavioral experiments and computational models he is trying to understand the role of political extremes in the increasingly polarization.

Evgeniya Korotchenko participant

Evgeniya Korotchenko is an independent professional with an academic background (a research psychologist, Ph.D.) working with market data, doing socio-cultural research and segmentation, and corporate ethnography for strategic decision making. During the Pandemic was released a collective whitepaper in which was discussed the research on self-confidence as a concept among females in different cultures. Evgeniya is passionate about data visualization and is attracted to getting a sense of the city through social data. Besides professional work, her lifelong interest is in the field of perception of art

Research question & motivation

Description: The American National Election Studies (ANES) are national representative surveys of American eligible voters that have been conducted before and after every presidential election since 1948. The focus of the survey includes voter perceptions of the major political parties, the candidates, national and international issues.

Here we asked whether opinions expressed by Twitter users match, in an aggregated manner, those gathered in the ANES (after controlling for demographics) or if it is true that extreme opinions are overrepresented and more salient in social networks.

Research questions and hypotheses:

1. As seen in ANES data, negative feelings towards the opposite party are increasing (Iyengar et al., 2019). Could we observe this trend using Twitter data?

2. Just before every American election there is an important and controversial event that captures media attention (aka "October Surprise"). How do these events impact Twitter? Are there more tweets related to the election? Are there more negative tweets? Do the negative tweets affect both candidates or only the one involved in the scandal?

Data collection

ANES
American National Election Studies

Data from its own surveys on voting, public opinion, and political participation

ANES feeling thermometer data from 2008, 2012, 2016, 2020

I'd like to get your feelings toward some of our political leaders and other people who are in the news these days. I'll read the name of a person and I'd like you to rate that person using something we call the feeling thermometer. Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person. Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person and that you don't care too much for that person. You would rate the person at the 50 degree mark if you don't feel particularly warm or cold toward the person.
If we come to a person whose name you don't recognize, you don't need to rate that person. Just tell me and we'll move on to the next one.

- 100° Very warm or favorable feeling
- 85° Quite warm or favorable feeling
- 70° Fairly warm or favorable feeling
- 60° A bit more warm or favorable than cold feeling
- 50° No feeling at all
- 40° A bit more cold or unfavorable feeling
- 30° Fairly cold or unfavorable feeling
- 15° Quite cold or unfavorable feeling
- 0° Very cold or unfavorable feeling

Twitter Academic API

Audience opinions expressed in textual contents of tweets corresponding to time when the ANES performed

Keywords to pull tweets: candidates' names (each contain one and only one candidate's name)
2008: Obama XOR McCain
2012: Obama XOR Romney
2016: Clinton XOR Trump
2020: Biden XOR Trump

Methods

ANES data:

- Analyze Americans' sentiments towards Democrat and Republican president candidates

Twitter data:

- Analysis of several **controversial events**. For each election year, we pull 3 days before and after the controversial events "October Surprise" week:
    - 2008: Record-High Job loss report on November 1
    - 2012: Hurricane Sandy on October 22
    - 2016: Hillary Clinton email controversy on October 28
    - 2020: On October 2, Donald Trump announced that he and Melania Trump had tested positive for COVID-19

- To sample the voluminous tweets, we only pull the **tweets created in the first 3 minutes per 30 minutes in the weeks of October surprises**.
- Use these data to analyze Americans' sentiments towards Democrat and Republican president candidates in the last four elections

