Analysing ChatGPT through the Lens of a Researcher

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1. Abstract

ChatGPT is making waves in the technology space and has sparked debate among various researchers about its impact on students, industries, the labor market, etc. While there are various articles and research papers published on ChatGPT and available on SCOPUS, there is a need for better understanding to comprehend how scholars perceive this new technological disruption.

With each passing day, we are seeing more and more research articles being published. While some research has been critical of ChatGPT, some have highlighted its positive impacts only, and few have analysed both the pros and cons of this new technology. We have analysed 100 research papers and case studies from SCOPUS to look at ChatGPT from the lens of a researcher and tried to narrow down to the areas, which according to researchers will be highly impacted. This has been done by reviewing all the articles and categorizing them based on the researcher's point of view about the impacted sectors and fields.

Keywords: ChatGPT, Artificial Intelligence, Natural Language Processing, Large Language Models

2. Introduction

ChatGPT is an Artificial Intelligence chatbot that has been developed by OpenAI. It was released in Nov 2022 and is built on OpenAI' s GPT-3.5 and 4.0 large language models (LLM). Since its launch, ChatGPT has been the subject of debate among various scholars, particularly around its impact on students and various industries and sectors.

While AI has been around for some time now, ChatGPT took everyone by storm. Its ability to write human-like text content has everyone talking about it. While it's still new, more researchers and analysts are discussing about its pros vs cons, but no one is denying the fact that it's here to stay and will impact everyone in varying capacities.

ChatGPT presents many opportunities in different fields, but it also brings its own challenges. While there are some areas where ChatGPT can totally disrupt the way of working, there are other areas where it might pose challenge in term of authenticity, ethics, and fabricated work. Since it came into picture, researchers have focussed on different fields where ChatGPT' s application can bring a major change. These include Medical Research, Academic Research, Healthcare, Education, Social Media to name a few. There are many ways in ChatGPT can really get rid of several redundant processed which on one side is good but can also have impact on the labor markets.

All these research studies give us an insight into how our lives will be impacted in future via tools like ChatGPT and this is just the beginning. This research analyses top cited articles from SCOPUS and tried to understand a researcher's perspective of ChatGPT and whether they look at it in a positive, negative or a neutral way. It also tries to narrow down the most critical area according to researchers, where ChatGPT can bring a change or have maximum impact.

2.1 Overview of ChatGPT:

ChatGPT is a highly advanced language model developed by OpenAI that is based on the GPT-3.5 architecture. It was launched in November 2022. This model is a highly effective artificial intelligence (AI) system that can understand and generate natural language text at a level that is comparable to that of human beings. ChatGPT is designed to perform a wide range of language tasks, including text completion, text classification, and text generation. It is also capable of serving as a conversational interface, allowing users to engage in natural language conversations with the model.

The architecture of ChatGPT is based on the transformer-based model, which is a highly effective deep learning architecture that has been used in many natural language processing tasks. The transformer-based architecture is highly effective in processing large amounts of sequential data, which makes it highly suitable for language modelling tasks. The transformer-based architecture is highly effective in capturing the contextual dependencies between the various elements of a sentence, which enables the model to generate highly coherent and contextually relevant responses.

ChatGPT has been trained on a massive amount of data, which includes billions of tokens from a variety of sources, such as books, websites, and other text-based resources. This large corpus of data enables the model to generate highly accurate and coherent responses. The model has been trained using a combination of unsupervised and supervised learning techniques, which enable it to learn from the vast amounts of data that it has been exposed to. The model is designed to continuously learn and adapt to new data, which enables it to improve its performance over time.

Just after 2 months of it's launch, ChatGPT had over 100 million active users. To give an idea of the volume, TikTok which is a very popular social media platform, reached 100 million users after 9 months of coming into the market.

2.2 ChatGPT and Search Engine:

There is a big difference between ChatGPT and search engines. While search engines indexes webpages on internet to help the user find the information they asked for, ChatGPT does not has the ability to search internet for information.

ChatGPT uses the information it learned from training data to generate a response, which can lead to incorrect data as it's training itself on data being fed and not looking at resources being updated and being made available online.

3. Objective of the Study

While we are seeing more and more articles and papers on ChatGPT, AI and NLP, the objective of this study was to review these articles and try to see ChatGPT' s impact from a researcher's point of view. This helped us understand how researchers are interpreting ChatGPT' s potential impact and the areas to lookout in near future as more impact of ChatGPT might also lead to a shift in the labor market of that specific sector.

This is also important as the biggest concerns right now with ChatGPT are two. Jobs losses due to AI replacing humans doing redundant tasks and then the ethical concerns in field of academics and research. There is a general thought process that ChatGPT will have biggest impact on academia and research, but our study goes into the details on top articles by different researchers and tries to unearth, what are the areas which might have the biggest impact according to researchers.

Since ChatGPT was just launched in November 2022, we will surely find many other areas where research studies will happen, and impact of AI will be evaluated. This study shows the current trend based on available data.

4. Data Methods

For our research, we reviewed top 100 articles from SCOPUS. These were sorted based on the number of citations. ChatGPT being a new phenomenon in the market, we did not find lot of citations for ChatGPT based articles. In total there were 371 citations from 217 articles published between 2022 and Apr 2023.

Out of these articles, we reviewed the top 100 ones and first, categorized just by looking at the title of the articles whether they are written with a positive, negative, neutral (no clear positive or negative overtone) or debating (positive vs negative) tone. There is a growing interest in this

topic and we will soon see more number of articles be updated on ChatGPT in coming time.

