

ChatGPT Public Perception and Academic Analysis



Seminar” Diachronic Language Models”(6CP)

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Outline

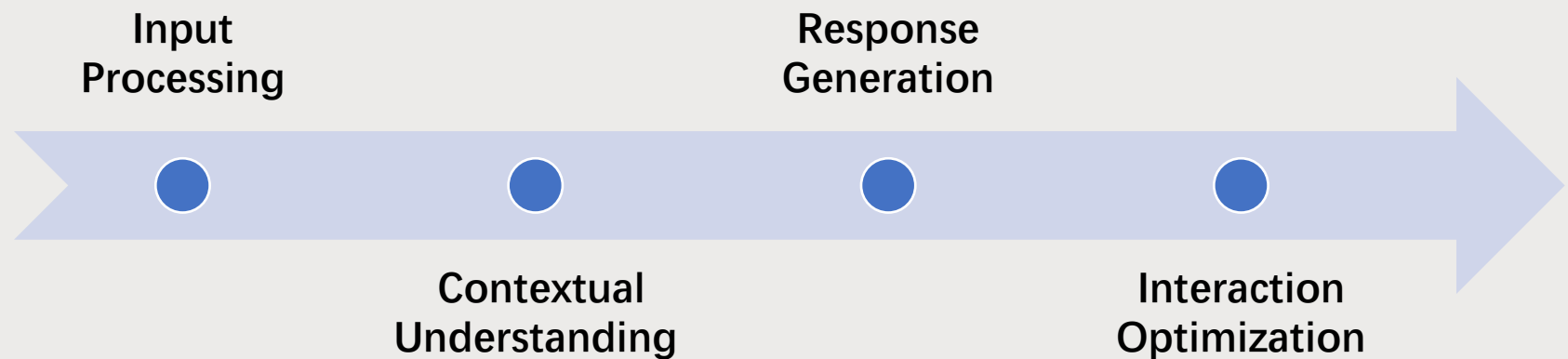
- 1. Introduction of ChatGPT
- 2. ChatGPT model and Architecture
- 3. Public Perception on Social Media
- 4. Analysis of Scientific Papers
- 5. Conclusion and Discussion



01. Introduction of ChatGPT

- ChatGPT is a dialogue system based on GPT (Generative Pretrained Transformer) architecture. It uses deep learning methods, especially uses large-scale data sets for pre-training, to understand and generate natural language.