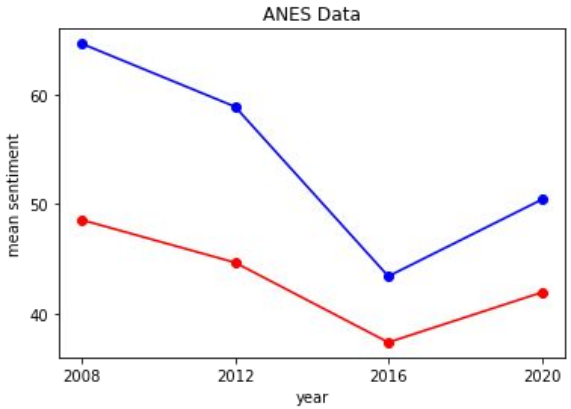
Methods: Tweet processing

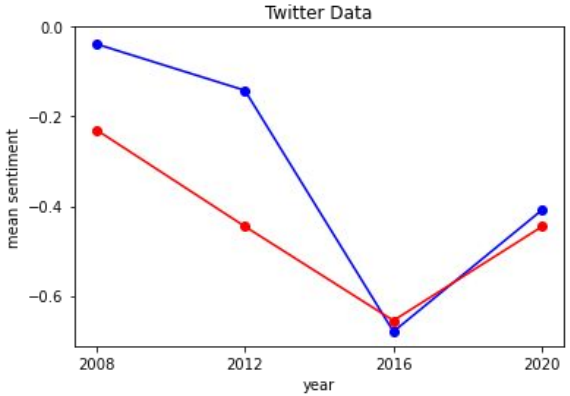
1. Removing emojis, @user and URLs
2. Sentiment classification with pretrained classifier* to classify text as positive or negative
3. Political orientation classification with pretrained classifier to classify text as having either Democratic or Republican sentiment**
4. Average sentiment calculation and visualization

* based on a few experimentations, this model could produce biased predictions that target underrepresented populations

