No AI on a Dead Planet: Sentiment and Emotion Analysis Across Reddit Communities on AI and the Environment

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Abstract

This paper investigates how different online communities perceive and discuss the environmental impact of AI through sentiment analysis and emotion detection. We analyze Reddit discussion from r/artificial and r/climatechange, using pretrained models fine-tuned on social media data. Our analysis reveals distinct patterns in how these communities engage with AI's environmental implications: the AI community demonstrates a shift from predominantly neutral and positive sentiment in posts to more balanced perspectives in comments, while the climate community maintains a more critical stance throughout discussions. The findings contribute to our understanding of how different communities conceptualize and respond to the environmental challenges of AI development.

1 Introduction

The debate on the impact of Artificial Intelligence (AI) is multifaceted, encompassing different areas of society and, more broadly, environmental sustainability (Crawford, 2021). One of the most pressing issues is the ecological footprint of AI systems, primarily due to their intensive computational requirements and consequent energy consumption of increasingly larger models (OECD, 2022; Wang et al., 2024). The extensive training of these models leads to substantial CO2 emissions and water consumption, with projections suggesting Large Language Models (LLMs) could potentially reach over 30% of the world's total energy consumption by 2030 (Bolón-Canedo et al., 2024). The environmental cost extends beyond training to daily usage. The public release of ChatGPT, powered by GPT-3, sparked widespread adoption of AI assistants, leading to a dramatic increase in their collective energy usage. For instance, each ChatGPT query during inference consumes energy equivalent to running a 5-watt LED bulb for 1 hour and 20 minutes. Furthermore, the carbon footprint of these systems is intertwined with broader issues of extractivism, both material and immaterial. This includes the resource mining, energy consumption, and product obsolescence cycles required to manufacture the hardware and infrastructure supporting AI (Brevini, 2023). These are all issues that must be addressed within the NLP scholar community, as our research work relies more heavily on LLMs.

Several efforts have been devoted to understanding and reducing the environmental impact of AI techniques (Verdecchia et al., 2023). For example, researchers have developed a carbon emission tracking tool for models training process (Budennyy et al., 2022), a lighter version of existing models (Lan et al., 2019) and they created optimized techniques for a better efficiency-consumption trade off like the Gaussian Process-based Bayesian Optimization (Candelieri et al., 2021).

Despite growing evidence of AI's environmental impact, studies have shown that these technologies are often perceived as more sustainable, or less environmentally harmful than they actually are (Yeh et al., 2021).

Building on previous research (Bosco et al., 2023), this paper investigates the online discourse surrounding AI's environmental impact through sentiment analysis (SA) and emotion detection. In particular, we focus on two interest-based communities on Reddit, the forum social network: the subreddits r/artificial and r/climatechange. By examining and comparing these two distinct threads of online conversation, this paper aims to shed

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light on the emotional gradient of online conversations on the matter.

The paper is structured as follows. Section 2 reviews existing studies on SA in climate change-related discourse; Section 3 presents our methodology and collected data, describes the models that were used to perform the analysis; Section 4 discusses the results of the analysis; and Section 5 outlines conclusions and future research directions.

2 Related Work

In recent years, the application of Natural Language Processing (NLP) and Sentiment Analysis (SA) to analyze the discourse on climate change (CC) and related environmental matters increased.

NLP methodologies were adopted for stance classification (Mohammad et al., 2016; Luo et al., 2020), entity recognition in environmental texts (Abdelmageed et al., 2022), bias detection in corporate communication (Moodaley and Telukdarie, 2023) and sustainability reports (Ning et al., 2021). Moreover, a growing body of research has examined bias in environmental discourse. Scholars like Leach et al. (Leach et al., 2021) and Takeshita et al.(Takeshita et al., 2022) have explored anthropocentric and speciesist biases in language, and developed methods to address these issues. The framing of environmental topics in media and political arenas has also been studied, investigating how these frames shape public perceptions and influence policymaking (Dehler-Holland et al., 2021).

Sentiment analysis in particular was adopted to analyze tweets corpora to capture the broad public feeling on climate change (Dahal et al., 2019; Mi and Zhan, 2023). Similarly, existing work focuses on public opinion or emotional responses towards particular ecological events or phenomena (Duong et al., 2023; Roberts et al., 2018).