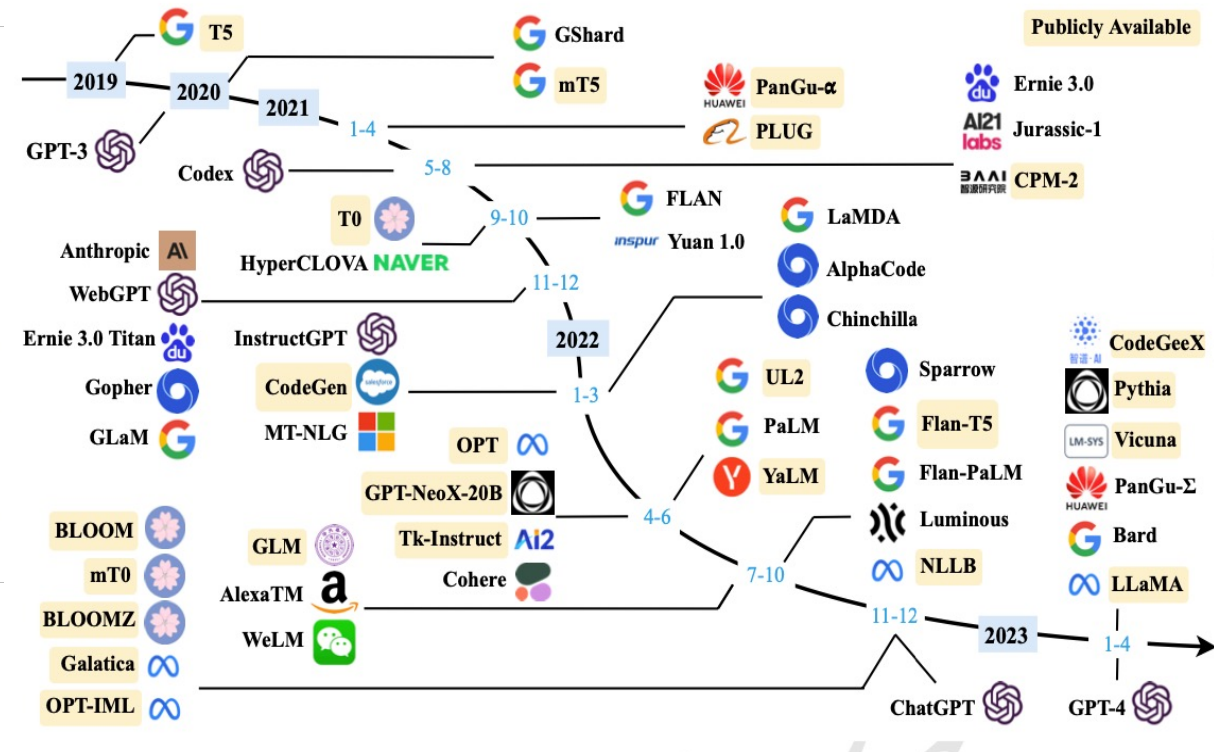
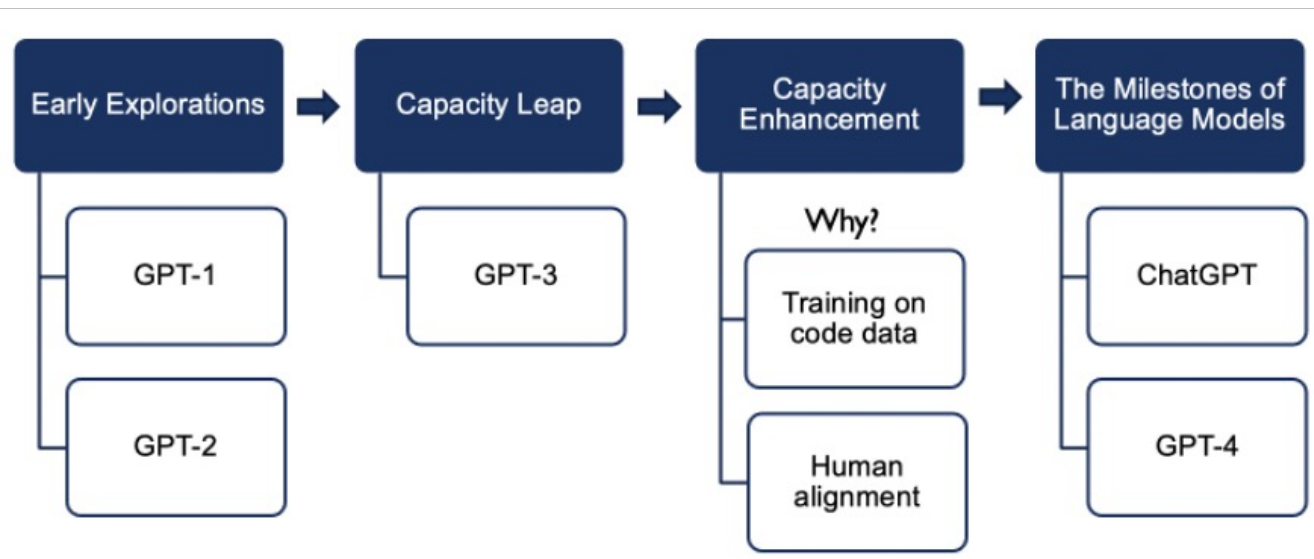
Workflow:





02. ChatGPT Model and Architecture

Development of GPT Model



Features

Transformer Model

Pre-training and Fine-tuning

Autoregressive Model

Multi-level Attention Mechanism

Large-scale Datasets

Transformer Architecture

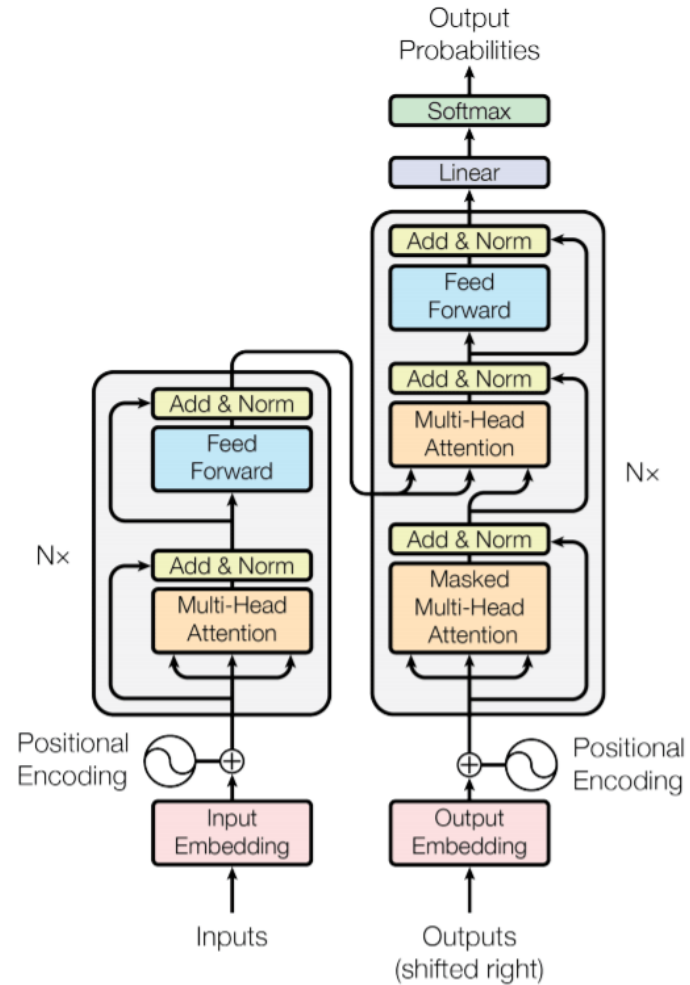
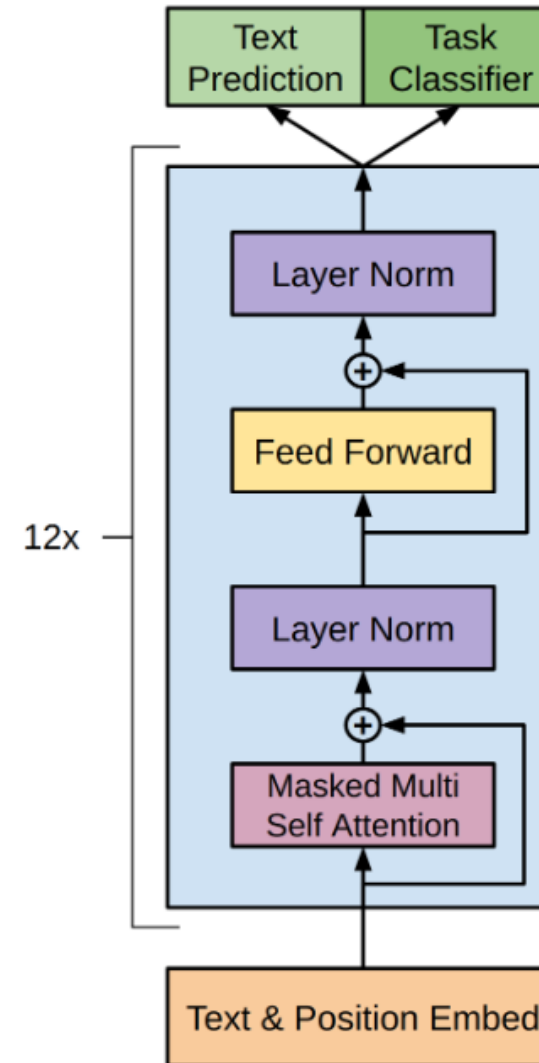


Figure 1: The Transformer - model architecture.

GPT Architecture





Can you please count the number of words in the following sentences:

s1 = "I like dogs and you like cats and we are all great"

s2 = "All the world is a stage and all the men and women merely player"

s3 = "The greatest opportunities are often the greatest risks"

s4 = "The ax in the house saves the carpenter"

s5 = "And here poor fool I stand once more, no wiser than I was before."



The correct answers should be :
12, 14, 8, 8, 14



Certainly! Here are the word counts for each of the sentences:

s1: 11 words

s2: 15 words

s3: 8 words

s4: 7 words

s5: 14 words

- Provide a **meta-analysis** of ChatGPT's perception across different platforms and sectors
- *social media* → *over 300k tweets from twitter*
- *academic papers* → *150 scientific papers from Arxiv & SemanticScholar*

Meta-analysis Method



A statistical technique



Combine and analyze data from multiple studies on a **specific topic**.



