Understanding Opinions Towards Climate Change on Social Media

NeurIPS 2023 Workshop: Tackling Climate Change with Machine Learning
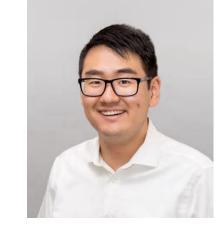

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Agenda

1. Context
2. Dataset
3. Methodology & Results
4. Pathway to impact

Context

Context

Identify the **growth / shrink of communities** of climate change supporters or non-supporter on social media.

How does real world events **influence opinions** about climate change on social media?

Dataset Details

Dataset Statistics

- 13.6 million tweets
- 3.6 million users
- 5.3 million retweets
- 16 million hashtags
- 11 million mentions

Mentions Network details

Mentions network: 11,531,869 edges

There are 3113406 nodes in the network

There are 202600 nodes in more than 10 edges in the network

There are 17868 nodes in > 100 edges in the network

-> keeping the core nodes and nodes in their edges

Conference of the Parties (COP) Events
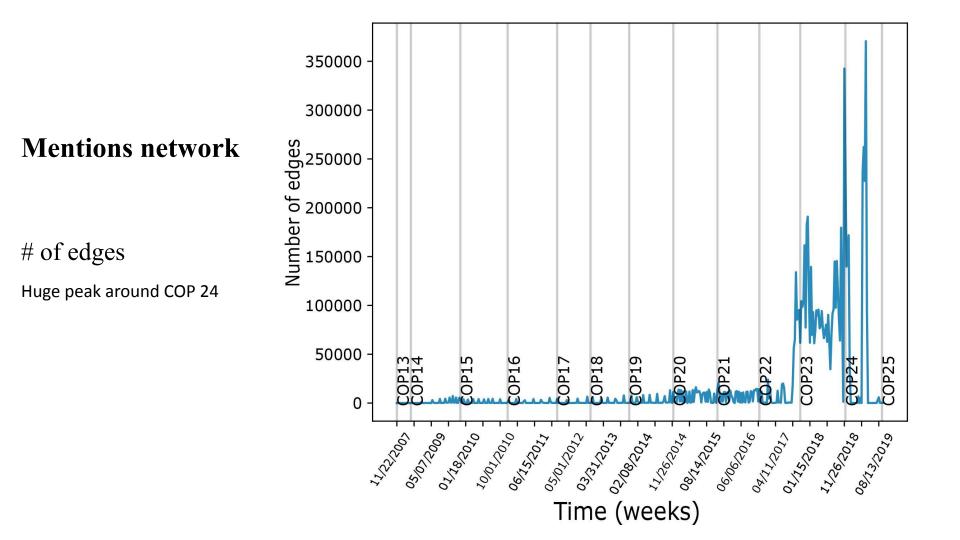
United nations climate change conference

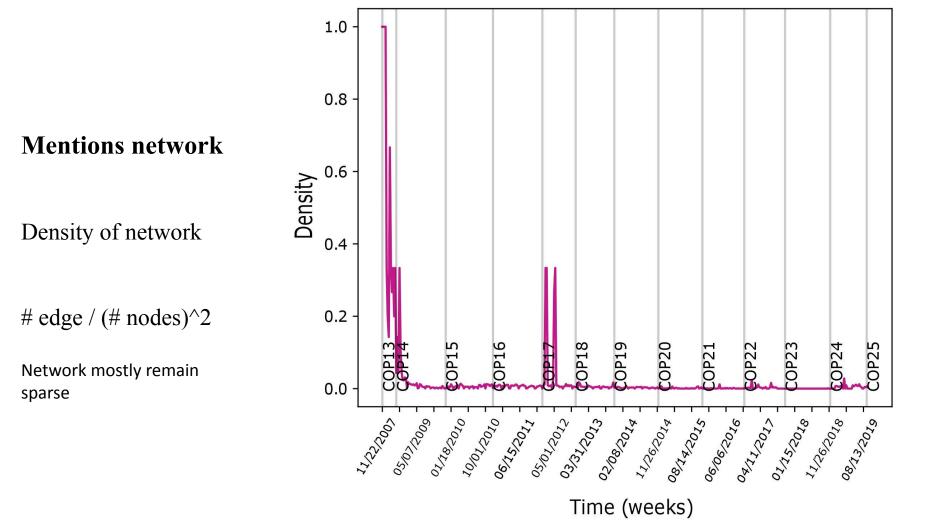**Goal:** review progress made by members of the United Nations Framework