Despite the growing environmental implications of AI systems, the field of Natural Language Processing has insufficiently explored how different communities perceive and discuss these ecological impacts. This study addresses this research gap through a comparative analysis of sentiment and emotional patterns in discussions across AI-focused and climate-focused online communities, offering insights into how distinct epistemic communities conceptualize the environmental implications of AI technologies.

3 Methodology

3.1 Data Collection and Preprocessing

We collected textual data from two Reddit subreddits: r/artificial and r/climatechange. These subreddits were chosen for their high levels of activity and engagement, with r/artificial hosting over 900k members and frequent discussions. The inclusion of r/climatechange was further supported by the alignment with prior research that identifies this subreddit as one of the five most significant climate communities on Reddit (Parsa et al., 2022). For each subreddit, we retrieved posts by searching for three predefined keywords: 'emissions', 'energy consumption', and 'climate change' for r/artificial; and 'artificial intelligence', 'AI', and 'machine learning' for r/climatechange. The selection of keywords was grounded in our preliminary analysis of the most frequently occurring technical terms in each subreddit when discussing the intersection of AI and environmental issues. Using the Reddit API via PRAW, the search was performed with top sorting method. Posts without any text content were then filtered out. For each remaining post, comments were recursively collected, including nested replies, ensuring a comprehensive dataset. The extracted data included post IDs, titles, bodies, and all associated comments with their metadata. The preprocessing phase involved concatenating post titles and bodies into a 'full_post' column. While links and URLs were removed, we preserved punctuation, emojis, and other textual features to maintain the original sentiment and tone. The resulting corpora are:

AI Corpus. 783 entries derived from discussion threads focused on environmental concerns in AI development, containing 47k tokens. Posts address directly environmental concerns in AI development, such as computational costs and energy consumption, averaging 338 words with 1,943 unique tokens. Comments primarily emerge from technical discussions, often focusing on potential solutions and technological optimizations. They average 50 words and contain 5,361 unique tokens.

Climate Corpus. 870 entries with a total of 66k tokens. Posts average 187 words with 1,130 unique tokens, while comments average 71 words with 6,439 unique tokens. Discussions center on technological interventions in climate change, where AI emerges mostly as a subtopic.

3.2 Sentiment and Emotion Analysis

For the sentiment and emotion analysis of the Reddit data, we selected two pre-trained models based on their relevance to the domain and the social media context. For sentiment classification, we used cardiffnlp/twitter-roberta-base-sentiment-latest (Barbieri et al., 2020), a RoBERTa variant fine-tuned on Twitter data. Despite being trained on Twitter, the model is suitable for Reddit analysis due to similar social media linguistic patterns. For emotion detection, we used monologg/bert-base-cased-goemotions-original (Park, 2020), which was fine-tuned on the GoEmotions dataset: a dataset of 58,000 Reddit comments. This model distinguishes between 28 distinct emotions, providing granular emotional analysis specifically calibrated for Reddit's conversational style. This expanded range of emotions allows for a more detailed understanding of emotional nuances in the discussions, which is crucial for our specific analysis.

4 Results and Discussion

The sentiment and emotion analysis reveals distinctive discourse patterns across two specialized communities under analysis. The analysis shows robust reliability with average confidence scores of 71% for sentiment classification and 85% for emotion classification across both datasets, with particularly high confidence in detecting the most frequent emotions.

The findings are presented first through an individual corpus analysis and then through a comparative analysis supported by representative examples that highlights divergences in framing, response patterns, and community engagement dynamics. Table 1 summarizes the sentiment distribution for posts and comments in both corpora.

4.1 Results on the AI corpus

Posts in r/artificial demonstrate a predominantly neutral outlook (50%) when discussing AI's environmental impact, with positive sentiments following (35%) and negative sentiment representing a minority (15%).

The community frames AI as a potential solution to environmental challenges, rather than emphasizing its role as a contributor to climate change, reflecting a characteristic techno-optimistic perspective within the AI community and the broader tech industry. In short, the dominating opinion seems to be that automatic technology like AI is a key to tackle and solve CC (Danaher, 2022).