Categorizing these articles just based on the titles does not categorically explains if overall, the researchers look the ChatGPT phenomenon in a positive, negative, or balanced light. So, we first categorized the articles into 4 categories going purely by the title. Neutral and Debating tones can be looked in a combined view as Debating tone means that the author is looking at ChatGPT in a balanced way analysing the positives vs negatives.

Tone	**Count of Tone**
Positive	38
Neutral	31
Debating (Positive vs Negative)	27
Negative (Critical)	4
Grand Total	**100**

Figure 1: Count of SCOPUS articles by tone of the Title

Neutral/Debating Positive vs Negative tone was assigned to titles which did not very clearly state positive impacts of ChatGPT or had a clearly stated debatable title (eg: Daily briefing: Will ChatGPT kill the essay assignment?)

Positive tone was given when the title suggested analysing a positive impact of ChatGPT (For eg: ChatGPT: five priorities for research).

Negative tone was assigned to titles which clearly stated some negative impact or downside of using ChatGPT (for eg: Abstracts written by ChatGPT fool scientists)

We then went through all the 100 articles and in detail analysed if the researchers are looking at ChatGPT in a positive, negative, neutral or a debating light. We found a gap in any research done to find the inclination of researchers towards this topic. This becomes more important as recent studies have shown that AI generated content could not be distinguished from human generated one by researchers. In a study by Northwestern University and the University of Chicago, AI and human generated content was evaluated by human reviewers and they could not detect difference in 32% of the cases. Since ChatGPT was released for general public, there has been a debate on its impact on the research quality and we wanted to analyse this tool very specifically from a researcher's point of view.

5. Literature Review

Sample: We reviewed top 100 articles published on SCOPUS and while we had categorized the articled earlier as Positive, Negative, Debating /Neural categories purely based on titles but we then categorized the articles based on the

content. After reviewing the 100 articles, below was the categorisation:

Row Labels	Count of Author's Opinion
Negative	9
Neutral / Debating (pros vs cons)	54
Positive	37
Grand Total	**100**

Figure 2: Categorization of SCOPUS articles after Literature Review

What was found is that most articles at this stage are debating the pros and cons of Chat GPT, AI and LLM in general and not explicitly praising or criticizing the product. Most articles are analysing the impact of AI, LLM and ChatGPT based on how it will be used. For eg. ChatGPT Friend or Foe(Editorial) discussed how it can be both, depending on how it will be utilized.

Different categories have been explained below:

Negative: we categorised articles as Negative if they are only discussing fallacies of ChatGPT. For example, *ChatGPT listed as author on research papers: many scientists disapprove* discusses how ChatGPT cannot be author of a paper as the author must take legal responsibility of their contribution while ChatGPT is just writing the paper based on the pre trained data model or in some case it fabricates the details also which is dangerous.

Positive: articles have been categorized under positive category if they clearly state only positives of ChatGPT and do not discuss any shortcomings. Example article is *ChatGPT, An Artificial Intelligence Chatbot, Is Impacting Medical Literature* Which Discusses the impact of ChatGPT on medical literature, including potential benefits and limitations as well but no negative impacts.

Neutral: we have categorized any article as neutral if the author has not taken a significant positive or negative tone from the start. All articles which are debating the pros and cons or are doing a review of the tool have been categorized as Neutral.

In the 3 categories defined, we also sub categorized them based on the area of study and below was the data:

Area of Study	Count of Area of Study
Medical Science & Research	42
Academics	23
Research	12
AI/NLP	7
Healthcare	3
Education	2
Science	2
AI/LLM	1
Cybersecurity	1
Simulation Designing	1
Blockchain	1
Entrepreneurship	1
Social Media	1
Supply Chain Management	1
Global Warming	1
Finance	1
Grand Total	**100**

Figure 3: Sub-categorization of articles by area of study

We have differentiated Medical Science and Research from pure Research as the former is very specific for the articles published in analysing it's impact in the field of medicine.

Although there are number of subcategories, but the literature review found that majority of the articles are skewed towards three different sectors/areas.

6. Result

While reviewing the top 100 articles on ChatGPT, we found that 54 of the articles are debating pros vs cons on using it or discussing its positives vs negatives. Other 37 articles talk about ChatGPT in a positive way discussing its potential disruption in various fields. Only 9 articles are completely critical about ChatGPT.

Since this topic is very new, we have still not seen too many negative reviews about ChatGPT now, it can be simply speculated about the potential demerits or exploitation of ChatGPT.

Out of the 100 articles reviewed, interestingly, 42 articles have been in the field of medical science and research which shows, there is a huge interest in how ChatGPT can be utilized as a disruptive force in medical sciences. Many of the research articles in this field are around using ChatGPT in areas of research, providing real time information, generating patient education materials etc.

The second and third ranking areas are as expected, in the field of academics and research.

There are obvious discussions around potential exploitations of using ChatGPT in writing research and scholarly articles. This is more so because ChatGPT is trained on existing dataset and in many cases also fabricates which can lead to potentially incorrect and invalid research articled. The more worry some situation is that in some recent studies, articles written by ChatGPT could not be differentiated by ones written by humans.

7. Conclusion

ChatGPT and AI are here to stay and the effect on few sectors is going to be substantial. While there will be some sectors and areas where the impact might be more, cutting off redundant manual tasks by AI but otherwise ChatGPT will be more of an aid to existing processes rather than a complete job eliminator.

The effects will also be seen in near future when ChatGPT will further develop. Most articles though see it making huge impact in medical sciences, research and academia. While ChatGPT can be a real aid in assisting with tasks like generating medical history, preparing patient discharge summaries, creating write ups whereas it can also lead to low quality research materials and negatively affect the research skills of research scholars and students.

Overall, we need to closely monitor how ChatGPT is going to shape up in near future and be prepared to get used to using AI in our day to day lives.

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