** pretrained model has it's limitations

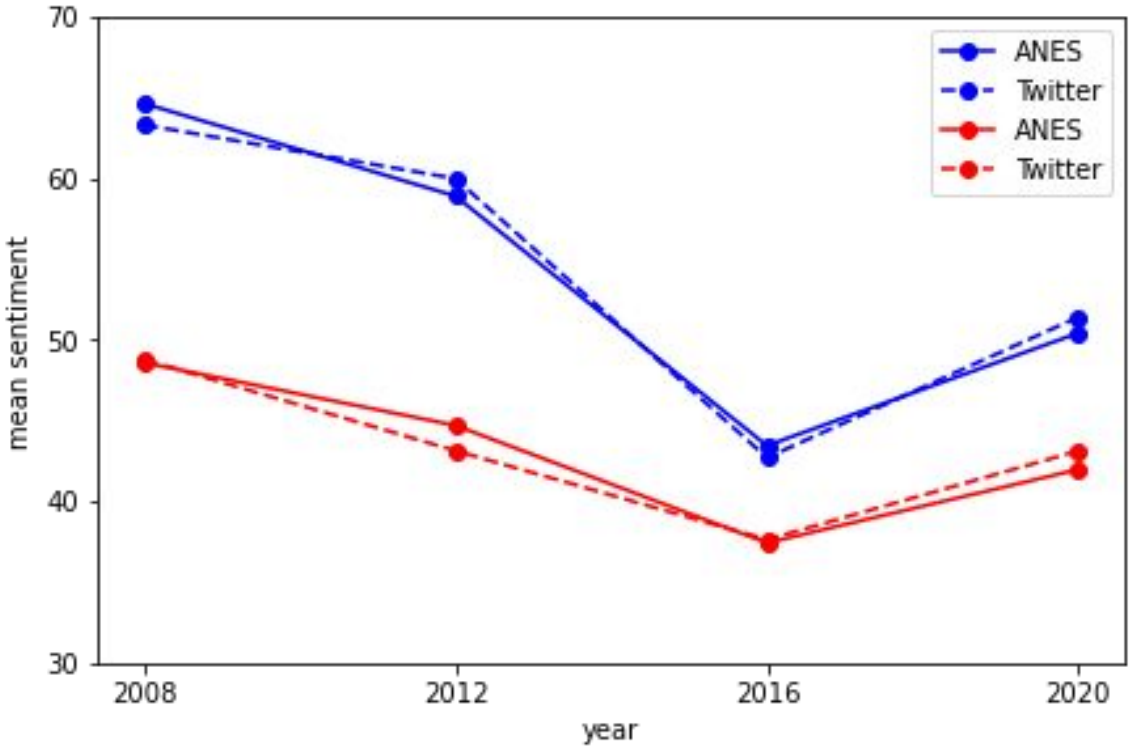
Results: ANES vs Twitter





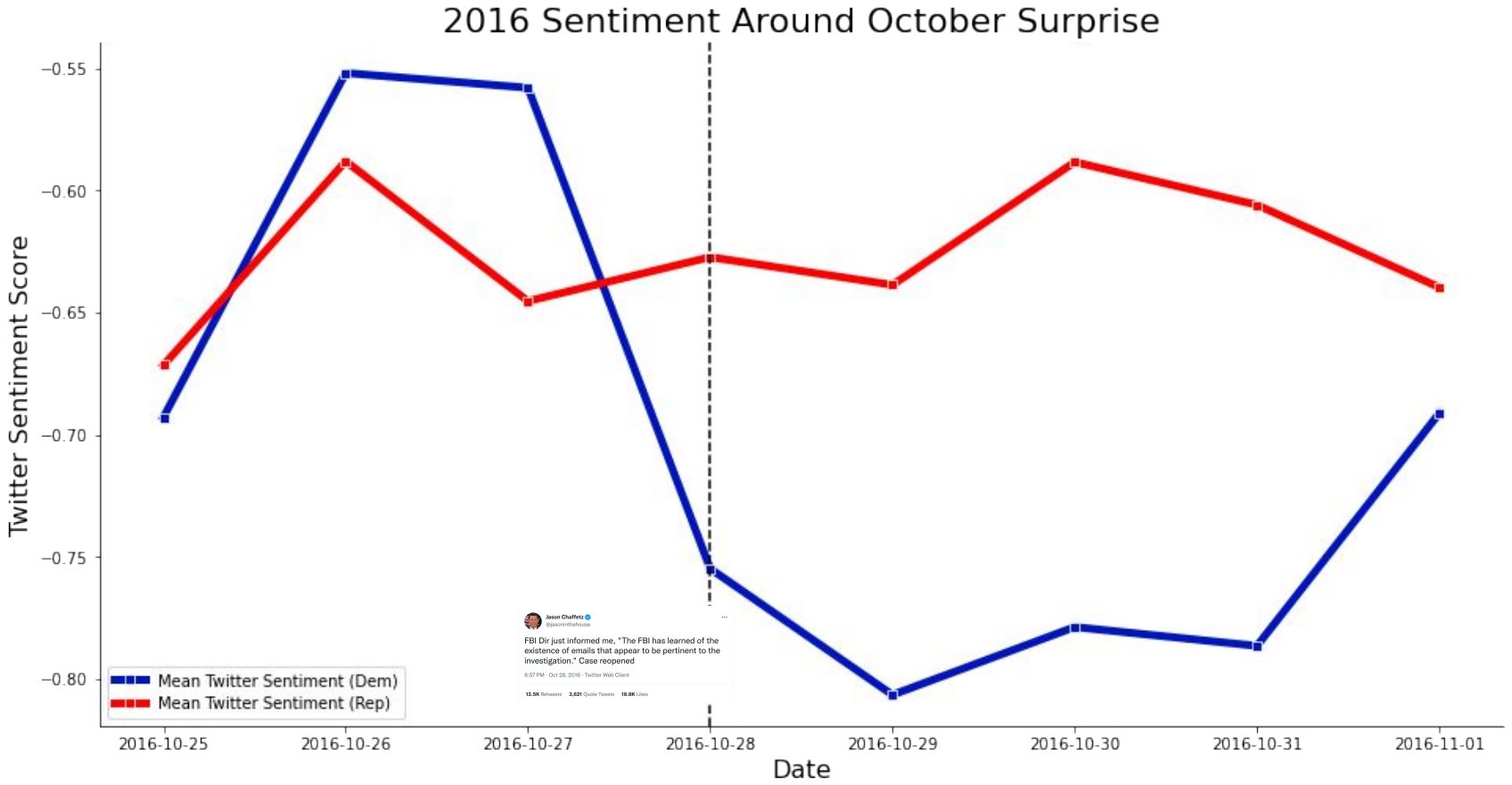
Democrat candidates