In the comments neutral responses predominate (51.7%), followed by negative (29%) and positive (19.3%) sentiments.

Emotionally (Table 2), posts exhibit high neutrality (50%), followed by confusion (15%) and optimism (15%), realization (10%) and a small presence of approval (5%) and admiration (5%). The emotional landscape in comments shows a more diverse spectrum with a strong presence of neutral expressions (45.7%), followed by a mix of positive emotions including approval (9.1%), curiosity (7.0%), and admiration (5.1%). Notably, even when criticism appears in comments, it manifests as measured skepticism rather than hostility, with annoyance (3.3%) and disapproval (2.9%) being the most frequent negative responses. This distribution suggests that while the community engages critically with AI's environmental impact, it maintains a predominantly analytical rather than emotional discourse.

4.2 Results on the Climate corpus

Posts in the Climate corpus demonstrate a markedly cautious perspective, with neutral sentiments strongly predominating (81.3%), followed by negative sentiments (12.5%), while positive sentiments represent a smaller fraction (6.3%). This distribution suggests how the climate change community approaches AI developments with reservation and skepticism. The sentiment distribution in the comments section shows an even more critical stance, where negative responses become the majority (45.5%), closely followed by neutral perspectives (43%), while positive sentiments remain minimal (11.5%). The community discussions tend to emphasize concerns about AI's role in environmental issues, potentially focusing on its energy consumption and environmental costs rather than its solutions-oriented potential.

The emotion detection analysis (Table 3) of posts reveals an interesting contrast: while posts express curiosity (31.3%), they also show confusion (12.6%) and present a small percentage of fear (6.3%), an emotion that did not appear at all in the first corpus. This emotional spectrum suggests that while there's recognition of AI's potential capabilities in doing good in the fight against CC, there's also uncertainty and apprehension about its

Sentiment	AI Posts	AI Comments	Climate Posts	Climate Comments
Positive	35%	19.3%	6.3%	11.5%
Neutral	50%	51.7%	81.3%	43%
Negative	15%	29%	12.5%	45.5%

Table 1: Sentiment distribution in the AI and Climate corpora (posts and comments)

Emotion	Posts	Comments
Neutral	50%	45.7%
Confusion	15%	4.5%
Optimism	15%	3.8%
Realization	10%	3.1%
Approval	5%	9.1%
Admiration	5%	5.1%
Curiosity	-	7.0%
Amusement	-	4.1%
Annoyance	-	3.3%

Table 2: Most frequent emotions in AI corpus (>3%)

Emotion	Posts	Comments
Neutral	37.5%	44.3%
Curiosity	31.3%	7.9%
Confusion	12.6%	3.6%
Admiration	6.3%	5.5%
Fear	6.3%	-
Gratitude	6.3%	-
Approval	-	8.0%
Optimism	-	5.1%
Disapproval	-	4.9%
Realization	-	3.9%
Annoyance	-	3.8%

Table 3: Most frequent emotions in Climate corpus (>3%)

environmental implications.

Comments maintain this complexity, with similar prevalence of neutral expressions (44.3%), but a different emotional spectrum. While approval (8.0%) and curiosity (7.9%) remain high, there's a stronger presence of critical emotions, with disapproval (4.9%) and annoyance (3.8%) appearing more frequently than in the AI corpus. This emotional pattern, combined with higher levels of realization (3.9%) and confusion (3.6%), suggests a more questioning approach to AI's role in environmental issues.

4.3 Qualitative Insights and Comparative Analysis

To complement the quantitative findings presented earlier, we draw on an extensive qualitative content analysis conducted on our dataset, examining hundreds comments from both communities to identify recurring patterns and themes. While the examples discussed below illustrate key dynamics, our broader observations are derived from a systematic review of full posts and associated comment threads. Through this analysis, we identified distinct patterns in how each community frames and react to environmental concerns.

