

Aleksandra Fostikov

The Institute of History, Belgrade, Serbia

FIRST IMPESSIONS ON USING AI POWERED CHATBOTS, TOOLS AND SEARCH ENGINES: CHATGPT, PERPLEXITY AND OTHER - POSSIBILITIES AND USAGE PROBLEMS

Abstract: In a world that has already stepped into the Age of Imagination, an era that directly follows the Digital Age, the rise of the use of new technologies has led to the emergence of not only augmented and virtual reality and the accelerated development of robotics, but also to a leap in the development of artificial intelligence. Its outlines are clearly visible in the latest model of ChatGPT, a product of the company OpenAI that became available to the public in open access on November 30th, 2022. It is believed that by December 4th, 2022, it already had one million users. There were already over 250 scientific articles on the topic of this model by February 12th, most of them published in the form of preprints on portals such as Academia.edu, ResearchGate, and even Arxiv, and it found its place in eminent magazines such as the Economist and Forbes, among others. The name of this AI bot appeared in thousands of daily newspaper headlines, including in the domestic Serbian daily newspaper Politika (Политика), and continuously appears in everyday reports from various fields that are also published by electronic daily portals. In addition, the news about it gained significant number of followers as the AI itself on the social and business networks such as LinkedIn. Given that this is the beginning of a new era both for numerous sciences as well as for the civilization, this article is divided in three parts. According to said, the first part pays attention to early impressions of the use of this model and its possibilities, the second analysis its application so far and its impacts, while the third part reviews its possible applications in digital humanities, archivists and museology. Additionally, as the first search engines based on the use of this model appeared in the meantime, attention is also drawn to their capabilities. This paper is written based on the material and articles published so far, as well as on testing of this model and its related search engines.

Keywords: Chat Generative Pre-Trained Transformer (ChatGPT), Artificial Intelligence (AI), Digital Humanities (DH), history, science, society, civilization.

1. Introduction

In a world that has already stepped into the Age of Imagination, an era that directly follows the Digital Age, the rise in the use of new technologies has led to the appearance of not only augmented and virtual reality, as well as the accelerated development of robotics, but also to a sharp rise in the development of the artificial intelligence [1]. The development of this new type of intelligence, whose contours and influence once represented the backbone of the Science Fiction, was presented over the last few months to the general public in its, almost full glory through presentation of the ChatGPT (Chat Generative Pre-Trained Transformer - ChatGPT) model by the OpenAI company. ChatGPT became available to the public as an open access model on November 30th, 2022 [2]. By December 4th, 2022, it already had one million users, and by the end of January it already reached 100 million users, a success that led to it being declared the fastest growing user base ever [3].

This open approach allowed personal tests of that model, which not only caused huge interest from the public and media, but also of science whose representatives

began to explore this new phenomenon and its effects on the modern age, individual science branches, the society, as well as the civilization in general. On February 12th, there were already over 250 scientific articles on this model alone, published mostly in form of preprints on portals such as are the Academia.edu, ResearchGate, Social Science Research Network (SSRN) or Arxiv. The number of published articles is probably significantly bigger taking in to account other repositories. ChatGPT also found its place in eminent magazines such as Economist and Forbes, but also in news topics of the Reuters news agency. Additionally, the name of this AI bot appeared in thousands headlines in various daily newspapers around the globe, not to mention daily reports from various fields published in the electronic daily portals. Also, on a daily base, news about it gained significant number of followers as the AI gined itself on social and business networks such as LinkedIn.¹

Accordin to above said, the first impressions on the use of ChatGPT are highlighted on this occasion, an attention was drawn to the mentioned potentials and problems in using this model, an all that based on the "conversation" with the same, as well as on the still very modest list of references and media.

2. The first impressions on the use of the AI-powered ChatGPT and its capabilities

The ChatGPT language model is supplied with data limited to the year 2021 and is "trained" to interactively learn and upgrade itself. It represents a version of the GPT 3.5 model family [4]. The importance of the appearance of this model and its availability have led almost instantly to a series of analyzes of its possible use. Although this model is based on a basic chatbot interface, the interface itself allows storage of multiple communications that can be used for individual topics or training. Depending on the tasks given, it is concluded that in addition to being a language model capable of conducting a "humanoid" interactive conversation, it also is universal language translator, including for old languages.² Prove that it is much more capable was demonstrated by tests that demonstrated that it can also pass the test for admission to various universities and specialties, including passing the test for a programmer, and it narrowly missed passing the test for a medical license [5]. Unlike the numerous tests he passed with a positive outcome in the case of physics, it failed to reach satisfactory parameters [6]. So far, it has also been used in one court process [7].

