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AI Angst or AI Adoration? : Sentiment and Topic Modeling on Reddit Data

(1470 words)

1. Introduction

Artificial intelligence (AI) is rapidly evolving, raising profound questions about its impact on society. This makes public perception of AI advancements crucial, as it influences policy, development, and societal preparedness.This study builds upon the growing body of work examining public perception of AI through social media analysis. One relevant study by Luo et al., 2023 utilized sentiment analysis on Twitter data to identify positive reception towards AI applications and concerns regarding job automation and the potential for conscious AI. Another study by Chen et al., 2022: Investigating Public Opinion on Artificial Intelligence through Social Media Analysis employed sentiment analysis on Weibo, a popular Chinese platform, to uncover a more nuanced picture where public sentiment towards AI oscillated between excitement for its potential and anxieties about ethical considerations and potential misuse.

This study, by focusing on the specific online community of r/singularity, investigates how public discussions on social media platform Reddit, express sentiment towards AI advancements. By analyzing sentiment and the topics associated with those sentiments, the study aims to shed light on the core concerns and aspirations driving public discourse on AI advancements.

2. Research Question

How do public discussions on reddit thread r/singularity express sentiment (positive, negative, or neutral) towards advancements in Artificial Intelligence, and what are the key topics/themes associated with these varying expressions of sentiment?

3. Method

3.1 Data

The Data for the study is collected from r/singularity, a Reddit community specifically focused on in-depth discussions about the technological singularity, artificial intelligence (AI), and human enhancement. While subreddits like r/futurology touch on similar themes, r/singularity was chosen due to its direct relevance to the research topic and considering factors like popularity, size, and the frequency of active user engagement within the community.

To assess prevailing sentiments and prevalent topics within AI discourse, data was extracted using the Python Reddit API Wrapper (PRAW), filtering comments based on the terms "AI" and "Artificial Intelligence", with case insensitivity. A total of 1000 data points were collected from top reddit posts. These top posts are based on the most upvoted and commented posts from the past year (between January 2023 and January 2024). This timeframe was selected to ensure the study of most recent viewpoints. My initial analysis revealed that top posts typically generate over 150 comments. Hence, To capture a diverse range of sentiments and topics, 100 comments were collected from each of the top 10 retrieved posts which gave a total of 1000 data points for the entire study. This method aims to strike a balance between spotlighting prominent discussions and ensuring a robust sample size for sentiment analysis and topic modeling.

To prepare the data for analysis, the curated comments from Reddit posts were transformed into a structured dataset using the pandas library. This dataset included relevant columns, like ‘Author’, ‘Text’, ‘Date’, ‘Score’ to facilitate efficient processing.

3.2 Analysis

To conduct sentiment analysis on the data points, this study utilizes the EMPATH Python package, a lexicon-based approach that offers a nuanced understanding of sentiments beyond simple positive, negative, or neutral categorizations. Empath analyzes the language used in the text and identifies keywords and phrases associated with positive, negative, and emotional categories. It then assigns scores to each category based on the frequency and intensity of these keywords

This study utilized empath to gauge the trend in positive and negative emotions towards AI in the proposed timeframe by leveraging the lexicon.analyze(text) function from the EMPATH library. This function assigned scores based on the intensity of negative, positive, and neutral emotions within the text, leveraging seed words from the Empath dictionary for categorization.

Before proceeding to topic modeling, the curated dataset was preprocessed using python re library's regex functions to remove non-alphabetic characters, unwanted colons, and commas. These pre-processing steps further included converting everything to lowercase, tokenizing the text, removing stop words, and lemmatizing the text. The results of this preprocessing were stored in a new column 'new_text', which was used for the rest of the study. This preprocessed dataset was used to train the LDA model. The model leveraged libraries like gensim and NLTK's stopwords module to build the bag-of-words (BOW) representation and vector embeddings. These were then used to create the corpus dictionary, which finally trained the LDA model with 10 topics. The LDA results were further visualized using the Python library pyLDAvis.

4. Result

A word cloud (Figure 1) was generated to visualize the most frequent terms and buzzwords used within the dataset during the specified timeframe.. It was observed that terms like "people," "AI," and potentially "human" were among the most frequently occurring words.

Figure 1: Word Cloud of the reddit dataset

The following line graph in figure 2 shows the changing trends in positive and negative towards AI over the specified timeframe. A significant increase in positive sentiment and a corresponding decrease in negative sentiment can be observed from January 2023 to March 2023, which suggests a heightened enthusiasm surrounding AI developments during this period. However, this trend does not persist, and positive scores decline in the following months.

