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COMPUTATIONAL MODELING OF PUBLIC PERCEPTION OF ARTIFICIAL INTELLIGENCE ON REDDIT USING ML

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Discussions about artificial intelligence (AI), particularly generative models like ChatGPT, have become more common on social media these days, reflecting a wide range of public opinions and worries. From 2022 to 2025, this study examines public opinion and thematic discussion on Reddit related to artificial intelligence (AI). Using more than 35 carefully chosen keywords, we gathered more than 2900 posts and 636000 comments from 10 subreddits pertaining to artificial intelligence. Logistic Regression, SVM, and Naive Bayes were used to perform a supervised sentiment classification using a labeled Reddit dataset. Applying the best-performing model to our entiredataset showed that 20% of comments were negative, 35% were neutral, and 45% of comments were positive. BERTopic topic modeling revealed dominant themes like creative tools, automation anxiety, and AI ethics. Our study provides insight into how online communities perceive and respond emotionally to the rise of generative AI.

Keywords: artificial intelligence, generative AI, sentiment analysis, topic modeling, social media mining, public perception, natural language processing.

REDDIT ПЛАТФОРМАСЫНДАҒЫ ЖАСАНДЫ ИНТЕЛЛЕКТКЕ ДЕГЕН ҚОҒАМДЫҚ КӨЗҚАРАСТЫ МАШИНАЛЫҚ ОҚЫТУ ӘДІСІМЕН МОДЕЛЬДЕУ

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Жасанды интеллект (ЖИ), әсіресе ChatGPT сияқты генеративті модельдер туралы талқылаулар соңғы жылдары әлеуметтік желілерде жиілеп, осыған орай қоғам әртүрлі пікірлер мен алаңдаушылықтарды білдіруде. Бұл зерттеу 2022–2025 жылдар аралығында Reddit платформасындағы жасанды интеллектке қатысты қоғамдық пікір мен тақырыптық талқылауларды талдады.35-тен астам мұқият таңдалған кілт сөздердің көмегімен жасанды интеллектке арналған 10 сабреддиттен 2900-ден астам жазба мен 636000 пікір жиналды. Таңбаланған Reddit деректер жиынтығын пайдалана отырып, Logistic Regression, SVM және Naive Bayes алгоритмдері арқылы бақыланатын сентимент классификациясы жүргізілді. Ең жақсы нәтиже көрсеткен модельді бүкіл деректер жиынтығына қолдану нәтижесінде пікірлердің 20%-ы теріс, 35%-ы бейтарап және 45%-ы оң екені анықталды. BERTopic әдісі арқылы жүргізілген тақырыптық модельдеу шығармашылық құралдар, автоматтандыруға байланысты алаңдаушылық және ЖИ этикасы сияқты негізгі тақырыптарды анықтады. Зерттеу нәтижелері онлайн қауымдастықтардың генеративті ЖИ дамуын қалай қабылдайтынын және қандай эмоция тудыратынын түсінуге мүмкіндік береді.

Түйін сөздер: жасанды интеллект, генеративті ЖИ, сентимент талдауы, тақырыптық модельдеу, әлеуметтік желі деректерін талдау, қоғамдық көзқарас, табиғи тілді өңдеу.

ВЫЧИСЛИТЕЛЬНОЕ МОДЕЛИРОВАНИЕ ОБЩЕСТВЕННОГО ВОСПРИЯТИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА НА REDDIT С ИСПОЛЬЗОВАНИЕМ МАШИННОГО ОБУЧЕНИЯ

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В последние годы в социальных сетях все чаще возникают дискуссии об искусственном интеллекте (ИИ), в частности о генеративных моделях, таких как ChatGPT, что побуждает общество высказывать различные мнения и опасения. В данном исследовании был проанализирован общественный резонанс и тематические дискуссии об искусственном интеллекте на платформе Reddit в период с 2022 по 2025 год. С помощью более 35 тщательно отобранных ключевых слов было собрано свыше 2 900 постов и 636 000 комментариев из 10 субреддитов, посвященных искусственному интеллекту. С использованием помеченного набора данных Reddit была проведена классификация настроений под контролем с помощью алгоритмов логистической регрессии, SVM и наивного Байеса. Применение наиболее эффективной модели ко всему набору данных показало, что 20 % комментариев были негативными, 35% оказались нейтральными, а 45% положительными. Моделирование тем, проведенное с использованием метода BERTopic, выявило ключевые темы, такие как творческие инструменты, опасения по поводу автоматизации и этика ИИ. Результаты исследования дают представление о том, как онлайн-сообщества воспринимают развитие генеративного ИИ и какие эмоции он вызывает. Полученные результаты позволяют понять, как онлайн-сообщества воспринимают и эмоционально реагируют на распространение генеративного ИИ.