Systematically reviewing and synthesizing the results of these studies to **draw overall conclusions and identify patterns or trends**.



Help shape public debate and inform future development of ChatGPT

03. Public Perception on Social Media

Data Collection and Preprocessing

- Hash- tag search tool Snsrape
- Set target as #ChatGPT
- Deduplicate all the retweets
- Remove robots



Attribute	Detail
date range	2022-11-30 to 2023-02-09
number of tweets	334,808
language counts	61
English tweets	228127
number of users	168,111

Table 1: Information of the collected Dataset

Tweets across 61 languages

English (68%)

Japanese (6.4%)

Spanish (5.3%)

French (5.0%)

German (3.3%).

Social Media general Analysis

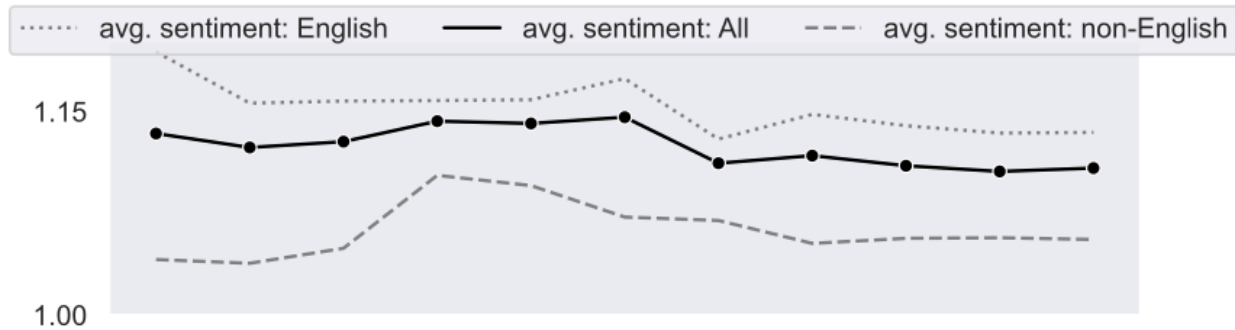
Analyze :

- A multi-lingual sentiment classifier based on XLM-Roberta
- The model performed variably across language with an F1-score of 71% for English
- Focus on English-language tweets.

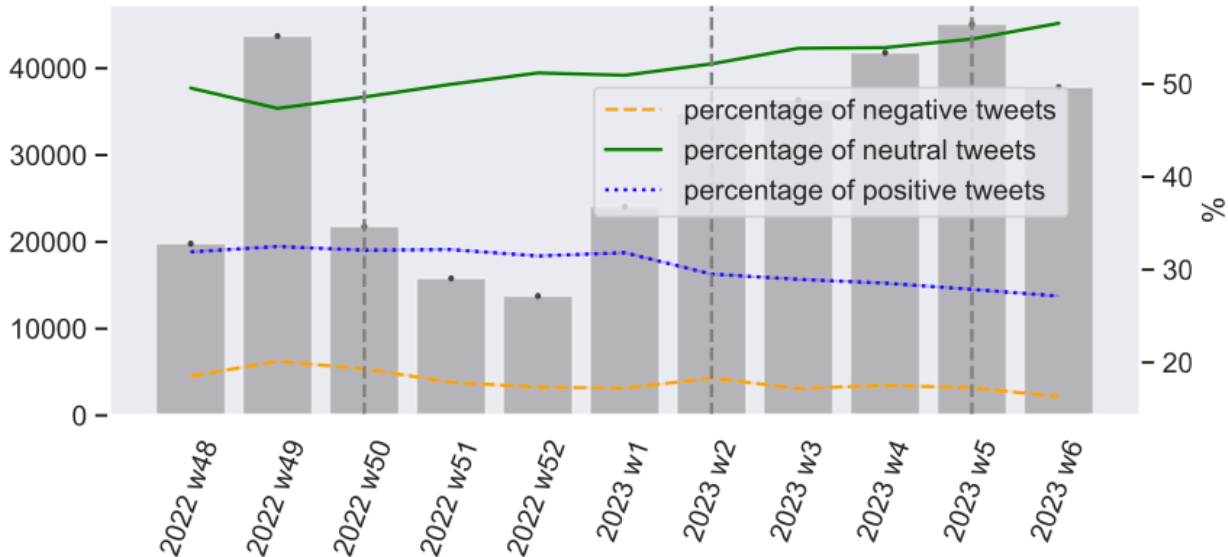
Sentiment	Number of tweets
Positive	100,163
Neutral	174,684
Negative	59,961

Table 2: Sentiment Distribution of all tweets.