Republican candidates

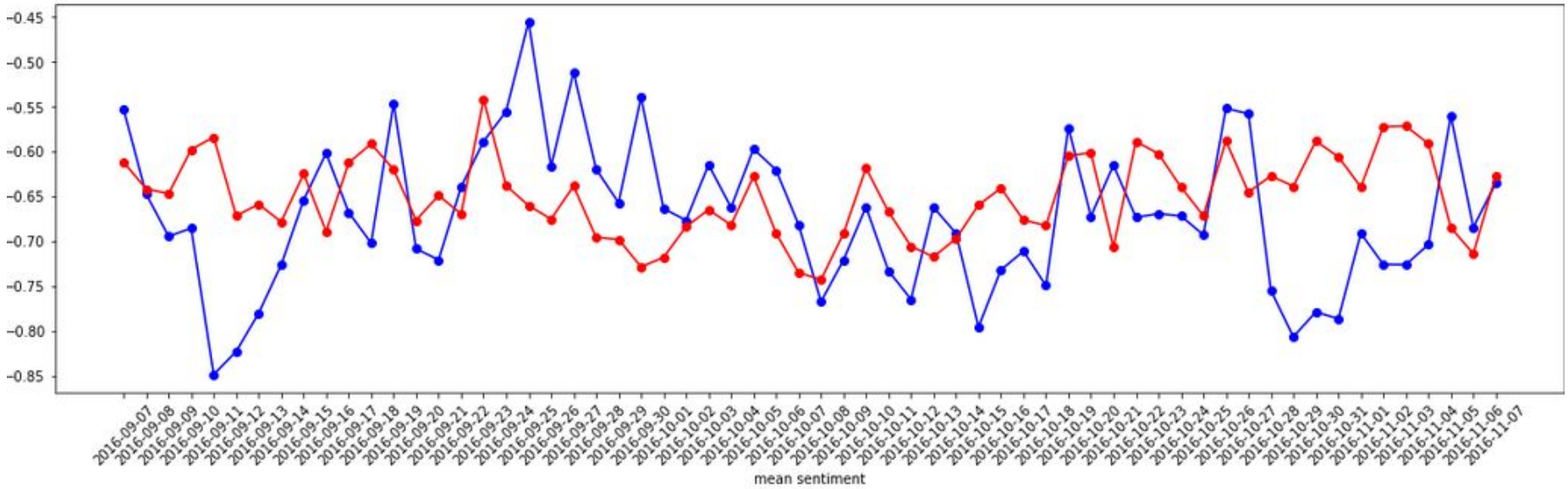


We (re)validated the use of social media sentiment to measure aggregated political emotions