Ключевые слова: искусственный интеллект, генеративный ИИ, анализ тональности, тематическое моделирование, анализ социальных медиа, общественное восприятие, обработка естественного языка.

Introduction. In recent years, an exponential growth in the capabilities and visibility of artificial intelligence (AI) is realized, in particular with the generative artificial intelligence (AI). Applications such as ChatGPT, Midjourney, and DALL-E have especially boosted AI technologies in a wide range of industries - from creative writing to design production to customer service to software development and hence the reason of popularity gaining momentum across the board [1]. Among these, OpenAI' s ChatGPT has attracted unprecedented attention on a global scale, achieving the unprecedented feat of becoming the fastest growing consumer application in history by reaching more than 100million users in only two months of its release [2]. The alarming development of these technologies has resulted in an array of different societal responses ranging from enthusiasm to apprehension to regulatory intervention. Authorities and educational institutions have taken various heterogeneous positions, such as New York City leaving out the prohibition to the use of ChatGPT on its school system [3], Italy temporarily suspending the use of the tool due to data privacy concerns [4]. These are emerging developments that indicate societal tension growing in inconvenience to the perceived opportunities and dangers of generative AI.

This duality is also reflected by data based on survey. Engagement in the Technologies According to Stanford HAI' s 2025 AI Index Report, 55% of respondents from 26 countries say that AI offers more benefits than drawbacks, but 58% of respondents say that they are concerned about the ethical and trust issues related to the technologies [5]. Social media platforms such as Reddit, X (formerly Twitter), Threads and LinkedIn generate huge volumes of user-generated content on an everyday basis and so offer timely insights into public sentiment and conduct. Often the data produced by these platforms are more up to date than the alternative data because of the organization of a topic-based communities and a free discussion from users. The explosive growth of social media has changed fundamentally the way modes of interaction, communication and expression of opinion are taken. With billions of users creating generous amounts of text, images

and video everyday, these are rich environments to study human behaviour. Empirical evidence shows that the average individual spends over two hours in a day on platforms like Twitter, Facebook, Instagram and TikTok [1]. These platforms make it easier for cross cultural and cross linguistic engagement, which would allow for unprecedented global discourse.

The scale and complexity of social media data often challenge the existing approaches of the traditional analytical methods, however, machine learning (ML) and deep learning (DL) methods provide scalable and useful mechanisms to extract the patterns, discover the sentiment trends and find the behavioral signals. In turn, the research on behavior analysis in the context of social media has been widely used in areas as diverse as opinion mining, sentiment analysis [6- 8], fake news detection [9], cyberbullying detection [10], and the prediction of trends [11, 12].

Recent work has used ML approaches to determine public opinion of AI on various social media platforms. For example, the authors [1] analyzed more than 3 million tweets between January 2019 and March 2023 concerning the occupation of users and their interactions with ChatGPT and other generative AI tools. Their findings showed that, although generative AI was generally favorably received, illustrators voiced very negative feelings, mainly because of the unethical use of artwork in the training of generative AI systems. Similarly, [13] used sentiment classification on 33,912 Reddit comments and noted that technical communities had a more even spread of sentiments, while non-technical subreddits had more negative sentiments towards AI, particularly related to job displacement and ethical risks. These researches highlight the power of ML in measuring nuanced public perceptions of AI technologies.

DL methodologies have also been used to further improve analyses of public perception to handle complex nuances in social media discourse. In particular, [14] proposed a DL framework for public opinion analysis for AI generated art discussions on Weibo by fusing a linguistically improved pre-training model (LERT) with bidirectional simple recurrent unit architecture (BiSRU++) model. The framework was able to obtain superior sentiment classification for short text. Moreover, they used clustering techniques which include autoencoder based dimensionality reduction, K-means clustering with C-TF-IDF keyword extraction to detect fine-grained user opinions and discussion patterns associated with AI-generated art. In a similar spirit, [15] presented a multimodal DL architecture using textual embeddings of BERT along with visual feature extractors such as 1D-CNN, UNet++, and ResNet-152 to predict general self-efficacy from social media. The hybrid model achieved an accuracy of 93.25%, proving the utility of combining textual and visual modality for psychological traits prediction using online behavior.