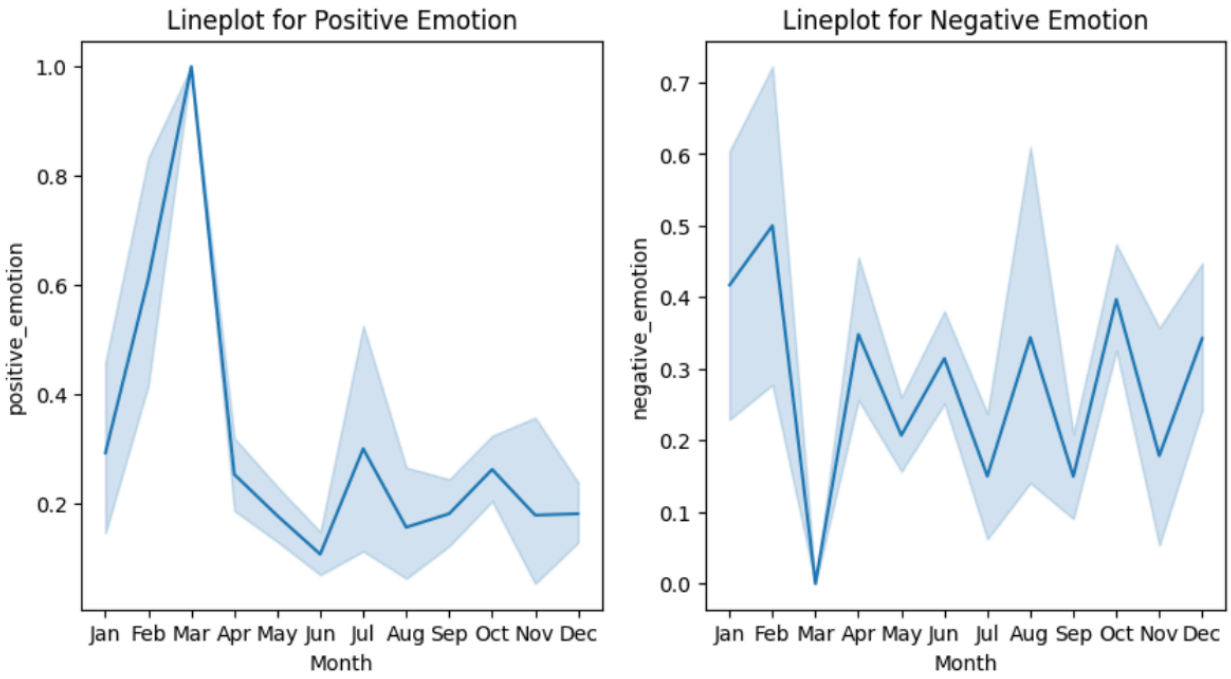

Figure 2: Trend of positive and negative sentiments during Jan 23- Dec 23

Table 1 presents the results of the LDA topic modeling, showcasing 10 topics alongside their prominent associated words or themes. The "Marginal topic distribution" column indicates the prevalence of each topic within the entire corpus dataset, while the "Words" column highlights the predominant terms within each topic.

Initially, the LDA modeling yielded topic numbers characterized by a high frequency of random keywords lacking informative value, such as 'i'm', 'will', 'like'. This issue was addressed by expanding the stopwords list for the dataset and retraining the LDA model. Upon examination of the table, it became apparent that several topics, namely 1, 2, 3, 4, 5, and 7, are frequently characterized by terms like 'people', 'world', and 'think', suggesting prevalent themes revolving around the social impact of AI and decision-making in conjunction with AI, which were prominent during the designated time frame. Furthermore, a pyLDAvis visualization of the LDA model for topic 4 is depicted in Figure 3, shows higher frequency of the words "Intelligence", "think", "world", "smart" which point towards discussions about the potential capabilities of AI and how it might reshape the world in the future.

Topic 9 delves into recent advancements in AI, featuring frequent words such as 'altman', 'openai', and 'new', indicating a focus on emerging developments within the field.

Topic	Marginal Topic Distribution	Words
1	15.3%	People, years, need, talk
2	13.7%	Think, data, world
3	11.6%	years, people, make, think
4	11.3%	Intelligence, think, world, smart
5	10.5%	People, years, work, way
6	9.9%	Intelligence, think, consciousness, game, theory
7	8.2%	Know, people, world, need, think
8	7.8%	Human, intelligence, know, future
9	7.7%	Years, time, new, altman, openai
10	4%	Believe, general, think, seen

