The future of Artificial Intelligence (A.I.): A public opinion.

Submitted by

	Last name, first name (alphabetical order)	Matrikelnr.	My contribution to this report:
1	Braunmiller Nina	k11923286	standardizing article layout, article merge discussion, research question, references, discussion section, group task reflection, refining report
2	K	k	article merge formulation, article merge discussion, method, discussion section, refining report
3	R	k	article merge discussion, sample section, results section, discussion section, refining report
4	S	k	article merge discussion, introduction, wordcloud, news values, pie chart, table, refining report
5	Z	k	article merge discussion, refining of sections in report, introduction, discussion section, group task reflection
6			

1) INTRODUCTION

One of the most hyped tools of today's world is undoubtedly *ChatGPT*. This publicly available chatbot, developed by the company *OpenAI*, is known for its ability to interact in a human-like fashion and respond to a broad variety of questions. It attracted over one million users just within the first week after launch [6]. Since *ChatGPT* has a large number of active users, it is discussed on a very frequent basis. Consequently, the media has a significant influence over people's perception on this technology quite easily; making it an interesting subject to explore in terms of its impact on society and the economy. This research concentrates on how authors from *The New York Times* (NYT) publications perceive *ChatGPT* and Artificial Intelligence (A.I.) as the technology behind it. To this end, selected opinion pieces are coded, analyzed and projected on a sentiment scale.

2) RESEARCH QUESTION

Before we analyze the opinion pieces, we consider following sets of codes:

- opportunity vs risk
- humanlike vs machinelike
- replace vs complement people

Considering these sets of code, we have a thought about fitting research questions:

- Is the “opportunity vs risk” set the most common discussed set?
- Is the overall opinion leaning towards a positive or negative sentiment regarding A.I.?
- Does a usual opinion piece reflect both, the positive and negative sides, of the discussed sets equivalently?
- Is “humanlike” an often discussed or mentioned topic in opinion pieces?
- Is A.I. perceived more as a social interaction partner (humanlike) than like a machine?
- Does the author’s expert field influence the appearance pattern of the sets of codes?

In general, opinions can be very fixated on one single aspect of a topic with clear connection to the positive or negative side. Therefore, we might assume that their attitudes and topics towards A.I. fit to the individual employment.

3) SAMPLE

In this section, the focus lies on the description of the articles that are analyzed. All of the opinion pieces were published in a time frame between December 2022 and July 2023. Compared to the release of ChatGPT on 30th of November 2022, the first article [5]

appeared only a few weeks after that. All of the opinion pieces have a manageable length between two and six pages, written in an understandable but also intellectual manner. Opinion pieces may reflect the population's opinion about a topic whereas the newspaper articles may try to shape the reader's opinion. Our focus of interest lies on the perception of A.I., therefore we choose opinion pieces. They are published in the NYT which geographically categorizes them to the US. The backgrounds of the authors are quite different. They are journalists [5] or experts on the political [4], economic [1, 3, 7], and technical [8] fields. The NYT, described as one of the world's great newspapers, is a daily published newspaper. Instead of a mass audience, they appeal to a cultured, intellectual readership. Its strength is in its editorial excellence, which makes it more a "broadsheet" than a "tabloid" [2]. This is supported by the provided opinion pieces.

4) METHOD

The research team consists of five people, namely, D , K , L , M and Nina. Our team read and manually coded six opinion pieces, with the following four team members (D , K , L , M and Nina) individually assessing all six opinion pieces. Each team member assigned specific parts of the opinion pieces to a color code, corresponding to a theme category. The details of these theme categories, based on deductive coding, will be explained in further detail later. Afterwards, in a team meeting, a merged version was formulated according to the common results, specifically passages marked by at least two members to one category using deductive coding. Additionally, the research team calculated the average sentiment scores from the team member evaluations, utilizing a scale ranging from -5 (most negative) to 5 (most positive). These calculated scores were then incorporated into the header of each opinion piece.

Our team used deductive coding, as it was proposed by the instructions of the project. Deductive coding is a qualitative data analysis method that involves applying predefined categories or theoretical frameworks to analyze and interpret data.