Results - Impact of October Surprise

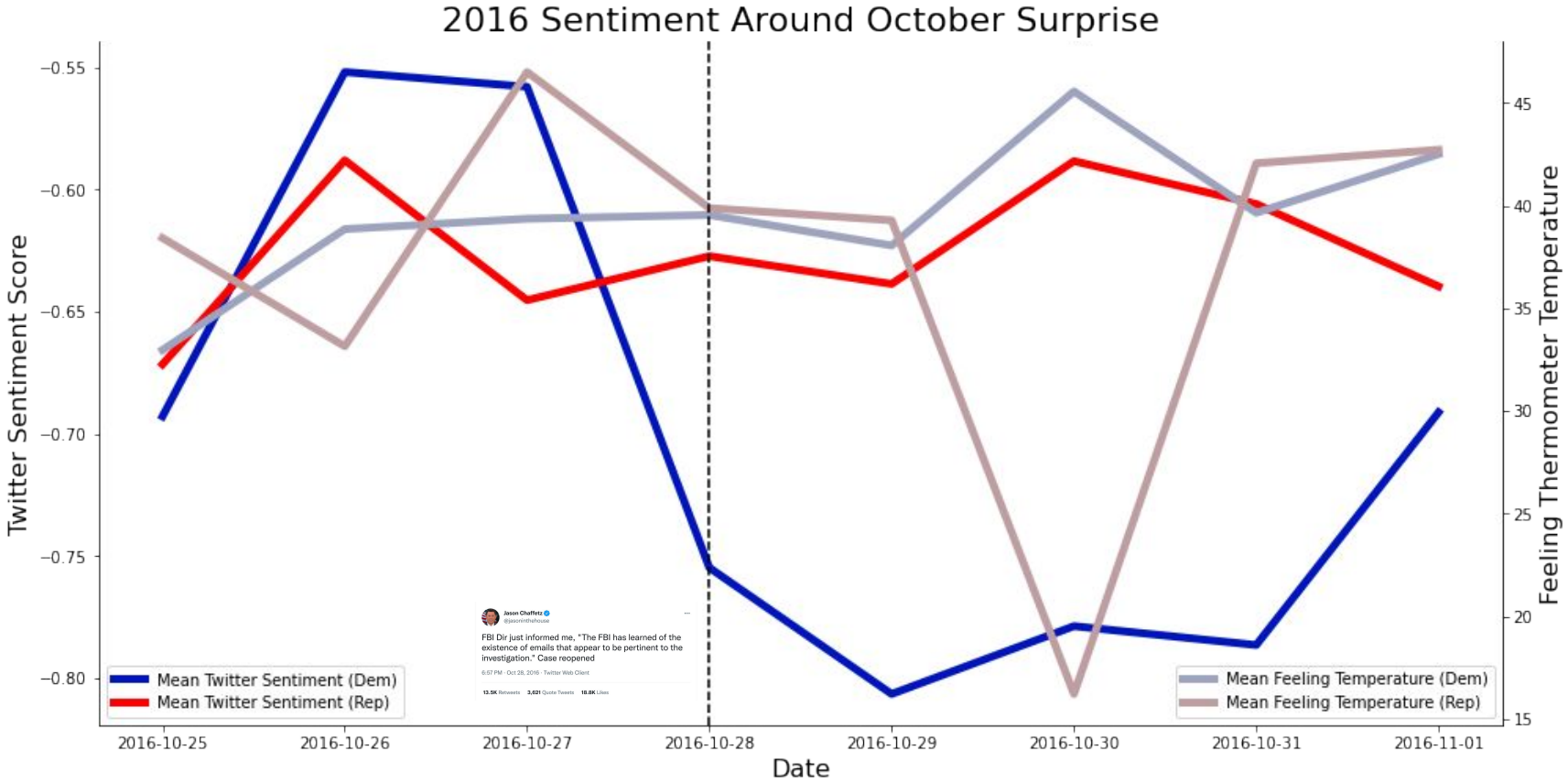


Two-Month view: Comeback?

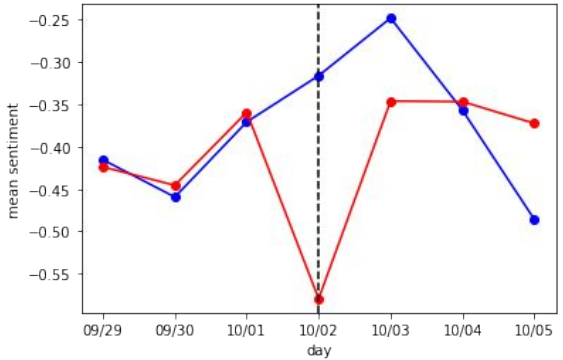


- Many troughs and peaks
- After the Oct 28 trough, there seems to be a “comeback” for the Dem candidate
  - But was it enough?

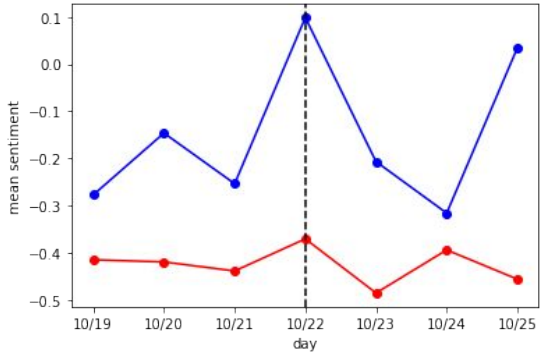
Results - Impact of October Surprise



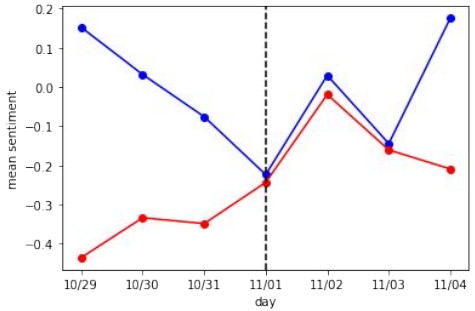
Impact of Other Supposed October Surprises