In addition to being able to write programs, it can also write poetry, essays, news or process sets of facts, and even can create his own riddles, jokes or stories based on given parameters, both original and by copying the styles of certain author [8]. It seems that the possibilities and upgrade potential of even this weaker model are almost limitless, at least for the given moment. At the same time, it turned out that although work was done to filter and block undesirable content on the newest version, it is still possible through use of the command to conditionally speaking trick the ChatGPT, and that said to bypass itself not only in terms of the content, but also in terms of its use for

¹ The information was given based on a search of the mentioned portals on February 12, 2023. Considering such a large number of news that comes out every day about this model, only those that were relevant to the text of this paper were taken into account.

² During our testing of ancient languages, Old Slavic and Latin were used. As far as we know, the language base is constantly being upgraded, and it has been noticed that in the case of certain less frequently used languages there are shortcomings. However, even at this level it is possible to use it like Google's translation service. Also in our case, he was tested to write Serbian Latin and Cyrillic, which he did without any problems, as well as to answer questions in one language in another.

different purposes. Thus, it was observed that it is blocked in some cases related to certain problematic issues such as euthanasia and suicide, but also that such limitations it can be effectively bypassed, at least temporarily [9]. What definitely requires attention when working with this model is the usage of clear commands in order to obtain completely satisfactory results.

This model, or at least its basics in narrow sense, are already planned to be used in numerous future applications of Microsoft's products, a company that already decided to invest about 10 billion U.S. dollars in further development and partnership with the GhatGPT's parent company OpenAi [10]. Based on this model, the Perplexity browser was also released in its "weaker" version, that still is undergoing testings, and that the author of this article had chance to only briefly test. Although that engine does not always give precise answers, and still needs to be checked and corrected, it can also generate answers generated on a similar way to those provided by the ChatGTP. Since that browser has access to the Internet, it is possible to use it to view and collect important information. In each given answer, it lists relevant sources from where it has took the data it is presenting [11]. It remains for future assessment to give answer on what quality will be the AI-powered search engines based on the same technology [12]. Of course, based on the question of whether and what model of AI should have access to Internet and in what way, at this moment is still a philosophical, legal and also ethical question, as well as question of the future influence and possibilities of one such powerful AI [13].

3. Possible applications, problems and impacts of the use of the AI and ChatGPT

As already pointed out above, the very first encounters with ChatGPT opened the field for a serious polemic both about the possibilities of its use for a number of tasks, and about its use in various scientific fields, but also about the potential problems that its use could lead to, both in certain specific sciences and at global level, among which the possibility of misuse stands out.

As positive aspects of its use, its application in education, science, development of new technologies, and potential saving of human lives stands out, and certainly it can find a role in supporting work with lonely people, and probably also in inclusion. Judging by works already published, it is considered that it can also find its place in psychology, i.e. in psychotherapy [14]. However, if for a moment we leave aside all the positive possibilities of using AI, as well as the given model, we must point out that certain problems also arise, and that impact of the introduction of a powerful AI already begins to be seen more clearly.

Although partially being left far from public eyes, the need for controlling the information flow and for a system that would recognize spreading of fake or questionable information has reached critical levels recently with the development of Internet, web networks and mass media. This also led to further development of criticism of modern digital sources, especially those widely available via Internet, as well as to establishment of projects dedicated to solving the issue of misinformation [15]. Also, almost hidden from public remained the issue of the use of artificial intelligence, which has already been used in the creation and generation of news by CNET and Bankrate.com, two portals dealing with technology news and finance that utilizing AI ended in publication of false data [16]. The fact that the future use of a powerful AI can represent a serious problem, especially in the context of political conflicts, requires even greater attention. In the given case, during conversation with ChatGPT, this model

brought the examples of disinformation of importance, seen below in the attached screenshots shown in Figures 1 and 2.³

Yes, that is a potential negative consequence of using language models like me. Misinformation can be spread when a language model is used to generate fake news or propaganda, while invasions of privacy can occur when a language model is used to collect and analyze sensitive information about individuals. To mitigate these risks, it's important for users of language models to be transparent about how the model is being used and for appropriate safeguards to be put in place to protect people's privacy and prevent the spread of misinformation. It's also important for researchers and developers to be aware of these potential risks and to design models and use them in ways that minimize harm. Additionally, it is important for users to verify the information from the models before using it and not solely rely on the model's output.