Sentiment over time



Weekly average of sentiment



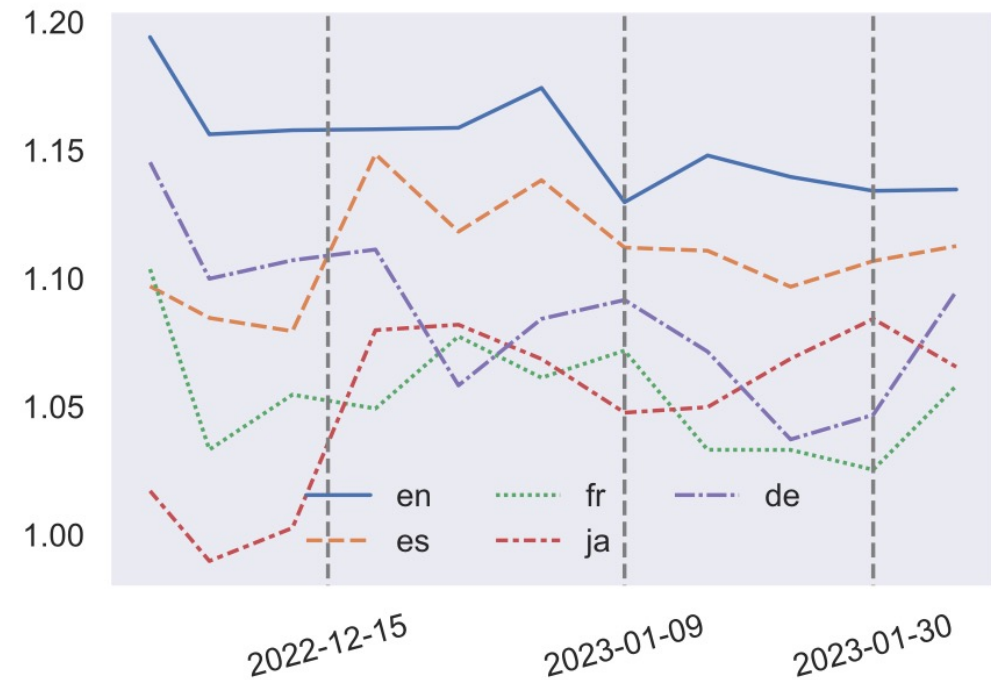
Bar plots :the count of tweets per week

Line plots : the percentage change of each sentiment class

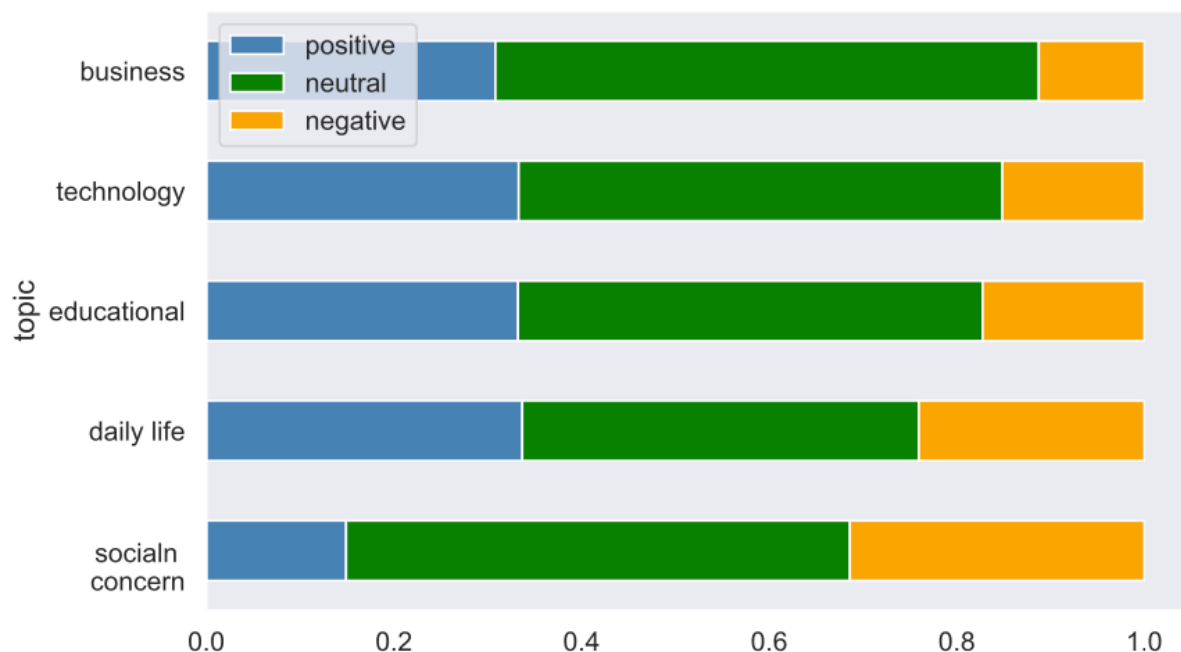
Sentiment across **language** and topic

Weekly sentiment distribution averaged per language

- English (en)
- Japanese (ja)
- Spanish (es)
- French (fr)
- German (de)

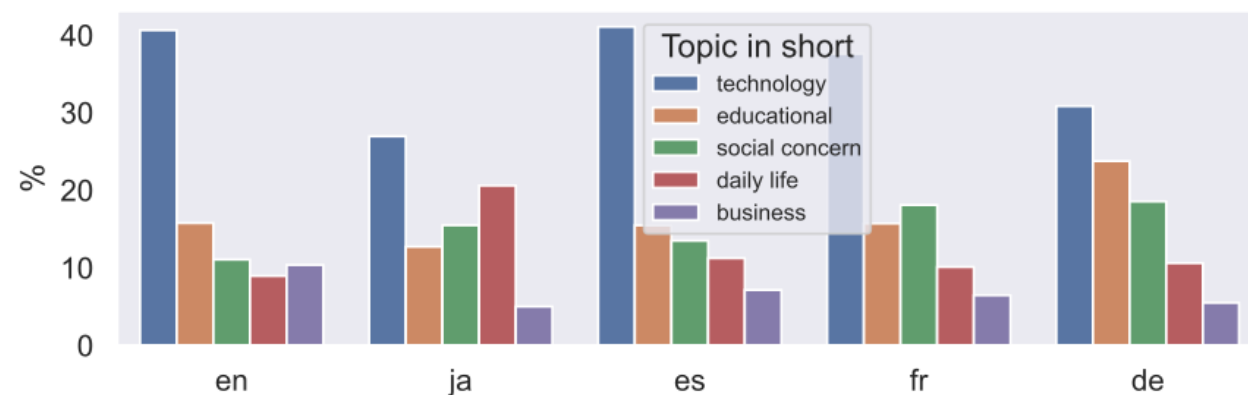


Sentiment across language and topic

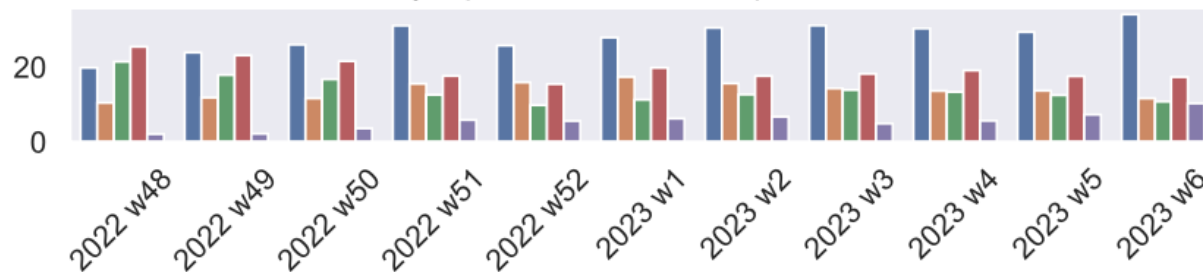


Topic distribution in sentiment

Topic distribution in percentage by different languages



Weekly topic distribution of Japanese tweets



Different Aspects of emotions expressed

- Methods: Manual analysis and annotation of 40 randomly selected tweets
- Positive emotions:
 - Analysis of 20 Positive Tweets
 - Key findings: 14/20 users expressed high admiration for ChatGPT
 - Positive reviews: Generating human-like text, ability to answer complex questions, creative applications (e.g. writing lyrics)
- Negative emotion:
 - Analysis of 20 Negative Tweets
 - Key concerns: 13/20 users expressed disappointment with the accuracy and detectability of the generated text
 - Ethical and social concerns: bias output, misinformation, potential job losses