The color-coded categories used, green, red, light brown, light blue, lila, and yellow—align with specific themes related to opportunity, risk, humanlike, machinelike, replace, and complement people, respectively. In addition to this color code, actors, spokespersons, and institutions are designating the color gray in our analysis.

The color code is the following:

Green (Opportunity): Passages coded as green refer to aspects of the opinion piece that discuss opportunities related to the subject matter.

Red (Risk): Red-coded passages likely highlight elements in the opinion piece that discuss potential risks associated with the topic.

Light Brown (Humanlike): Light brown-coded sections may indicate the portrayal of humanlike characteristics or behaviors in the context of the opinion piece.

Light Blue (Machinelike): Light blue-coded passages point out opinions regarding machinelike qualities or behaviors in the opinion piece.

Lila (Replace): Lila-coded segments indicate content referring to the potential for machines to replace certain human tasks or roles.

Yellow (Complement People): Yellow-coded parts are associated with passages discussing how machines can complement human needs and capabilities or work alongside people.

Gray (Actors, Spokespeople, Institutions): Gray-colored parts are to identify actors, spokespersons, and institutions within the opinion pieces.

In our final evaluation of opinion pieces, we counted how often passages fell into the same category by at least two team members, by putting the count in parentheses. If team members disagreed on the category, we went with the choice supported by the majority and noted the minority opinion in brackets. This method helps show how often certain themes appear (the count in parentheses) and how we resolved disagreements (majority decision noted, with minority view in brackets).

5) RESULTS

a. Deductive Coding - Meaning Units

The results of this analysis method can be seen in table 1. The first column describes the respective opinion piece, while the second column shows the amount of markings for each meaning unit. The third column conveys the percentage of the merged markings, to give us a better grasp of the dominating sentiment found on each article. The last column shows the sentiment scores for every article, based on the average score the individual analyst assigned to it.

Article	Total markings	Markings percentage	Sentiment score
[1] Steven Rattner	- 32: opportunity - 04: risk - 00: human like - 00: machine like - 15: replacement - 04: complement - 21: actors	- 58% opportunity - 07% risk - 00% human like - 00% machine like - 27% replacement - 8% complement	3.5
[3] Paul Krugman	- 12: opportunity - 04: risk - 04: human like - 00: machine like - 08: replacement - 02: complement - 04: actors	- 40% opportunity - 13% risk - 13% human like - 00% machine like - 28% replacement - 06% complement	3
[4] Ted Lieu	- 03: opportunity - 35: risk - 01: human like - 00: machine like - 01: replacement - 01: complement - 10: actors	- 07% opportunity - 85% risk - 03% human like - 00% machine like - 03% replacement - 02% complement	-2
[5] Farhad Manjoo	- 02: opportunity - 03: risk - 05: human like - 03: machine like - 00: replacement - 00: complement - 07: actors	- 15% opportunity - 23% risk - 39% human like - 23% machine like - 00% replacement - 00% complement	3
[7] Daron Acemoglu, Simon Johnson	- 01: opportunity - 11: risk - 00: human like - 00: machine like - 04: replacement - 00: complement - 17: actors	- 06% opportunity - 69% risk - 00% human like - 00% machine like - 25% replacement - 00% complement	-4.5
[8] Nathan E. Sanders, Bruce Schneier	- 01: opportunity - 15: risk - 02: human like - 00: machine like - 00: replacement - 00: complement - 07: actors	- 06% opportunity - 83% risk - 11% human like - 00% machine like - 00% replacement - 00% complement	-4.5

Table 1: Summarizing results of the deductive coding

Taking into account all the marked passages across the different opinion pieces, it is easy to see that negative sentiments dominate, with *risk* being the most recurrent code and *replace* (people) the third one. On the other hand, codes such as *humanlike* and *machinelike* were not found so often in the articles during our manual analysis or they were filtered out during merging. Although not visible on the table, the most frequently mentioned actors were *workers,* or some targeted workforce communities, and organizations from the public sector.

