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Title: Exploring Public Perceptions of Climate Change on Reddit (1208 words)

Introduction:

The urgency of understanding public sentiments and emotions regarding climate change has never been more critical. Online platforms, particularly Reddit, offer a unique space where diverse perspectives converge. This study aims to unravel how Reddit users across various subreddits express sentiments and emotions concerning climate change. We delve into the emotional and cognitive dimensions prevalent within these discussions. As climate change discourse is multifaceted, we draw inspiration from relevant papers, such as Fast et al.'s "Empath: Understanding topic signals in large-scale text" (2016) and Oreskes' "Beyond the ivory tower: The scientific consensus on climate change" (2004).

Research Question:

How do Reddit users across various subreddits express sentiments and emotions concerning climate change, and what emotional and cognitive dimensions are prevalent within these discussions?

Method:

Data Collection:

The research involved the collection of data from four distinct subreddits, namely 'climatechange,' 'sustainability,' 'ClimateActionPlan', and 'ClimateOffensive.' Each of these subreddits contributed 250 posts and associated comments, resulting in a comprehensive dataset that encapsulates diverse perspectives on climate-related discussions. This approach ensures a holistic representation of opinions across various online communities.

To collect the data, the Reddit API was utilized, focusing on the 'top' posts within each subreddit. The timeframe was not bounded, we just selected the 'top' posts. The data collection process involves retrieving information such as post titles, post bodies, and comments from each post. MoreComments objects are handled to extract additional comments beyond the initial set. A delay of 10 seconds is introduced between requests to the Reddit API to prevent rate limiting and ensure a smooth data collection process.

The collected data is stored in a structured format, specifically a Pandas DataFrame, where each row represents a data point (post) and includes attributes such as title, body, and comments. This comprehensive dataset allows for a detailed exploration of user sentiments and perceptions related to climate change on Reddit.

The dataset for subreddit climate change is shown below:

	title	body	comments
0	Billions of crabs went missing around Alaska. ...	[So basically the deep ocean water got warm en...	
1	\$266 Trillion in Climate Spending Is a No-Brai...	[Back to Math \n\nThe earth has 7 billion huma...	
2	Gray whales have been mysteriously washing up ...	[Starvation due to climate change, There is le...	
3	Corn Could Grow in the Canadian Arctic Within ...	["We'll be growing oranges in Alaska"\n\n"God ...	
4	Scientists say climate extremes of 2023 point ...	["Hey guys, just in case you missed the last 1...	
...
245	The past 7 years have been the hottest on reco...	[Do world governments realise how f***ed we ar...	
246	Over 500 Scientists From US, Europe and Asia U...	[Labeling biomass as a renewable is ridiculous...	
247	"[A] lab experiment suggested that reformulati...	[It's been out of the lab and in practice in A...	
248	Climate crisis reducing land's ability to sust...	[Why is this not on the frontpage??, This is m...	
249	90% of the Alaskan Snow Crab Population disapp...	[Oops we ate them all., [deleted], "Disappeare...	

250 rows × 3 columns

Figure 1. Dataset obtained from subreddit climatechange

Analysis:

The analysis was divided into 3 parts:

1. Content Analysis:

For each subreddit data, content analysis is performed to uncover key themes and word frequencies. The NLTK library is utilized for tokenization, and word frequencies are computed for a deeper understanding of the most common words in each subreddit's discussions.

