

Analyzing Power Outages with Social Media

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An aerial night view of a city, likely the DC Metro Area, with numerous lights from buildings and streets. A large, dark, semi-transparent circular overlay is centered on the image, containing white text. The text is arranged in a title and a question format.

The Problem:

How can we identify and analyze utility outage events in the DC Metro Area using social-media streaming data?

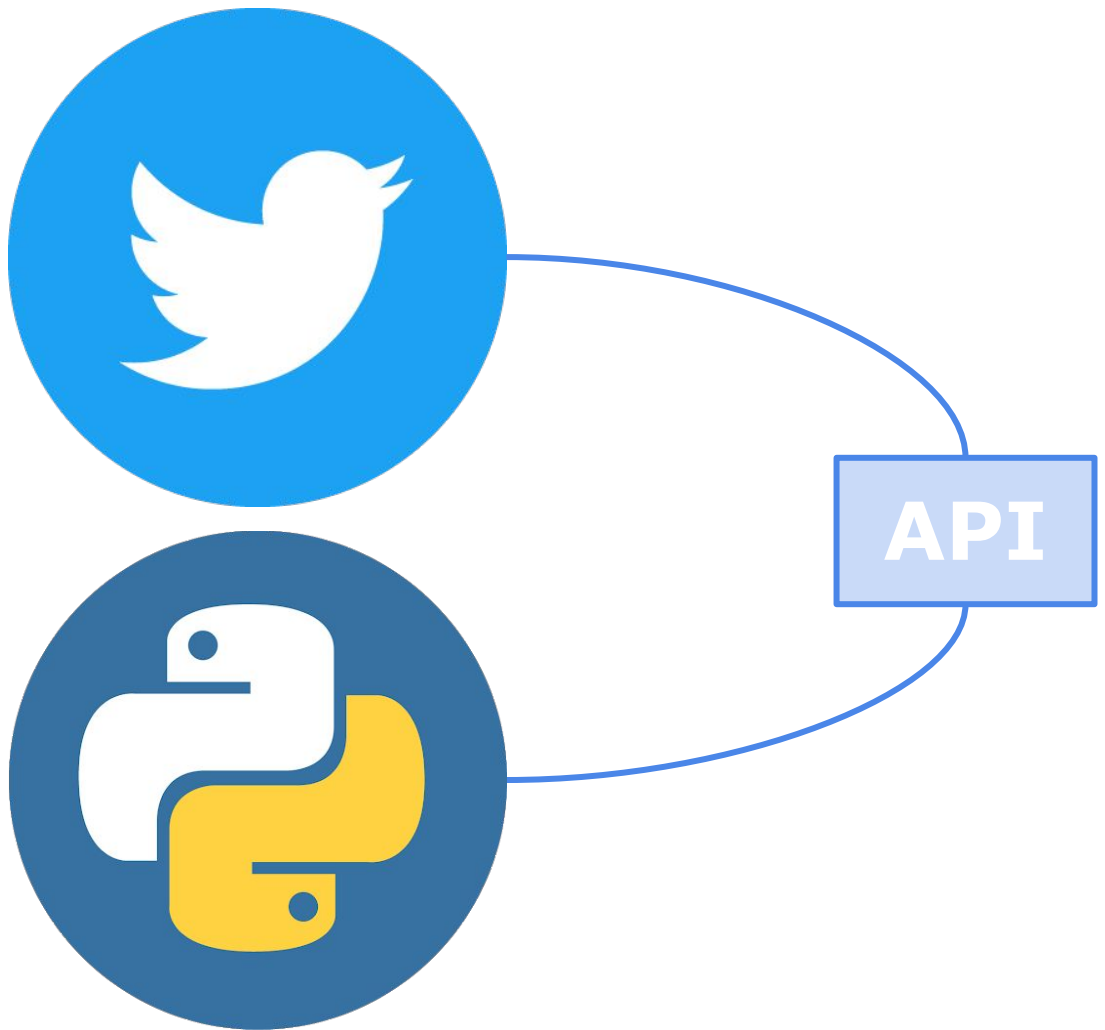
Methodology:

Twitter Query

- Time-based
- Word-based
- Language-based
- Location-based*

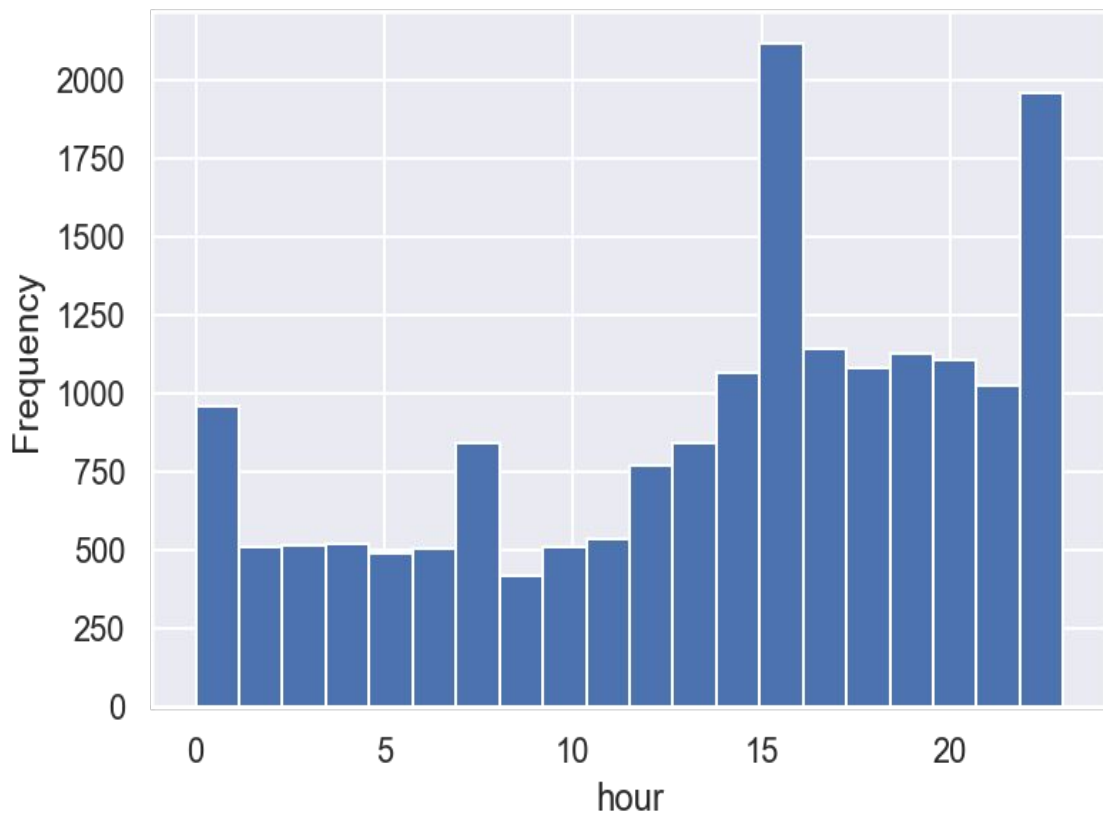
Limitations

- Twitter limits your API requests per user



Exploring the Data:

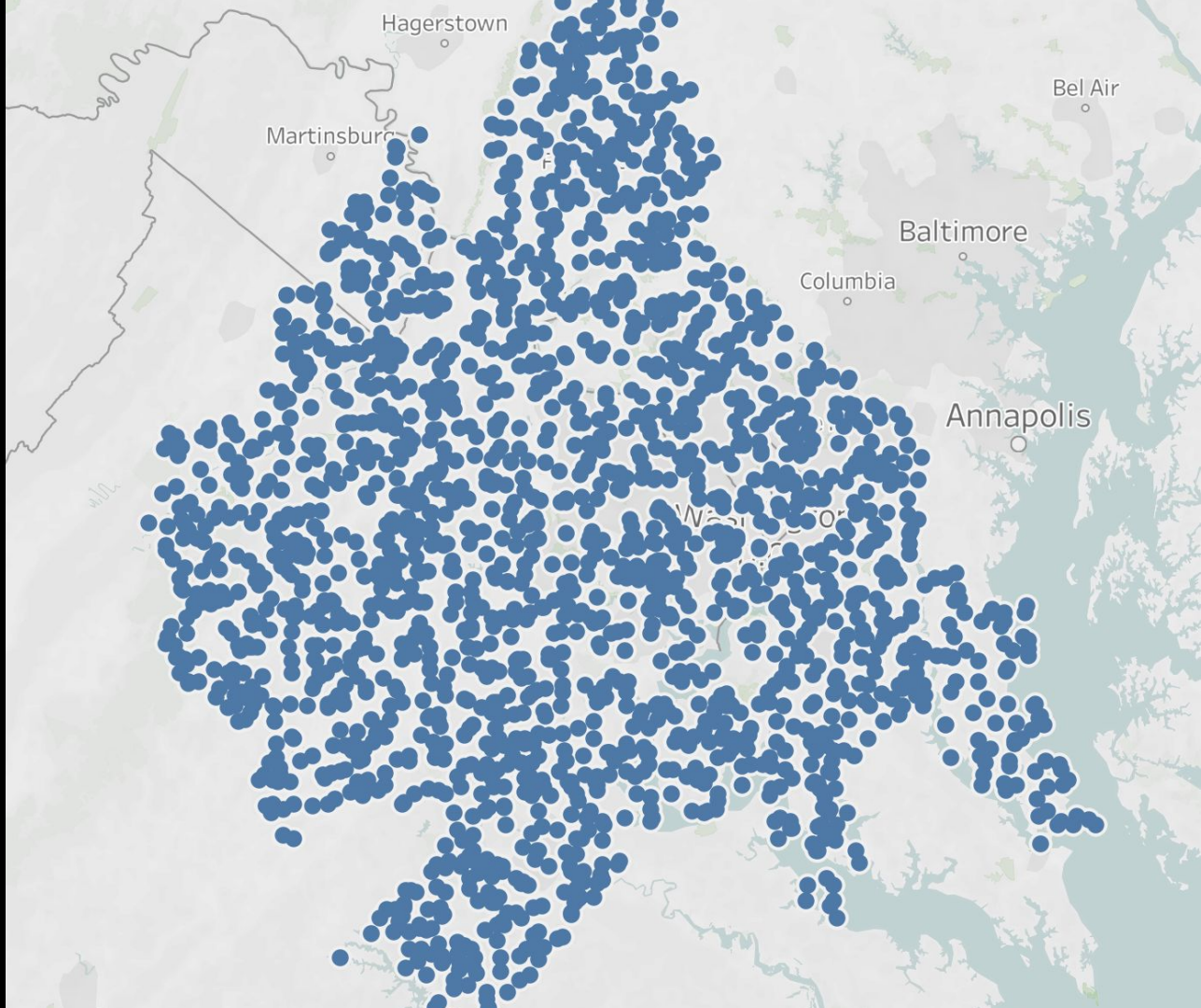
- Generated random synthetic geometries for 18,000 observations
- Seasonal but not consistent!
- Tweets varies in time (hours)
- Only text message (English)



Generating Features:

Generated random synthetic geometries for tweets:

- Generated within WMA polygon
- Premium API access would provide true geo locations
- Entity extraction using Tweet text proved challenging.



Sentiment Analysis:

- Most tweets re: 'power outage' come from official handles
- SA more difficult when phrases are short
- Good way to quickly identify strong emotions