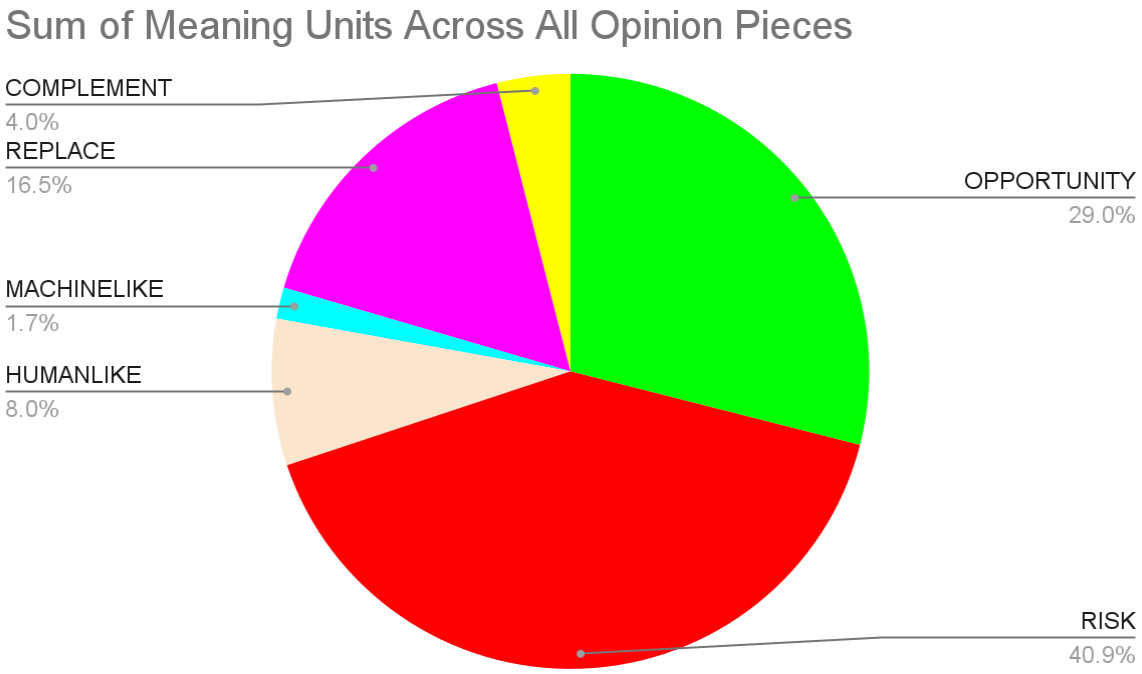

Figure 1: Pie chart of the meaning units.

Two representative text units of the most relative codes fall into the categories of risk and opportunity, respectively chosen from [1] and [4]. These categories combined make up 70 % of the total markings. They are chosen based on their different statements.

Risk [4, line 3-6]:

"Imagine a world where autonomous weapons roam the streets, decisions about your life are made by AI systems that perpetuate societal biases and hackers use AI to launch devastating cyberattacks."

Opportunity [7, 72-75]:

"This makes A.I. a must-have, not just a nice-to-have. We can only achieve lasting economic progress and rising standards of living by increasing how much each worker produces. Technology — whether in the form of looms or robots or artificial intelligence — is central to that objective."

b. Word Cloud

The main protagonist of our research, ChatGPT, is also the most repeated word among the New York Times articles, as expected. The most discussed actors are *human*, *worker* and *people*, showcasing the broad sector which is affected by this technology. The verb *will* is also dominant in the texts, denoting the fact that the authors of the articles focus mainly on the future or tend to communicate their predictions on the impact that ChatGPT *will* have in our daily life. *Technology*, *economics* and *time* are used in synergy to signal growth in particular domains. *Sandwich* is a rather unexpected word to show up, it was mentioned repeatedly by Farhad Manjoo in his article [5]. While *OpenAI* makes a small appearance, its creation, ChatGPT, serves as a catalyst for much larger discussions surrounding the future relationship between humans and artificial intelligence.

Figure 2: Cloud of the words in the opinion pieces. The size correlates with the amount of occurrences.