Figure 1. Possibilities of disinformation construction by ChatGPT

An example of fake news would be an article that falsely claims that a certain political candidate has committed a crime, when in fact they have not. The goal of the fake news is to mislead people and influence their opinion about the candidate. Another example could be a report that a new medical treatment has been proven to cure a certain disease, but in reality it has not been fully tested or approved by any medical institution. This can lead to people relying on ineffective treatments and potentially putting their health at risk.

It's important to note that fake news can take many forms and can be spread through various channels, including social media, websites, and even traditional news outlets. Additionally, fake news can be spread by both individuals and organizations with different intentions, from making money to influencing public opinion.

It is important to be critical of the information we consume, especially when it comes to news and to verify it by cross-checking the information with credible sources before sharing it.

Figure 2. Examples of disinformation provided by ChatGPT

Although in its essence the ChatGPT was not created to lie or participate in creation of such content, it is possible to induce it to do these actions, as well as to

³ As can be seen from all mentioned, ChatGPT itself draws attention not only to a number of possible abuses of its program, but also to the possible consequences of using misinformation. Apart from the examples given here to illustrate the problem, ChatGPT was not questioned further on this topic on this occasion.

falsely interpret certain data. In case of certain questions, as ChatGPT points out, it is prone to bias, and with certain commands it is possible to induce it to give out information that can enable its abuse, and to also to get blocked by certain sets of questions [17].

Also, it was noted that this model has already been used not only for making plagiarism, but also to help in carrying out a number of other illegal and criminal activities. All this triggered a reaction from the public and scientific circles, and opened a series of questions about the further use of AI, open access to such a system, the way of regulating its use, but also a set of questions about its impact on modern times and the further development of the society, within which also arise questions about the series of changes that its usage will produce either on education or economy. Thus, according to the changes that have already occurred, the necessity of defining a system for detecting plagiarism, but also the way in which new tools of this type should be integrated into education and science, is now already well emphasized [18]. Also, there is an issue of the potential recession and unemployment increase due to AI's ability to create, as already mentioned above, not only excellent essays, but also business activities, thus replacing human work. At the same time, AI also causes disruption of the workforce market due to the struggle for supremacy among the giant IT companies, and perhaps one of the most serious consequences is indeed the firing of large number of personnel [19].

4. Possible applications of the ChatGPT and AI in Digital Humanities and scientific research

Since it is not possible to deal with all individual issues and aspects of AI accessibility in one paper, on this occasion we devoted our attention to the analysis of the use, possibilities and problems of using such a model and its possible influence and application within the digital humanities and separately as a working tool. So far, the testing of this model has shown that in addition of being capable to program on its own and having at the same time interface that allows programming with simple commands written in natural language, the writing of programs through syntax is also replaceable and accessible to the wider scientific community enough to allow it at least to basically test and make models according to their own needs.⁴ Such acceleration of work will certainly have unforeseeable consequences for the future transition of the humanities, as well as for the research work itself. Thus, not only will the humanities itself become digital in every segment, either at the level of primary research or at the level of presentation, but a series of activities will be able to be simplified by upgrading this model, while the results themselves will be more representative in every respect.

Of course, in order to achieve all this, and for this type of AI to be fully implemented, it will be necessary to consider its possibilities, as well as the further development of critical thinking and the analytical approach by AI itself, as well as supervision over the analysis of the data that is available through it. The problem of misinformation could be reduced, at least within its application in science, to a minimum by a well-defined parameters and questions, and by its further study. By asking it to describe its potential contribution to humanities and science, and especially

⁴ Certainly, although it can produce types of programs on command and thus provide a basis for ideas, the fact that it cannot apply the same programs itself, as well as implement them according to their purpose on the Internet to which it is not connected, requires further work by the programmer on the given problem.