Beyond people’ s feelings, the mechanisms for self-governance have developed in online communities to deal with the spread of AI-generated content. A study [16] examined the prevalence and evolution of rules surrounding the use of AI generated content in communities by analyzing more than 300,000 public subreddits. Explicit AI-related rules, though small in number during the first year, more than doubled in a year and most in the larger subreddits focused on art or celebrities. These regulations often dealt with issues of authenticity and quality for AI-generated images. In a separate study, [17] investigated 100 high profile TikTok videos using the hashtag ”chatgpt” that collectively received more than 250 million views. Most of these videos promoted the use of ChatGPT for tasks such as writing essays and coding, while some were about how to avoid AI-detection tools. These findings illustrate user familiarity with AI technologies and how policy responses driven by the community and technological advances are in a dynamic interplay.

This study uses the platform Reddit to examine how generative AI is being discussed among topic-specific communities in the community as an example of the growing interest in AI. The main objectives of this research is:

- to analyse the sentiment dynamics of such

discussions using the supervised machine learning models.

- to identify the topics that dominate AI-related discourse in different communities and time periods.

The importance contributions of this paper are summarized below.

Dataset Construction: The construction of our data include a systematic calendar for data collection and filtering of data by collecting and filtering posts and comments. We crawled and compiled a corpus of 2948 reddit posts and 636,036 comments from 10 reddits related to AI. The content covers January of 2022 to December of 2025. This customised dataset provides a significant basis for the linguistic and affective analysis of the public discourse about generative Artificial Intelligence on a significant scale.

Sentiment Classification: We trained and tested several machine learning classifiers (Logistic Regression, SVM, Naive Bayes) on a public labelled dataset of Reddit posts and used the best performing classifier on our unlabeled dataset.

Topic Modeling: Using BERTopic, we identified predominant themes and semantic structure in the discussions in the Reddit forum, allowing us to analyse how the discussions change over time.

Materials and Methods. The methodological pipeline for this study consists of two major steps: (1) training a model for sentiment classification on an existing labelled dataset that is available in the public domain; and (2) putting the trained pipeline into operation on the custom collected Reddit dataset. As you can see in Figure 1, the process divides into three sequential steps: The asynchronous Reddit data collection, the text preprocessing, the sentiment classification with the help of supervised learning algorithms, and finally the topic modelling by using BERTopic. This part describes the data sources, preprocessing methods, feature representation technique and the classification methods used.