2. Sentiment Analysis:

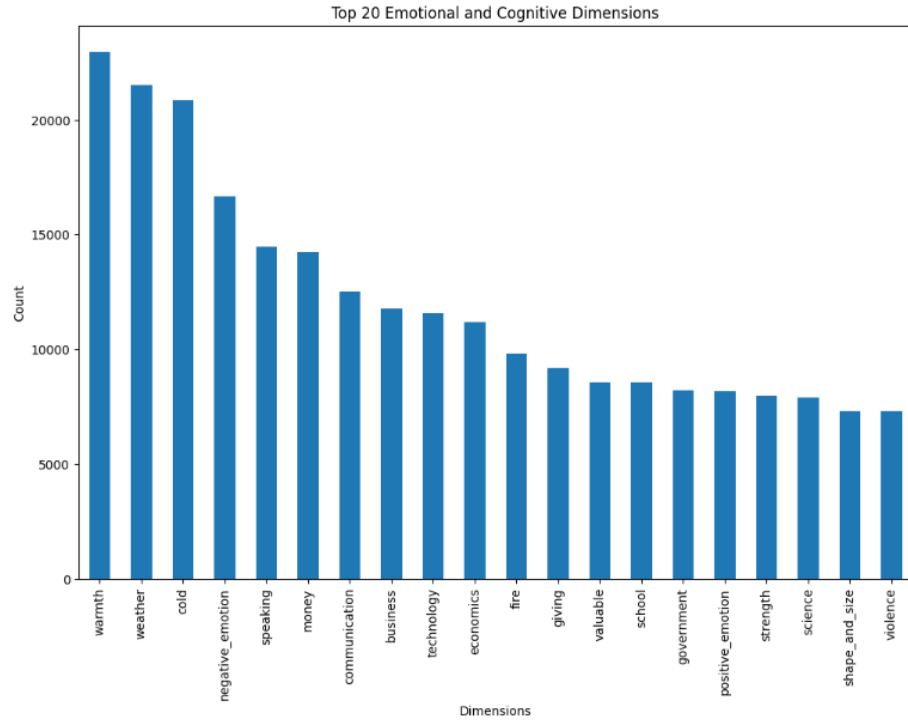
For sentiment analysis, we employ the EMPATH tool, a powerful tool for categorizing text data into various emotional and cognitive dimensions. The tool helps uncover nuanced sentiments expressed by Reddit users regarding climate change. The top 20 dimensions are visualized in a bar plot, offering a comprehensive view of the prevalent sentiments across the selected subreddits.

3. Statistical Analysis (LDA):

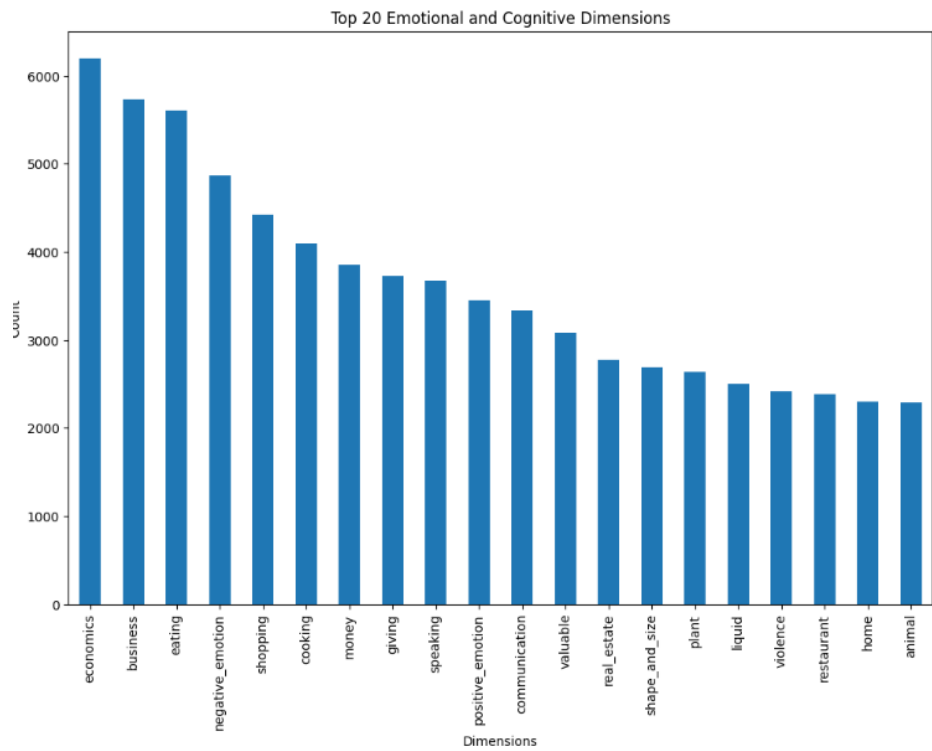
Statistical analysis involves employing Latent Dirichlet Allocation (LDA) for topic modeling. The topics are visualized using a box plot, and the top words for each topic are printed to provide a deeper understanding of the thematic distribution across posts.