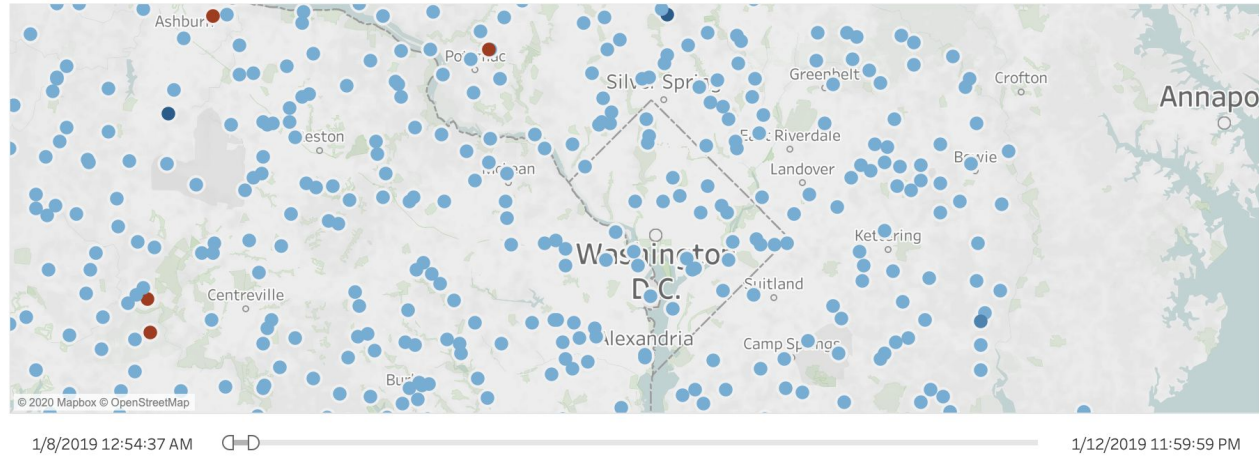
<i>'Power outages are bad for economic growth.'</i>	-0.14
<i>'Great power outage.'</i>	+0.33
<i>'Manitoba is getting reinforcements to deal w/ widespread power outages. Details at 6 SK time w/ GX94 News.'</i>	0.00

Visualization:

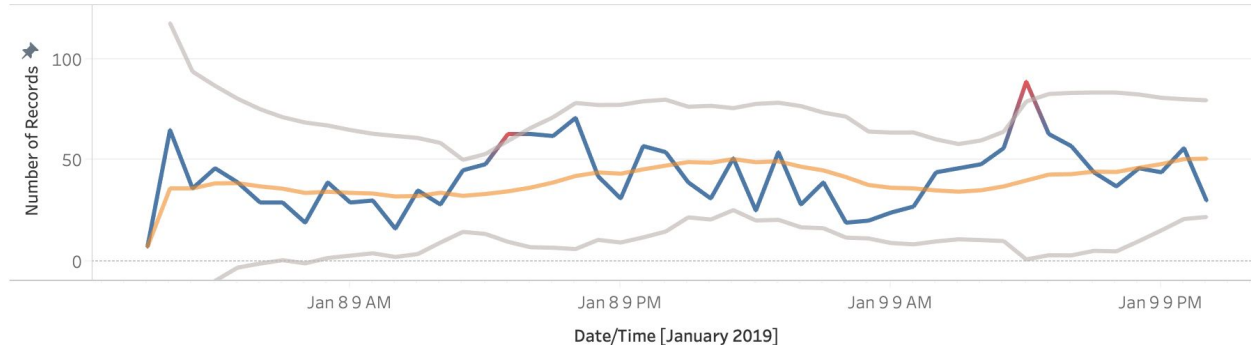
Interactive Dashboard Proof of Concept: Tableau

- Dynamic, Elegant, Ubiquitous
- Temporal Outlier Analysis
- Spatial Analysis (synthetic coordinates)
- Demo...

Map of Power Outage Tweets



Timeline and Outlier Analysis of Power Outage Tweets



Conclusions and Recommendations:

1. Identify Outages using Social Media:
 - a. **Premium Twitter API**
2. Interactive Dashboard:
 - a. **Tableau**
3. Automate:
 - a. **ETL**
4. Next steps...



Developer

Questions?



Citations

1. https://www.researchgate.net/publication/327143549_Improving_sentiment_analysis_for_twitter_data_by_handling_negation_rules_in_the_Serbian_language
2. <http://docs.tweepy.org/en/latest/>
3. <https://weather.com/news/news/2018-10-17-hurricane-michael-power-outages-nasa>
4. <https://earthobservatory.nasa.gov/images/78445/power-outages-in-washington-dc-area>