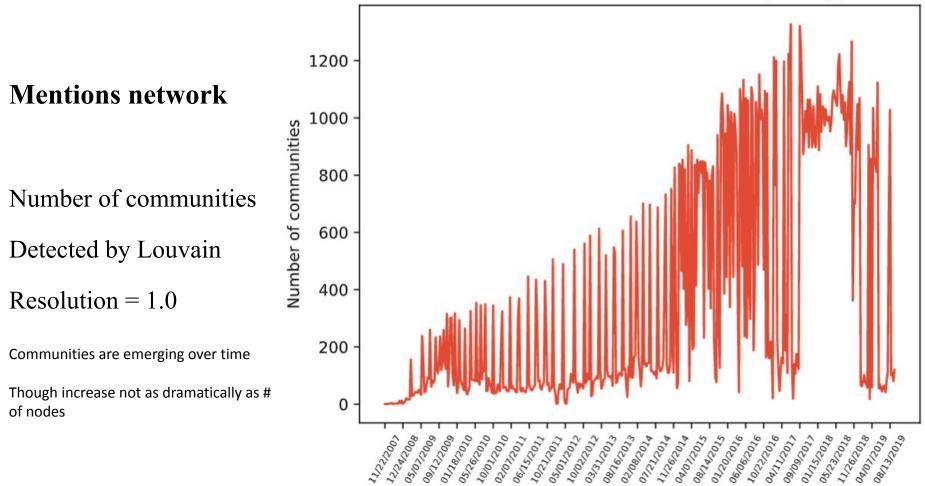Convention on Climate Change (UNFCCC) to limit climate change.

COP13 ,03 Dec 2007 - 17 Dec 2007,"Bali, Indonesia"
COP14,01 Dec 2008 - 12 Dec 2008,"Poznan, Poland"
COP15,07 Dec 2009 - 18 Dec 2009,"Copenhagen, Denmark"
COP16 ,28 Nov 2010 - 10 Dec 2010,"Cancun, Mexico"
COP17,28 Nov 2011 - 09 Dec 2011,"Durban, South Africa"
COP18,26 Nov 2012 - 07 Dec 2012,"Doha, Qatar"
COP19,11 Nov 2013 - 23 Nov 2013,"Warsaw, Poland"
COP20,01 Dec 2014 - 12 Dec 2014,"Lima, Peru"
COP21 ,30 Nov 2015 - 12 Dec 2015,"Paris, France"
COP22,07 Nov 2016 - 18 Nov 2016,"Marrakech, Morocco"
COP23,06 Nov 2017 - 17 Nov 2017,"Bonn, Germany"
COP24,03 Dec 2018 - 14 Dec 2018,"Katowice, Poland"

Mentions network

of edges

Huge peak around COP 24

Mentions network

Density of network

edge / (# nodes)^2

Network mostly remain sparse

Mentions network

Number of communities

Detected by Louvain

Resolution = 1.0

Communities are emerging over time

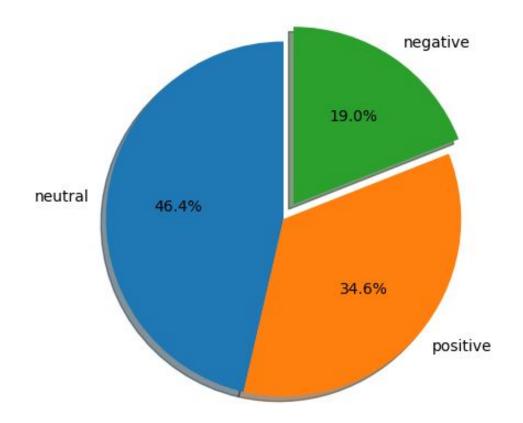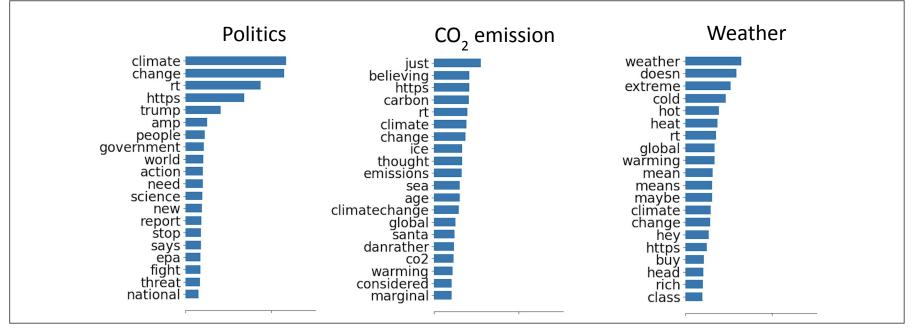Though increase not as dramatically as # of nodes

Number of communities over time (weekly)

Methodology & Results

Sentiment Analysis

Topic modeling

We discovered 10 climate change-related topics people like to talk about. Here are 3 of them: <u>politics</u>, <u>CO2 emission</u>, and <u>extreme weather</u>.

Pathway to Impact

Stakeholders

Policy makers: utilized the insights to guide decision-making.

Non-government organizations & advocacy groups: target their campaigns more effectively.

Scientists (IT, social, environmental): studying the patterns and dynamics of climate change- related online communication.
Journalists: may use the results to inform their reporting.

Public: will be influence by the actions made by above parties.

Climate deniers & opponents

Barriers

Privacy concern: to deal with it, we utilized de-identification techniques and focus on only the trend instead of investigate individuals.

Data quality: slangs & buzzwords; sarcasm