to digital humanities, this AI presented a series of relevant data. Also, during a series of "interviews" during which it was questioned from different historical periods, with an emphasis on medieval and modern history, the AI gave a series of answers, which it was ready to repeatedly generate based on questions asked. In order to be able to control the answers and their validity, the AI was asked questions based on topics for which answers and their different segments are already well known to us. Among other things, it was examined about medieval mining, mining codes, Latin and Old Slavic languages, the history of sex and genders, Macedonian-Bulgarian relations, as well as on the Ukrainian-Russian relations before the crisis, and according to data time limits, on similarities and differences between individual languages and speech groups, and about its possible influence on contemporary society and the creation of misinformation. It gave a series of valid answers to all questions, which, in the case of given parameters, could have been in the form of an essay of two to three thousand words, that is, up to about two pages of an author article.⁵ As it is clear from the answers, starting from the method of collecting sources and literature to their processing and collecting adequate facts related to the necessary data, that the ChatGPT can create an initial list of sources and literature related to the basic research question, but also to collect data scattered throughout materials and literature.⁶ In this sense, it can be of immense help if it is supplied with enough adequate data.

As the ChatGPT points out on its own during conversations, its application in the digital humanities will in the first place basically enable and facilitate several things, such as shortening the working hours spent in collecting, but also in clearing the source material itself, cataloging the data, or identifying the source.⁷ Thus, by potentially adding a software solution for deciphering manuscript material as well as for transferring it to printed sources, while at the same time having possibility to translate it, especially in case of old languages into the modern ones, the material would become more accessible while the search and marking of individual words would lead to its accelerated digitization, storage and preservation.⁸ In the same way, only through other solutions the preservation of cultural heritage in general would also be accelerated.⁹ The possibility to compare a huge amount of information would also lead to a change in the way of research work. Namely, any future researcher despite having to know all those skills required today, would indeed only supervise the process of search and analysis, especially comparative within the structure. This will allow him to devote much more time and attention to the synthesis. Also, future models would independently map and collect data, even through crowdsourcing from available open access sources or those data collected during field researches [1].

Despite all above-mentioned points identifying future directions and changes in the scientific methodology, as well as the criticisms and methods of accessing existing

⁵ We received this information during an interview about writing an essay. On that occasion, the answer was that he could write an essay of a maximum length of 2-3,000 words.

⁶ On that occasion, questions were asked, among others, to list all the sources of Saxon mining law known to it, to compare the competence of blacksmiths in those laws, and to list the manuscripts of importance for the research of Emperor Dušan's Code.

⁷ In the case of identifying the source or the author, it would be possible to determine the families of manuscripts and copies, but also to indicate who took what from and by comparing the features of the text. See below.

⁸ Thus, when asked if it could decipher and analyze certain texts, as well as provide meta data about them and categorize them, it answered that it could do so if it was given access to the same texts and additional software.

⁹ On that occasion, it was asked to deal with the issue of searching for photos of the church on the Internet, that is, to suggest, given that it does not have access, how they could all be searched and collected.

data, the ChatGPT itself presented number of possibilities for its application in digital humanities, archivists and museology. Thus, among other things and apart from those given in the screenshots below, it also mentions the following operational possibilities within its potential engagement: “Text analysis, Translation, Data visualization, Information retrieval, Natural language processing, Machine learning, Corpus analysis, Sentiment analysis, Topic modeling, Named entity recognition, Language modeling, Text classification, Text clustering, Network analysis, Social media analysis, Geographic information systems (GIS), Audio and video analysis, Digital archives, Digital libraries, Digital publishing, Digital storytelling, Cultural heritage preservation, Augmented reality, Virtual reality, Gamification, Interactive exhibits, User experience design, Web development, Mobile application development, Open data initiatives”. In the context of archives and museums, and in addition to the attached screen No. 5, when asked how it can be also applied, it answered: “Yes, ChatGPT can be used to create digital archives. It can assist in automating the process of data entry, categorization, indexing and searching of archival material. Additionally, ChatGPT can automatically generate metadata for digital material, which facilitates its searchability and accessibility”. By using ChatGPT to create digital archives, museums and archives can expand the accessibility of their collections and contribute to their preservation and conservations for future generations (see figures 3, 4 and 5).¹⁰

Here is a list of possible applications of ChatGPT in digital humanities: Text analysis, stylistic analysis, translation, text generation, author recognition, sentiment analysis, text categorization, entity recognition, keyword recognition, text clustering, speech pattern identification, text correlation analysis, language recognition, summary generation, network analysis, social media analysis, topic identification, search engine enhancement, automatic metadata generation, automatic theme recognition in text, improvement of message personalization, automatic citation recognition, automatic reference recognition, automatic recognition of key statements, improvement of recommendation systems, automatic speaker labeling in dialogue, social network analysis, speech analysis, automatic translation of summaries, and trend analysis in texts.