Results:

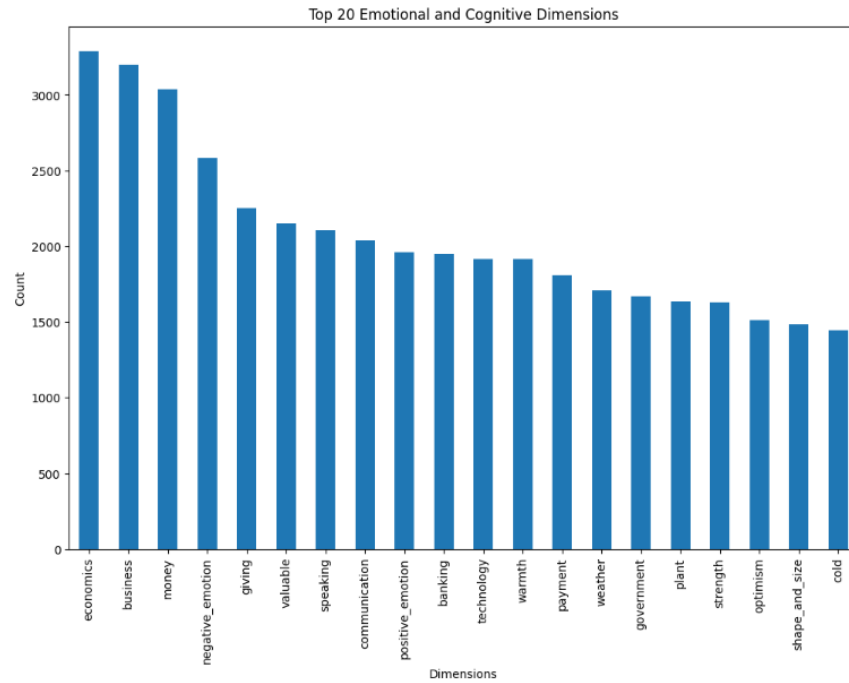
The EMPATH tool offered a detailed breakdown of emotional and cognitive dimensions. Visualizing the top 20 dimensions highlighted the most salient aspects, providing a snapshot of the diverse sentiments expressed across subreddits. They have been shown in Figure 2.



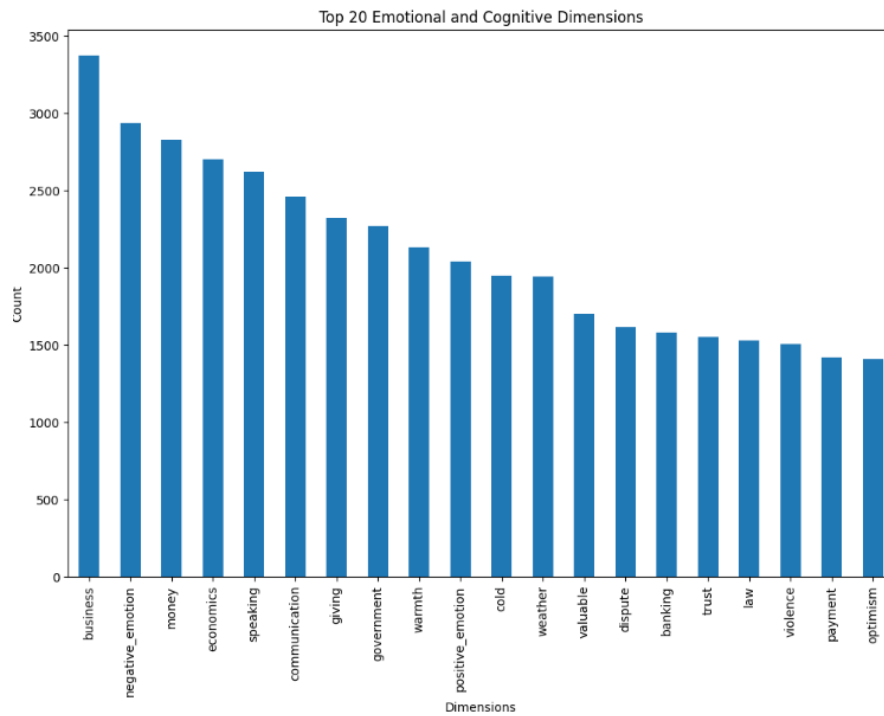
(a)