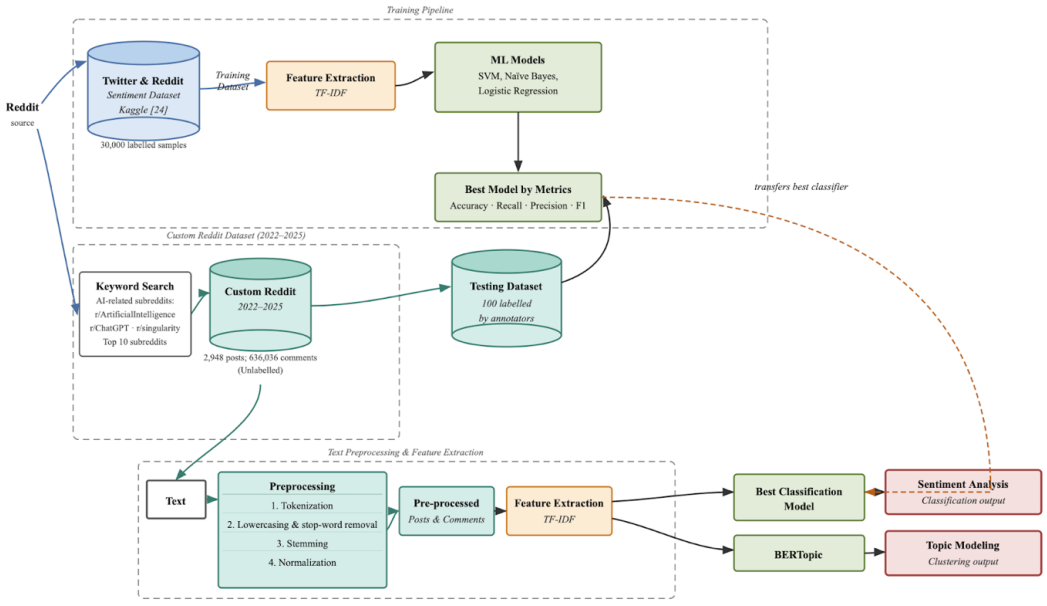


Fig.1 - Overall pipeline for data collection and determining sentiment data classification and topic modelling

To train and test the models for the classification of sentiment, an openly available dataset hosted at Kaggle ”Twitter and Reddit Sentiment Analysis Dataset” was used [18]. This resource includes labelled comments from both Twitter and Reddit, that are categorised into three sentiment classes;

positive, neutral and negative. Representative comments with their associated sentiment labels from the training dataset are shown in Figure 2.

CLEAN COMMENT	CATEGORY
Comments made by the people extracted from various Reddit (SubReddits), mainly focused on comments.	*Describes the actual sentiment of the respective comment, ranging from −1 to 1.*
family mormon have never tried explain them they still stare puzzled from time time like some kind ...	+1
buddhism has very much lot compatible with christianity especially considering that sin and sufferin...	+1
seriously don say thing first all they won get its too complex explain normal people anyway and they...	−1
what you have learned yours and only yours what you want teach different focus the goal not the wrap...	0

Fig.2 - Examples of comments and labels of the sentiments from the training data

Our custom dataset was harvested from January amantek 2022 to April amantek 2025 using the asyncpraw python library as will be described in Figure Maler 3. We picked the top ten Reddit subreddits that are recognised for active discussions around AI such as r/ChatGPT, r/OpenAI, r/ArtificialIntelligence, r/Futurology and r/Singularity. A keyword filter with over thirty-five AI-related terms in self-description (e.g. ”AI ethics”, ”GPT”, ”AI future”, ”OpenAI”, ”artificial intelligence”, etc.) was used in the posting’ s title and content. In the collection we obtained 2948 posts with more than 636,036 comments. Metadata for each post, including post id, subreddit, timestamp, the text body of the entry, the upvote ratio, score, or number of comments, etc.

TEXT	REDDIT SUBREDDIT
There is some cool stuff happening in the **medical field**. AI shows promise to be able to read imaging better than people and find cancer earlier. There is more but this stands out to me.	*r/ArtificialIntelligence*
When you refer to AI (within that I include robotic technology too) I think there's potential for it to replace a substantial amount of manual jobs. What's shocking is the pace at which it is taking over — it's mind blowing and exciting at the same time.	*r/Futurology*
If AI causes mass displacement, we might see a short-term market surge due to efficiency, but in the long run, the lack of consumer spending could drag the economy down. Productivity gains alone won't sustain a healthy market without a buying public.	*r/Showerthoughts*

Fig.3 - Sample posts and comments from AI related reddit discussion for our custom dataset

The dataset used for this research articles from Reddit, carefully maintained to only text, in order to avoid issues with the ingestion of other types of data and to be compatible with the pipelines of natural languages and automatics based on transformers. Images, external links, videos, and other multi-media content were excluded so as to maintain consistent text structure to be analyzed. Posts consisting of media only (without textual descriptions) were removed, but if the submission

had selftext fields that were not empty, the post was retained.

To further improve the quality and reliability of the dataset, we have applied several preprocessing steps: we have taken out duplicate entries, posts which are deleted or unavailable, and have performed some basic text cleaning to remove noise, such as HTML tags, emojis, punctuation and special characters. These procedures resulted in a structured corpus that can be used for machine learning based analysis. The distribution of collected posts and related comments across the subreddits under consideration is shown in Table 1, highlighting the amount of contribution of each community to the entire corpus.