Table 1: LDA model results

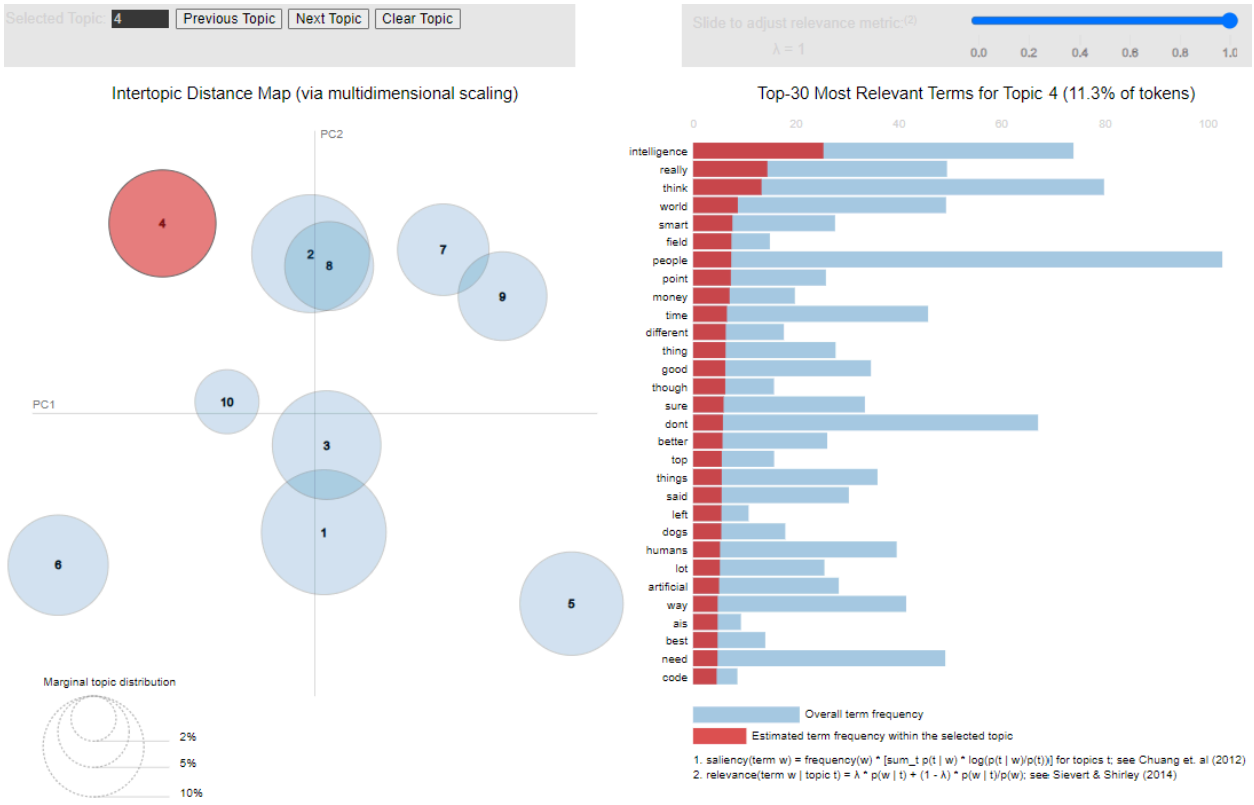

Figure 3: pyLDAvis visualization of the LDA model

5. Conclusion

This study explored public sentiment and discussion topics surrounding AI advancements on Reddit's r/singularity forum. By analyzing sentiment and the linked topics, the research provided insights into the core interests and concerns driving public discourse on AI.

The sentiment analysis study revealed a dynamic trend. There was a surge in positive sentiment in early 2023, potentially reflecting excitement about specific breakthroughs. However, this enthusiasm waned in later months, suggesting a more nuanced perspective emerged, demonstrating a shift from initial optimism to a more balanced view that considers both the potential benefits and potential drawbacks of AI. The results of topic modeling concluded, Social impact of AI and the role of AI in decision-making as prominent themes within the discussions. This suggests that the r/singularity community is not only interested in the technical aspects of AI advancements but also in the potential

consequences for society. Additionally, the analysis highlighted ongoing interest in keeping up with recent developments within the field of AI research.

These findings paint a picture of public perception on Reddit that appears to be a complex interplay of AI Adoration and AI Angst. While initial bursts of excitement may greet new advancements, a more balanced perspective emerges over time. The potential benefits of AI are weighed against anxieties about its social impact and responsible development.

6. Limitations

This study acknowledges several limitations that should be considered when interpreting the results. Firstly, the limited and small volume of data which originates from a single social media platform (Reddit) and focuses on specific subreddit. While the subreddit may be popular, it might not accurately reflect the broader public opinion. Underrepresented or absent demographic groups could skew the sentiment analysis. Additionally, discussions on similar platforms with different user bases might reveal contrasting perspectives. Secondly, Sentiment analysis tools have limitations in capturing the subtleties of language, and topic modeling can be subjective. Finally, the study only analyzes text data, missing the richer context of user demographics and motivations behind their posts.

7. References

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