(b)



(c)



(d)

Figure 2. The top 20 dimensions for the following subreddits (a) climatechange, (b) sustainability, (c) ClimateActionPlan (d) ClimateOffensive

From LDA, we got the top 5 topics for the different subreddits. They are presented below along with their distribution:

1. climatechange:

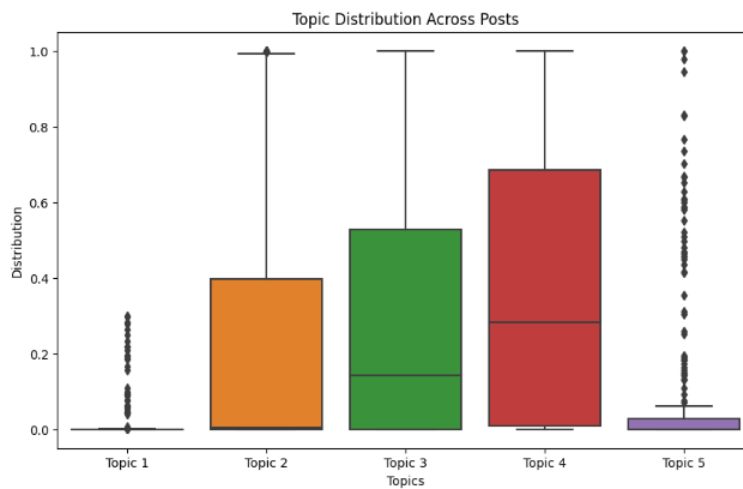
Topic 1: carbon, capture, co2, plants, ocean, forest, trees, methane, area, nhttps

Topic 2: climate, change, people, just, don, years, like, science, co2, think

Topic 3: people, nuclear, just, energy, like, don, power, need, think, climate

Topic 4: climate, change, just, people, years, like, don, co2, https, warming

Topic 5: ice, sea, https, years, temperature, year, www, like, water, just



2. sustainability:

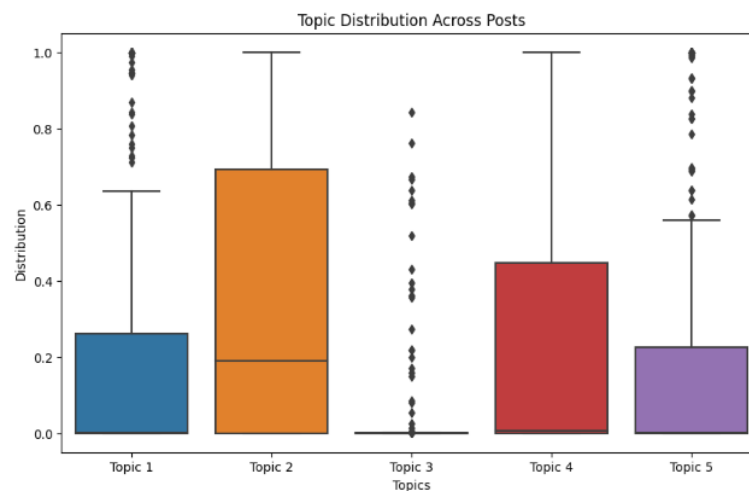
Topic 1: milk, just, like, don, water, people, use, stuff, dairy, things