04. Analysis of Scientific Papers

Overview of the papers analyzed from Arxiv and SemanticScholar

Sources of information:

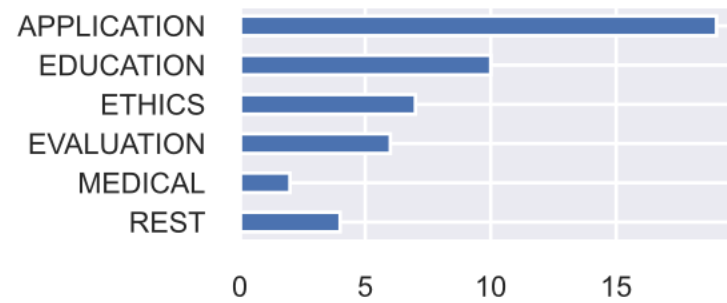
- (1) preprints from Arxiv, which may or may not have already been published
- (2) non-Arxiv papers identified through SemanticScholar (humanities and social sciences).

Source	Number of instances
Arxiv	48
SemanticScholar	104

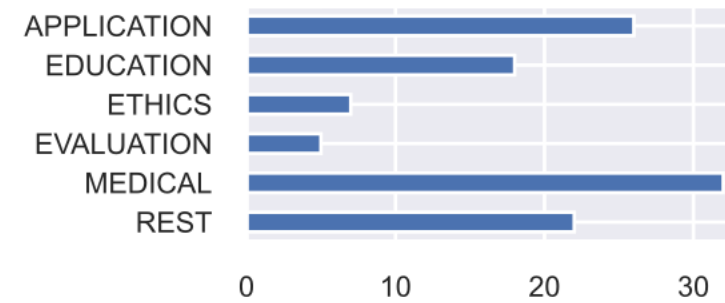
Methods: Manual analysis

Category	Labels
Topic	Ethics, Education, Evaluation, Medical, Application, Rest
Quality	0 (= NAN), 1,2,3,4,5
Impact	Threat, Opportunity, Mixed, NAN