Table 1 - Number of posts and comments from each subreddit

Subreddit	# of posts	# of comments
ArtificialIntelligence	724	86842
AskReddit	3	1,488
ChatGPT	467	178,850
Futurology	34	15,976
OpenAI	582	104,936
Showerthoughts	14	6,549
artificial	537	46,572
science	34	15,155
singularity	457	133,828
technology	95	45,840

The first step before our model training was a set of various preprocessing steps including cleaning and normalizing the text: Conversion of all the characters to lower case. Eliminating noise, such as the removal of HTML tags, emojis, punctuation and special characters. Tokenisation with NLTK, the transformation of strings to token lists. Stemming using Porter Stemmer to cut down words to their root from. Several steps were applied uniformly to all training and test samples. For textual feature analysis, we have used the Term Frequency-Inverse Document Frequency (TF-IDF). This approach gives higher weights to the words that are frequent in a given document but rare in the overall corpus and, therefore, emphasise the discriminative words rather than common words. TF-IDF vectors were used as input vectors for all classifiers used in this study.

We trained and evaluated several machine learning models for the mitigation of sentiment classification. Logistic Regression it is a linear classifier which is computationally efficient and interpretable. Support Vector Machine (SVM) works well for high dimensional data which is sparse. Naive Bayes is a probabilistic baseline and is balanced when it comes to speed and performance. Each model was trained using the labelled datasets and a manually annotated sample of 100 Reddit comments was used for validation.

Results and Discussions. The performance of the models for sentiment classification was evaluated using four common evaluation measures: Accuracy, Precision, Recall and F1 Score. These measures give comprehensive evaluation of classification quality especially in the multi-class case.

Precision is defined as the ratio of true positive predictions over the whole number of predictions whose class is positive:

Precision measures the proportion of true

positive predictions among all predicted positives [19]:

$$Precision = \frac{TP}{TP + FP} \quad (1)$$

Recall indicates the proportion of true positive predictions among all actual positive cases [19]:

$$Recall = \frac{TP}{TP + FN} \quad (2)$$

Accuracy is the ratio of all correct predictions (positive and negative) and the total number of predictions [19]:

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN} \quad (3)$$

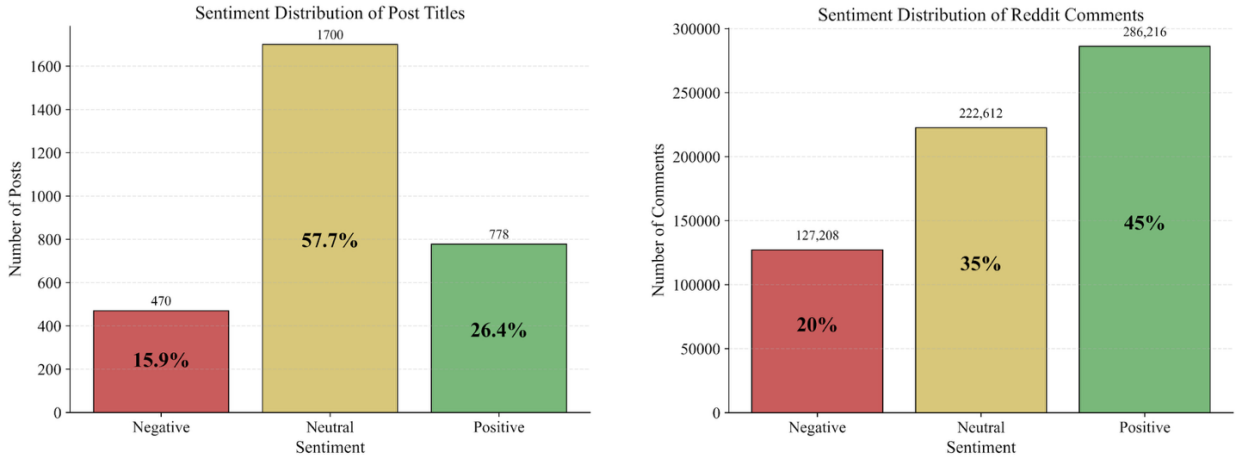
F1-score is the harmonic mean of Precision and Recall and is a balance between two [24]:

$$F1 = 2 \times \frac{Precision \times Recall}{Precision + Recall} \quad (4)$$

These metrics are very popular in the fields of natural language processing and machine learning assessments [19]. Table 2 shows the performance of three learning algorithms in the Reddit sentiment classification task. Among the models tested, Logistic Regression was the highest performing model with an accuracy of 84.3%. This shows that it is better at correctly identifying the sentiment category based on the achieved datasets.