Topic 2: people, just, like, don, think, need, change, make, climate, way

Topic 3: food, https, plastic, com, www, just, people, waste, like, don

Topic 4: plastic, just, like, people, don, use, make, waste, need, recycling

Topic 5: meat, people, just, like, animals, don, animal, eat, https, food



3. ClimateActionPlan:

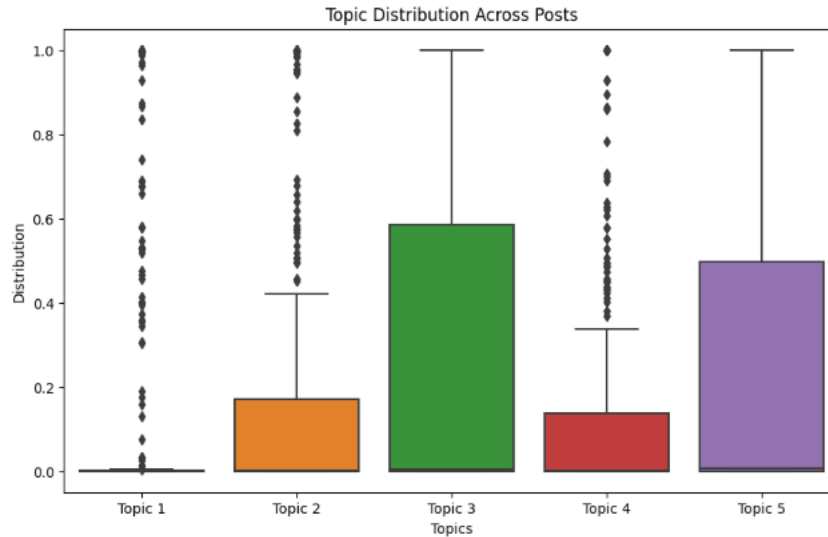
Topic 1: meat, just, like, people, make, don, beef, https, think, good

Topic 2: trees, like, just, tree, plastic, carbon, people, use, water, plant

Topic 3: just, like, people, climate, don, need, energy, nuclear, change, good

Topic 4: https, carbon, www, org, com, energy, climate, tax, http, reddit

Topic 5: people, just, like, don, money, nuclear, climate, energy, https, com



4. ClimateOffensive:

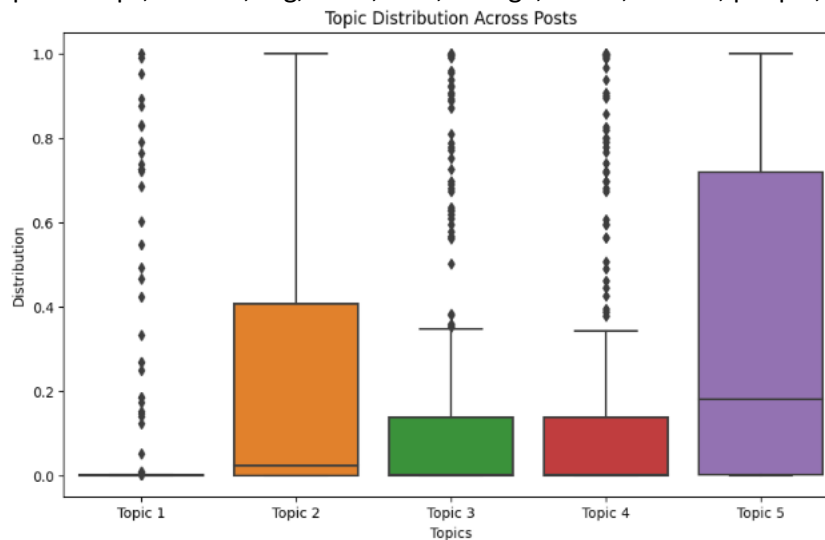
Topic 1: companies, people, emissions, change, climate, carbon, just, https, oil, fossil

Topic 2: people, just, like, don, meat, need, change, think, climate, make

Topic 3: climate, people, change, like, just, don, think, plastic, https, time

Topic 4: ecosia, trees, https, search, like, just, com, org, planting, people

Topic 5: https, climate, org, www, com, change, reddit, carbon, people, don



Conclusion and Limitations:

The analysis of Reddit discussions on climate change shed light on the diverse sentiments and emotional dimensions within the online community. From Figure 2 we can see that there are a lot of common dimensions among the different subreddits. Also, a common observation is that the frequency of negative emotion is higher than that of positive emotion across all the subreddits. The topic modeling results underscore the diverse and multifaceted nature of discussions within each subreddit. While common themes such as climate change awareness and sustainable practices emerge, each subreddit maintains a unique focus. The identified topics reflect the community's interests, concerns, and efforts to address climate change from different perspectives, including personal behaviors, policy interventions, and corporate responsibility. This diversity highlights the complexity of the climate change discourse and the necessity for holistic approaches to mitigate its impacts.

Our analysis unveiled the rich tapestry of climate change discussions on Reddit, showcasing diverse sentiments and cognitive dimensions. However, limitations exist. The reliance on 'top' posts assumes representativeness, potentially overlooking sentiments within less visible threads. Limitations include the potential bias introduced by the Reddit platform and the specific subreddits chosen.

References:

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