6) DISCUSSION & PRACTICAL IMPLICATIONS

Evaluation

Surprisingly, ChatGPT is of minor interest. Almost all [1, 3, 4, 7, 8] opinion pieces are more focused on the general possibilities of A.I. not discussing too precisely specific applications. Only [5] focuses on the interaction with ChatGPT and therefore presents A.I. as an interaction partner such that the research question “Is A.I. perceived more as a social interaction partner (humanlike) than like a machine?” matches this but only this opinion piece. For the remaining it is simply not applicable. However, through ChatGPT A.I. could be postponed to the public interest again. Same observation accounts for the research question “Is ‘humanlike’ an often discussed or mentioned topic in opinion pieces?” as there are a lot of movies thematizing A.I. as a system with humanlike consciousness. Surprisingly, that was not the case, more precisely only in 8.0 % of all inter-rater overlaps. Risks, opportunities, and replacement of people are much more present topics. It seems that in the current situation, it is not worth discussing humanoid robots or chatbots because it doesn’t seem to be predictable on how it will have an impact on daily life in the near future. The other topics seem to be closer to the present with heavier impact.

From the table summarizing the codes found on each piece, we can see that negative and positive sentiments coexist, however, one of them tends to be dominant depending on how optimistic the author feels towards ChatGPT. Therefore, the answer to “Does a usual opinion piece reflect both, the positive and negative sides, of the discussed sets equivalently?” tends more forward to “no”. The opinion pieces portray a more negative sentiment towards A.I. describing powered breakthroughs in technology. Thus, “Is the overall opinion leaning towards a positive or negative sentiment regarding A.I.?” can be answered by pointing to the negative trend observation. Uncertainty about the future seems to fuel this negative sentiment given that the authors mostly speculate about potential outcomes if A.I. keeps improving and acquiring more humanlike capabilities. Furthermore, according to the results of the analysis, authors are more inclined to believe that A.I. technologies will replace people rather than complement them. This is evident in the fourfold higher frequency of passages discussing replacement compared to those emphasizing complementarity.

As highlighted in section 5.c indicating the high number of occurrences of the verb “will”, most opinion pieces try to predict the future development in A.I. and assess those.

Furthermore, there is an observable link between profession and opinion or viewpoint. The journalist [5] simply wants to try out ChatGPT and it seems he wants to fill up a contribution. The economists [1, 3, 7] discuss different perspectives of A.I. on the economy and try to predict the economic development with justification of past happenings. Besides that, the

politician [4] wants to regulate A.I. more to prevent negative consequences. The most crucial viewpoint could be the one of the technicians [8] as they possibly have a better idea of A.I. and its functioning. Interestingly, they have a quite dystopian viewpoint on A.I.. For future research it could be meaningful how other technicians see A.I. with its risks and opportunities. It follows that the research question “Does the author’s expert field influence the appearance pattern of the sets of codes?” can be answered with “yes”. The politician and technicians outline the risks whereas the journalist has a more neutral up to positive view on A.I. describing it more like a human interaction partner. Only the economists don’t agree with each other by focusing more on the opportunities or on the risks of A.I.. However, they don’t contradict each other, it’s more like that they complement each other in their seemingly realistic scenarios. Reading the previous sentences, the question “Is the ‘opportunity vs risk’ set the most commonly discussed set?”, can be affirmed. It follows, that the opportunities and risks of A.I. could be a hot topic in general as A.I. has the potential to be misused but also to be engaged in good doings. It is a question which can’t be simply answered with one winning perspective. The topic is too complicated and A.I. too flexible in usage. Therefore, it makes sense that the opportunity vs risk discussion is heavily in progress, essentially because all human life can be drastically exposed to the A.I. usage. For journalists or publishers it can be recommended to keep diversity. For instance, when predictions about the future are made, then different realistic scenarios should be illuminated. In a public discussion, the pros and cons should always be given a fair chance to have their say. Professional journalists and publishers should keep this principle always in mind.