Table 2 - Sentiment Classification model performance on Reddit

Model	Accuracy (%)	Precision	Recall	F1
SVM	80.1	0.79	0.76	0.77
Naive Bayes	81.5	0.80	0.78	0.79
Logistic Regression	84.3	0.84	0.83	0.83



a **b**

Fig.4 - Distribution of sentiments in the custom Reddit dataset (a) Sentiment distribution of post titles (b) Sentiment distribution of user comments

Figure 4a shows the class distribution of the Reddit posts collected. Out of 2948 posts, 57.7% were in natural language (neutral), 26.4% were positive and 15.9% were negative, suggesting that a substantial portion of the discourse done in relation to AI is either neutral or informative, and

a substantial minority of the same is optimistic or full of concern. Figure 4b shows the distribution of sentiments for 636 036 comments taken from AI related subreddits. These comments were categorized in three classes of sentiments: positive (45% positive), neutral (35% neutral) and negative (20% negative).

Figure 5 gives an idea of the sentiment structure of Seine of AI related Reddit discourse between 2022 and 2025. Together, the data suggest a detectable shift in collective rhetoric, signalling a shift from an initial level of suspicion in the use of artificial intelligence to more general acceptance and regular interaction with this technology in society.

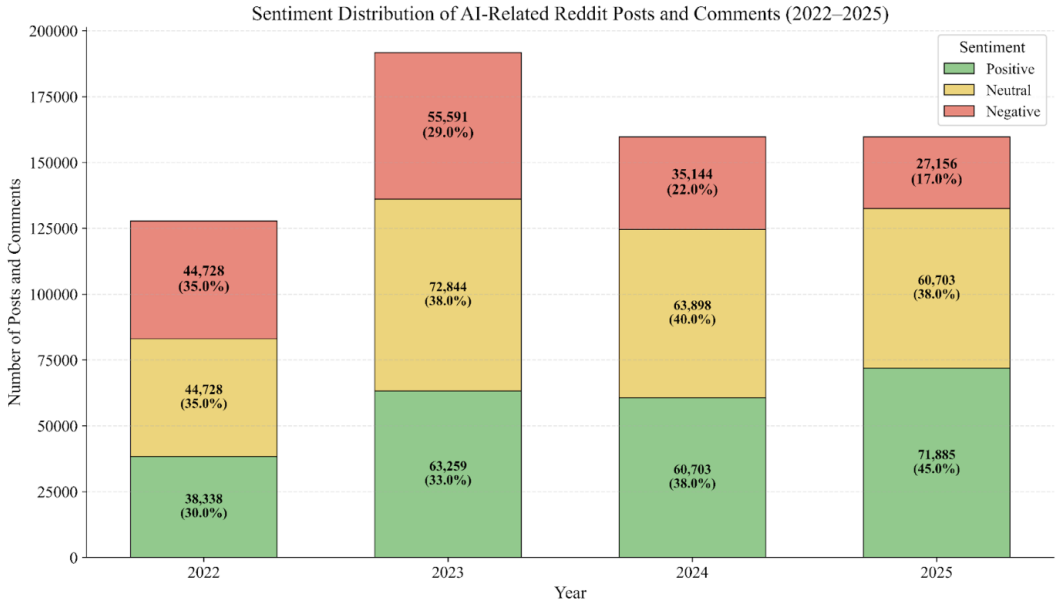


Fig.5 - Sentiment distribution in the collected custom Reddit dataset 2022–2025

In order to identify main themes in the Reddit discussions that relate to AI, an unsupervised topic modelling, based on the BERTopic algorithm, was performed. The technique incorporates transformer based embeddings, clustering and class based TF - IDF weighting to produce coherent and interpretable topics. The model was trained on the collected posts and comments and came up with ten dominant topics of discussion. A brief summary of the information at each topic was created using the top 10 representative keywords. The topics cover such diverse concerns as job automation, ethical issues, education, misinformation, everyday productivity and regulation. The topic clusters are presented in Table 3. For instance, T1 is about Job Displacement and AI Threats and is defined by keywords that include ”job”, ”automation”, ”risk” and ”income”. In comparison, T10 is more hopeful about AI, containing keywords such as ”innovation”, ”future” and ”progress”.