2020: Trump COVID announcement

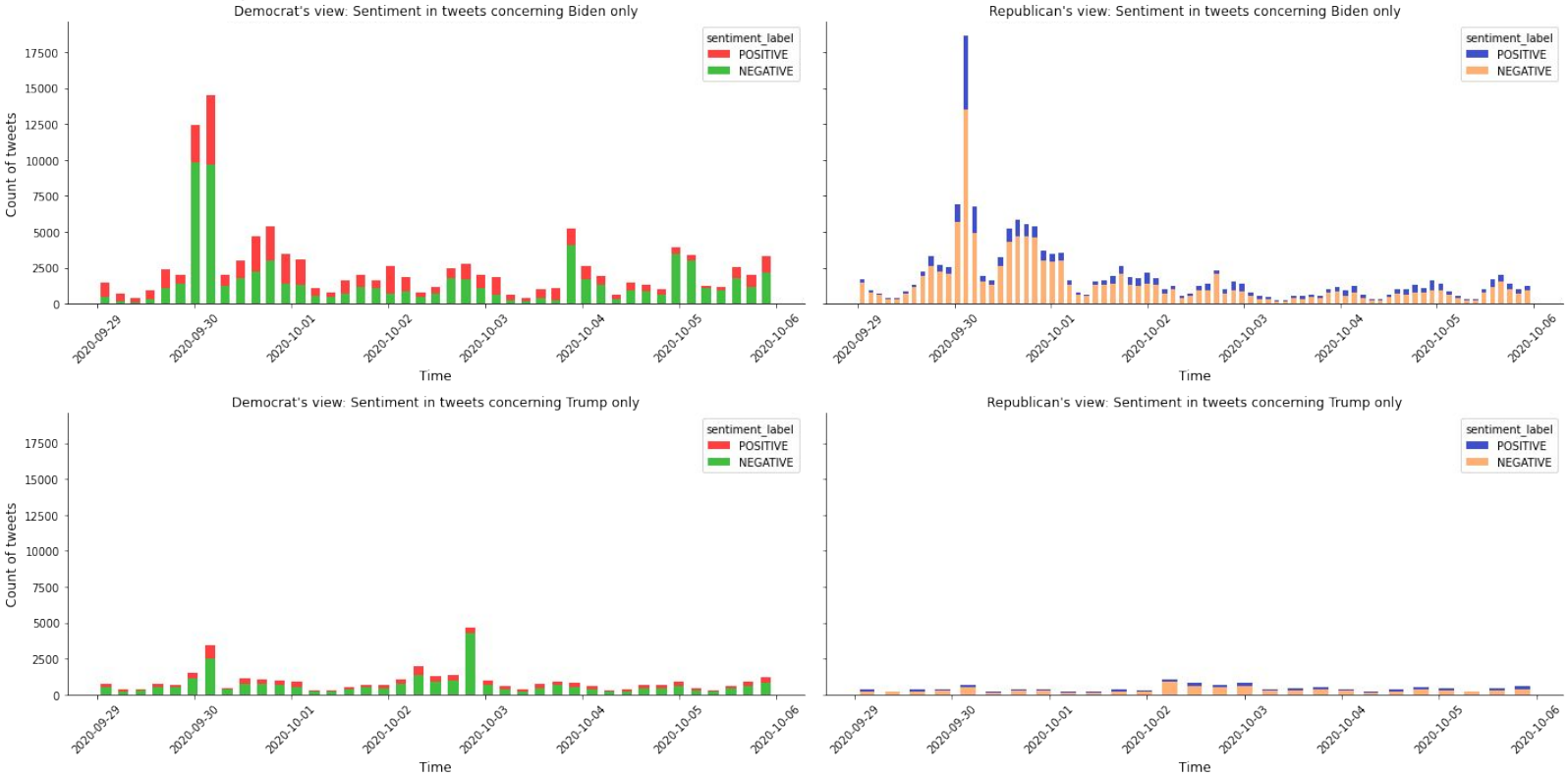


2012: Hurricane Sandy



2008: Record job-loss report

Other Types of Events



Debate on 30 September 2020

Results summary

1. We were able to validate the use of tweets to study aggregated political emotions.
2. Impact of October Surprise
   a. For 2016, significant impact on twitter sentiment against the Dem Candidate - as widely suspected
   b. For 2020, there does seem to also be an impact
   c. For 2012 and 2008, not much impact was observed
3. Fluctuation of sentiments
   a. Not just due to October Surprises, but also due to other events like debate

Possible limitations & biases

- When trying analysing ANES survey data for the “October Surprise” week, we deal with a very restricted sample, which is not representative of the population
    a. It is only for web respondents
    b. This is in contrast to the full sample, which can be properly weighted to achieve representativeness
- There is only twitter data for the last four elections. So, comparing only 4 points against ANES (which go back to 1948) is tricky.
- Pretrained models limitations and biases
- Haven’t checked for bots
- Need to filter for USA

Next steps

1. For comparing data in a daily basis, it is probably better to use surveys like NYT online.
2. It is worth analyzing the various peaks and troughs in the daily sentiment to determine the cause of these fluctuations:
    a. Topic Modelling of tweets around these peaks and troughs
    b. Analysing more features, such as media, the users' profiles and interactions among users to remove irrelevant information, bots, institutional accounts

Thank you

Evgeniya Korotchenko - @E16600561 @evekoro
Federico Zimmerman - @FedeZimmerman
Shufan Jiang
Sudhang Shankar - @ShankarSudhang

References

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