Limitations

The main limitation of the work is that only six opinion pieces are analyzed. With that small number of sources it is impossible to make convincing statements about the perception and attitude towards A.I. of the population. Even further the authors come from a variety of specializations, namely journalism [5], politics [4], and economy [1, 3, 7] but only two authors are experts in technology [8]. It follows that the small sample with its variety of person groups can only give a rough idea on how future research questions could be of interest. Also, the lack of technology experts is remarkable as A.I. is technology. Furthermore, the authors, without exception, are male. This raises questions about diversity and representation within the discourse on A.I. and contributes to the limitation of viewpoints.

Also very critical can be the fact that the publisher is for all the sources identical, The New York Times. It follows that the opinion pieces might be biased in their opinion as the publisher has the control over what is published to a given time by whom. Clearly, there is a lack of freedom and therefore also the presented opinions might give a manipulated perception of how the population feels about A.I.

Conclusion

From the comparison of the individual codings it is easily notable that for some sections it was very hard to decide to what category they match best. The perception was very different among the group members. In extreme cases, parts have been marked as an opportunity and as a risk by others. For some opinion pieces it is even hard to find sections marked by multiple people, beside the color coding.

In the dynamic landscape of A.I. technology, an exploration of both risks and opportunities is imperative. While the potential for innovation and efficiency is undeniable, the analysis also underscores concerns regarding job displacement, ethical implications and biases. Seeking a balance in dealing with the risks and harnessing the opportunities is crucial for the integration of A.I. into the rapidly evolving technological ecosystem. At the same time it is essential to ensure that A.I. aligns with human values and enhances their collective well-being.

7) GROUP TASK REFLECTION

The member table on the title slide already tells about the contribution of each member. However, what it is not able to show is the process of group work which is described in more detail in the following text. It will discuss that the organization of the group members can be complicated but through bringing structure into the group work, this kind of obstacle was solved. Even further, small time-consuming problems appeared. Those can also be solved through organization, automatization, and usage of fitting software. It tells us to make more meta-work before starting with concrete work in the future.

As a first step we created a self-organized Discord server in which all members are enlisted. We started our research by individually defining research questions and coding the opinion pieces. Right after, we scheduled a virtual meet-up for merging our codings. The first one was scheduled just hours in advance and had to be moved since not everybody was able to join. That’s definitely something we would not do in the same way again. Afterwards, with enough time ahead, we always found a slot which worked out for everyone, even with the full-time working students in our group.

For merging the codings one of us (Dimitrios) shared his screen with his coding and called-out the line numbers. The rest of us were checking their own and raised their voice whenever they had a marking themselves appearing in the affected line. We also realized back then, that our line numbers of the individual codings were not matching fully anymore. So next time we would definitely distribute not docx, but rather pdf files.

After we saw how hard it is to have just two matching codings, we agreed to include all codings in our merged version whenever at least two group members have a matching coding. Afterall, we noticed that this was a crucial decision. The coordination of this set-up went quite well and after introducing an order of people raising their voice, it went even faster. The most inefficient part was for each mark in the coding to describe verbally from where till where an individual marking is located. Reflecting on this subtask of merging our codings, we most probably should have used (or even developed) some sort of tooling to directly compare and maybe even auto-merge the highlighted colors. One possible issue though would have been that the highlighting colors were not the very same in everyone's case. Because some used predefined colors from their personal favorite tooling selecting the colors closest to the ones on the slides.

Directly after the code-merge we distributed some basic tasks to pre-fill the report. We came up with more or less evenly distributed junks of workload which have all been (individually) processed in a good manner. The collaboration of the report was very good in general. We worked on it concurrently using Google Docs, which was definitely the right way to go. Besides the live view of everyone's edits, the comment functionality was helpful as well.

During the discussion we directly noted down some keywords for the report, but it was somehow hard for us to come up with a larger amount of information which has not already been covered before. The formulation and refinement tasks were on an individual basis again, for efficiency reasons. One thing which always appears when multiple people work on the same document is the very different styles of writing, apart from using the same tenses.

All in all it was a well-coordinated group with clear communication and good performance. In summary, a few minor problems appeared but were solved efficiently. The remaining five members all fulfilled the single-work tasks self-organized and actively engaged in the group work such that a flexible report writing was enabled. Through that the group work was a cooperative teamwork avoiding stubborn task split.