Figure 3. List of some of the applications of ChatGPT in digital humanities

¹⁰ Although it mentioned a large number of applications, due to repetition it was not possible to systematize them through screens. Therefore, we bring them in the form of text taken from the interviews we conducted, while the screens are attached only as an example of how ChatGPT can illustrate its possible applications.

Some other applications of ChatGPT in digital humanities include: automatic expansion of dictionaries, generation of keywords, analysis of text-based museum collections, text sampling, language modeling, text rating, text matching, named entity recognition, sound recognition and speech transcription. ChatGPT can also be used for conversation simulation and testing of text generation software, as well as for generating textual content for education and entertainment.

Figure 4. List of other applications of ChatGPT in digital humanities

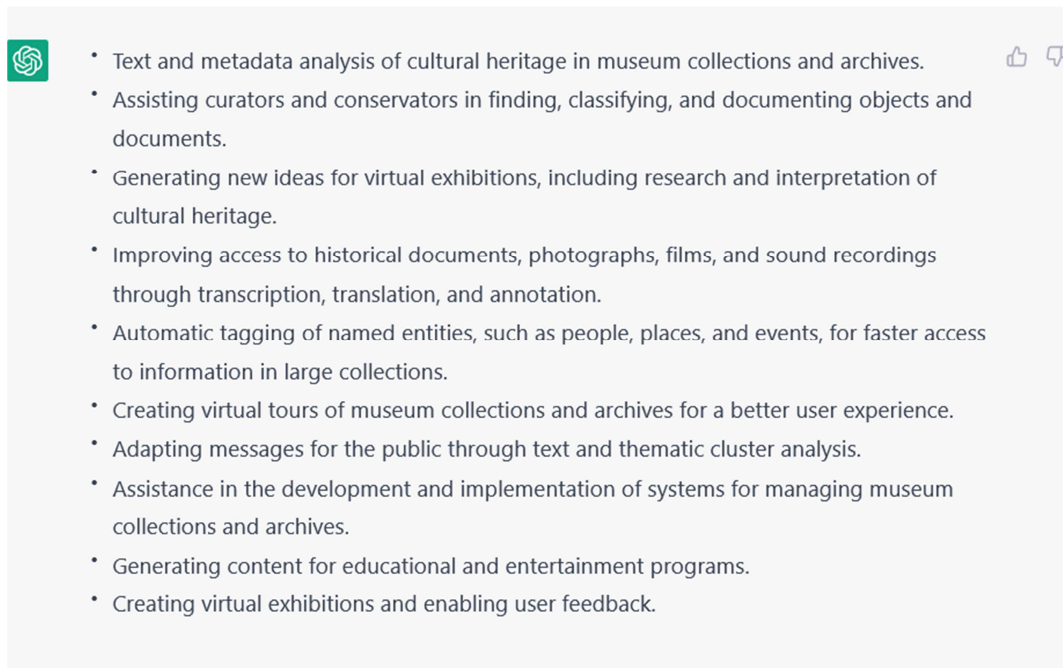


Figure 5. List of some applications of ChatGPT in archives and museums

Everything mentioned so far points to the fact that the future use of AI in this form can lead not only to the acceleration of research, but also to the collection of a greater number of valid facts, thereby contributing to a better synthesis of the research question, the preservation of cultural heritage and its better representation to the public [20].

5. Conclusion

At the very end of this short review based on currently available information and the research on possibilities and problems of applying AI in digital humanities, as well as cultural institutions and society, it must be pointed out that the first impressions of AI chatbot model capabilities are more than satisfactory. Also, according to all above mentioned, it should be emphasized that this work represents only a series of possible topics that have been conceived and should also be explored in future, in accordance with the fact that the very issue of further use and integration of not only ChatGPT, but

also AI into modern world has unknown consequences for each segment of life, including science, the further development of the society, on everyday life, education, politics, the way of warfare, or the economy, among others. Therefore, such models must be clearly tailored and correspond to given parameters while at the same time being developed within clearly defined ethic standards and rules of conduct, as well as secured from potential abuse as much as possible.

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