The selected examples illustrate these broader patterns:

Example 1. The post "*AI already uses as much energy as a small country. It's only the beginning*" presents the International Energy Agency's prediction about data centers' future energy usage, which could become equivalent to Japan's consumption by 2026. Despite the worrying prediction suggested by the title, the body of the post adopts a report-like, fact-based narrative that aligns the AI community's tendency toward neutral, technical discourse. This consistency in style likely explains why the model classified it as neutral. The comments section displays a characteristic tendency toward constructive and solution-oriented approach. For instance, one user asks how the energy cost of AI compares to that of gaming, expressing curiosity. Subsequent comments frequently pivot toward potential solutions, discussing fusion energy and improved GPU efficiency, reflecting the community's tendency to view environmental challenges as technical problems awaiting solutions rather than insurmountable obstacles.

Example 2. An illustrative example of the Climate community dynamics can be found in this post: "*AI for Ocean Cleanup: A Better Use of Robotics? Found this good question on another platform. 'Can we get some AI to pick plastic out of the ocean or do all robots need to be screenwriters?' instead of replacing all other human*

job titles. Why not use AI for the environment and betterment, aside from using it for profit?". It was classified with neutral sentiment and confusion emotion, probably because it poses a series of consecutive questions. However, the comments reveal a more complex spectrum of emotions. Some responses show cautious optimism, classified by the model as desire ('I would really like to see AI be used like this'), while others, negative and classified as showing disapproval and disappointment, express technical skepticism ('Ai is a significant contributing factor to carbon production. It's not environmentally friendly at all.') or point to broader systemic issues ('There's not enough clean energy. It's a problem. Data centers also use a large amount of fresh water. I'm so sick of hypothetical answers from technocrats').

Example 3. Another post, titled "*Big Tech's thirst for AI dominance may bring literal thirst for everyone else*" highlights critical concerns about data centers' water consumption. The post was classified as neutral and realization, but it triggers diverse emotional responses in the comments: from existential concerns classified as negative with sadness ('Bruh we are all going to die slow and painful deaths'), to the curiosity that emerges in questions about cooling systems' efficiency.

Example 4. The post titled "*AI and Climate Change - Our best hope*" promotes a podcast featuring a scientist discussing machine learning's potential for climate change mitigation. The post, classified with positive sentiment and optimism emotion, exemplifies the techno-optimistic framing often found in the AI community. The comments section reveals overwhelmingly positive reactions, with multiple expressions of gratitude and admiration ('Awesome stuff - really banking on AI being what leads us away from our worlds current political and climate situation'). However, this optimism is occasionally tempered by critical perspectives, as seen in comments like 'Yeah, that's humans mentality - keep on messing up', classified with negative sentiment.

These examples showcase the different approaches detected for the two different communities. Within the AI subreddit, environmental predictions are often addressed through constructive and techno-optimistic perspectives, demonstrating a tendency to overlook the environmental risks of unrestricted AI system growth. On the other hand, the climate community is predominantly wary of the framing that sees AI as a valid tool in the fight against CC.

5 Conclusion and Future Work

This study presents an analysis of sentiment and emotion patterns in discussions about AI's environmental impact across two Reddit communities. The AI community shows a neutral-positive sentiment, while the climate community is more neutral in posts but varies between negative and neutral in comments. Emotionally, AI discussions feature approval, curiosity and admiration; the climate corpus reveals a slightly broader emotional spectrum, with higher frequencies of critical emotions like disapproval and annoyance. Qualitative analysis reveals different problem-framing approaches. The AI community tends to approach environmental concerns as technical challenges amenable to optimization, often transforming warnings about energy consumption into discussions of efficiency improvements. The climate community's responses indicate attention to systemic environmental impacts, with a marked skepticism toward technological solutions.

Future work will address current limitations of this study through the development of a high-quality, manually annotated dataset focused on the topic of our interest. The creation of a gold standard dataset will enable proper evaluation of different models' performances on our specific domain. To this end, we will develop annotation guidelines, conduct inter-annotator agreement studies, and create a corpus capturing the language patterns that are present in discussions about AI's environmental impact. Such a resource would not only allow for more reliable model evaluation but could also serve as training data for fine-tuning models specifically for this domain. Expanding the analysis to include more diverse online communities could also enrich the findings and reveal additional patterns.

Finally, the differences between AI and climate subreddits highlight the need to foster connections and encourage collaboration between commmunities. Future research could create a more productive dialogue, perhaps through development of shared tools or frameworks that combine both approaches to assess and tackle AI's environmental impact.

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