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ATTACHMENTS / APPENDIX

The appendix consists of the merged color-coded opinion pieces and the individual color-coded opinion pieces of each of the team members.

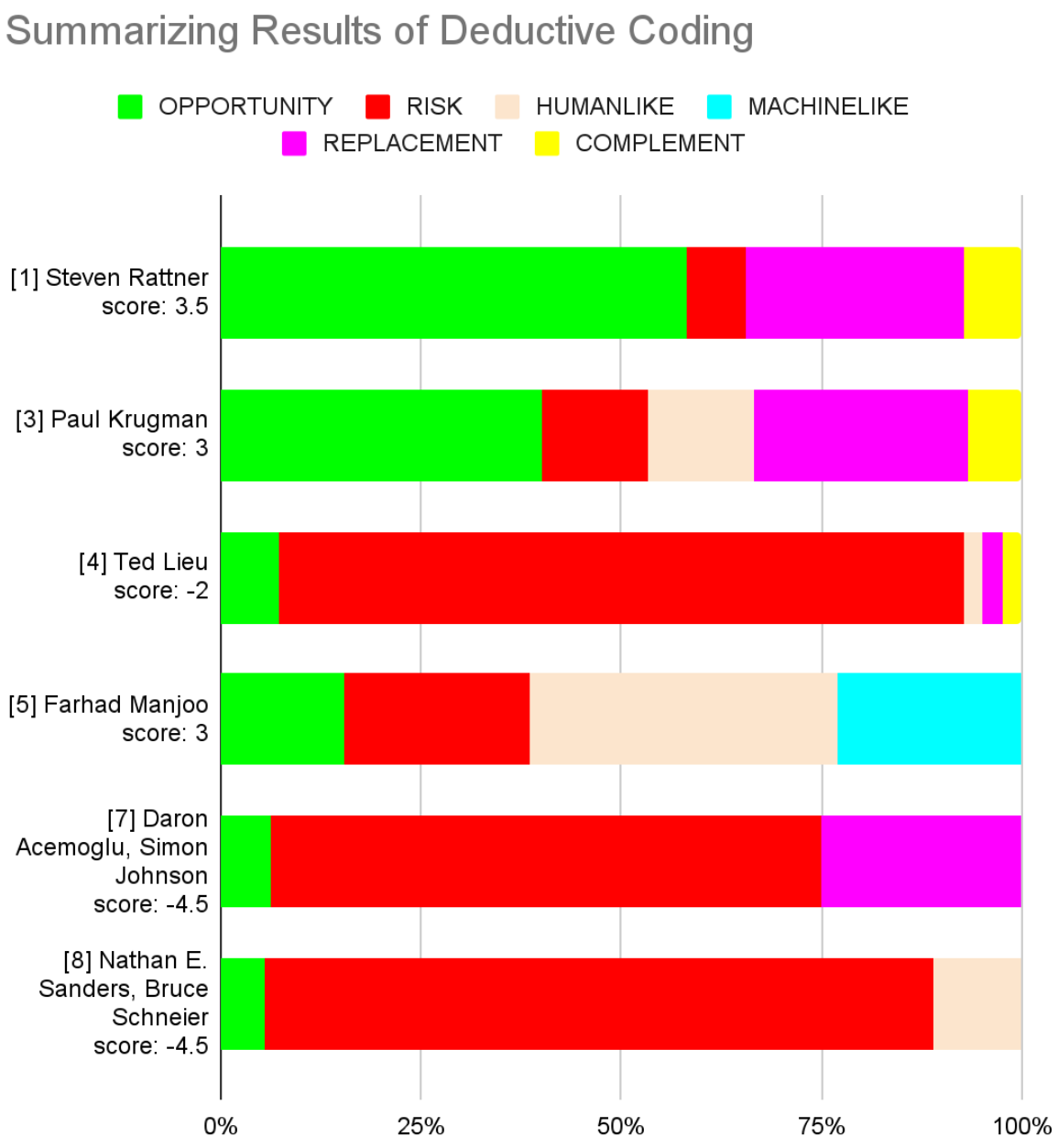

Figure 3: Bar chart visualization for the marked meaning units of each opinion piece