Topic

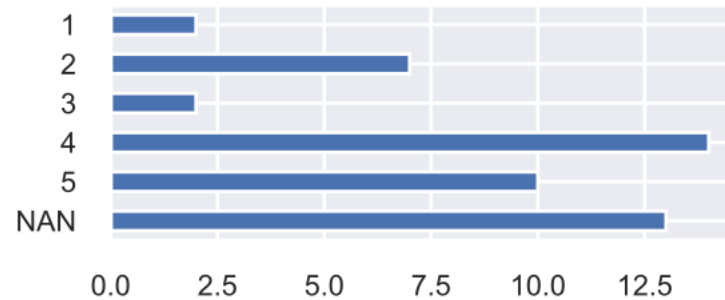


(a) Arxiv

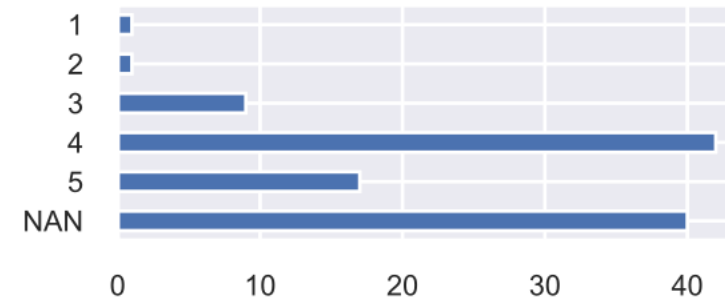


(b) SemanticScholar

Performance Quality

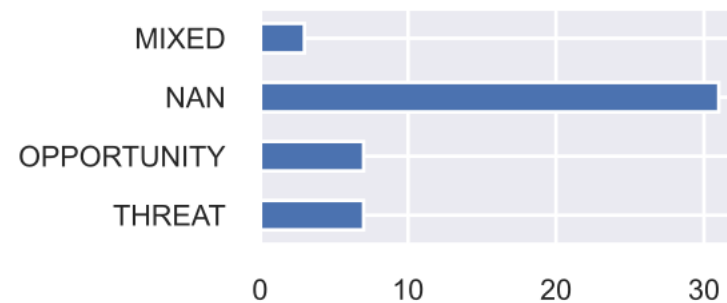


(a) Arxiv

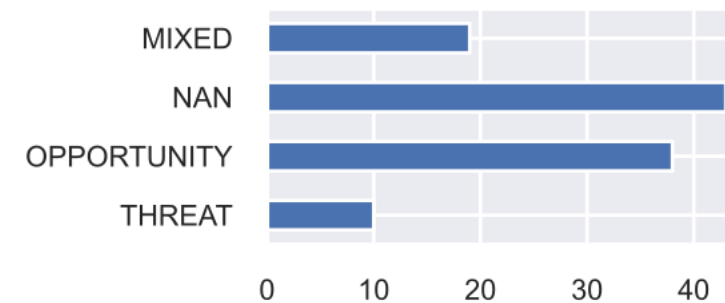


(b) SemanticScholar

Social Impact



(a) Arxiv

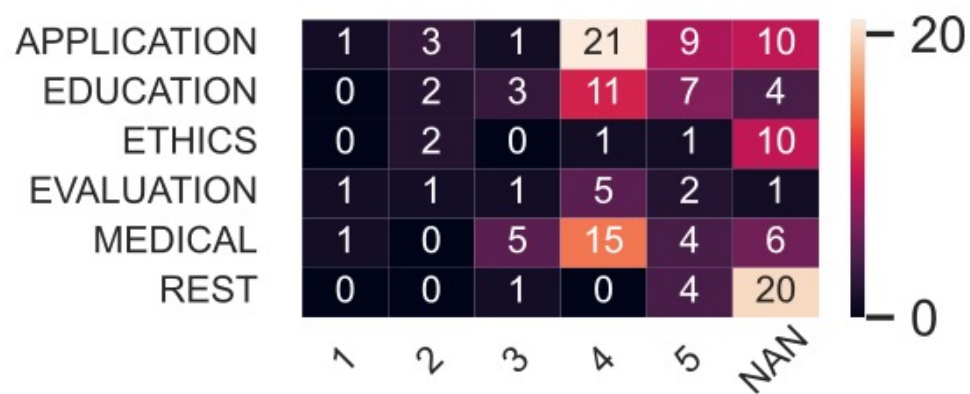


(b) SemanticScholar

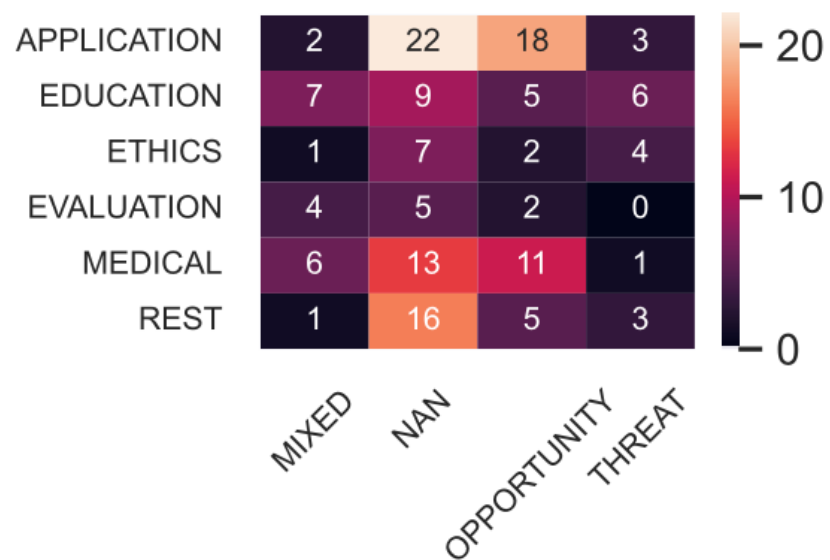
Social Impact X Performance Quality



Topic X Performance Quality



Topic X Social Impact



05. Conclusion



ChatGPT is generally perceived as positive, high-quality, and associated happy emotions predominate.



Its recognition has declined slightly since it was first released, and it is considered to have more negative sentiments in languages other than English.



While ChatGPT is seen as a great opportunity across multiple scientific fields, including medicine, it is also seen as a threat from an ethical perspective and in the educational field.



This finding helps shape the public debate and inform the future development of ChatGPT.



Discussion & Question

- How to identify and reduce bias during data collection and model training?
- Facing the development of LLM, what are the potential future developments and areas of research ?

Reference:

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