This thematic categorisation makes the range and emotion of AI-related discourse a lot clearer, supporting conclusions from sentiment analysis indicating the presence of a polarity between fear, control narrative and optimism, innovation narrative.

The present study investigated the public perception of artificial intelligence from a large scale user generated content on Reddit. Sentiment analysis showed a complex scenario of emotions.45% of posts and comments were positive in their sentiment, 35% were neutral and 20% were in negative sentiment. These proportions vary slightly from those in similar studies conducted on Twitter, where negative sentiment is the majority in conversations about the societal effect of AI. [1].

Table 3 - Topic names and top 10 keywords from Reddit Discourse on AI

	Topic Name	Top Keywords
T1	Job Displacement AI Threats	job, replacing, automation, worker, risk, fear, economy, loss, human, income
T2	AI in Education	learn, education, student, tutor, assignment, cheating, use, tool, help, school
T3	Creativity AI Generation	art, image, generate, music, style, story, expression, create, photo, video
T4	Ethics Privacy Concerns	privacy, bias, ethics, consent, data, misuse, algorithm, track, trust, identity
T5	AI Tools Daily Productivity	write, use, save, automate, task, time, efficiency, tools, assist, routine
T6	AI Misuse and Misinformation	fake, generate, bias, misinformation, authenticity, deepfake, trust, concern, lie, spread
T7	Future of AGI and Superintelligence	AGI, consciousness, future, control, power, risk, singularity, human, reality, threat
T8	Chatbot Behavior and Dialogue	chatbot, talk, answer, voice, respond, reply, ask, query, joke, explain
T9	AI Regulation Governance	rule, control, government, law, trust, rights, protect, misuse, decision, policy
T10	Positive Outlook on AI	progress, innovation, exciting, opportunity, growth, future, dream, vision, hope, change

Notably, Reddit' s general tenor seems to be more balanced, and may be evidence of community-specific discourse practices and moderation norms. For example, the subreddits related to ChatGPT (r/ChatGPT) and OpenAI (r/OpenAI) have more positive sentiment, while the subreddits focused on technology (r/technology) and futurology (r/Futurology) are more concerned about job displacement, ethical issues, and regulation issues. The results of the topic modeling analysis support this interpretation. Themes such as ”Job Displacement and AI Threats”, ”Ethics and Privacy Concerns” and ”AI in Education” were regularly discussed across different years, suggesting that the users are not just acting with an emotional response to the developments in AI, but rather engage in a thematically and value-free discourse.

Furthermore, the performance aspects of the used machine learning models were promising. Among three classifiers of model evaluation, Logistic Regression, Support Vector Machine (SVM), and Naive Bayes classifiers had highest accuracy with 84.3%. This result is consistent with the previous work establishing the power of the linear models in the context of text classification in a social media scenario. But even so, there are still limitations. Although the size and scope of the Reddit dataset is quite extensive, it lacks any non-textual data (e.g. GIFs, videos, memes), which can also provide salient signals of sentiment. Additionally, noise could be in the pseudo - labelled data, however, this was addressed through manual validation.

Conclusions. In this paper we introduce the results of a large-scale sentiment and topic analysis of Reddit discussions on artificial intelligence (AI) between 2022 and 2025, built on a curated data, which includes 2,948 posts and more than 636,000 comments in a total of 10 popular AI-related subreddits, each of which has more than 10 million participants. The aim was to explore the emotional response and attitudes of users to emerging AI technologies. We observe that most users post with a positive sentiment, yet a sizeable proportion of the users post with a neutral or negative sentiment with

fluctuations over time by subreddit and year thus reflecting changes in the public mood due to global events, changes in political policy, and releases of high-profile technology.

The discussions focus on the topic of ethics, concerns about automation, educational uses of AI, and penalizing tools like ChatGPT, which confirms that Reddit is not only a space of reactionary behaviours, but a space of deliberation about the wider social consequences of AI. Sentiment classification models have been trained using the labelled Reddit dataset; the models show an accuracy score above 80% for the best model and provide an example for further research in public opinion mining and computational social science.

In summation, the findings offer meaningful insights for artificial intelligence developers, policymakers and communication strategists who are wishing to reconcile the deployment of AI with society values. As AI systems become increasingly entrenched in people' s lives, ensuring that the public understands how the systems are perceived, trusted, and critiqued is important.

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