Journal of Scientific Exploration

Anomalistics and Frontier Science

BRIEF REPORT

UnityGPT vs. ChatGPT: A Comparative Review for Frontier Scientists

HIGHLIGHTS

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SUBMITTEDSeptember 14, 2023ACCEPTEDSeptember 31, 2023PUBLISHEDOctober 31, 2023

A new AI-powered search and language tool gives researchers more informed and balanced information on frontier science topics than the popular ChatGPT software.

ABSTRACT

Artificial intelligence tools based on Large Language Models (LLMs), such as OpenAI's ChatGPT, are revolutionizing how we process and synthesize information. However, these tools can be anemic when applied to niche or unconventional domains, such as parapsychology. This is due to the fact that the input content used to train these LLMs draws predominately from mainstream internet sources (e.g., Wikipedia), and thus, the corresponding outputs inherit various biases surrounding heterodox subjects. This review introduces UnityGPT, a custom AI tool provided with a vast array of unconventional research from a plurality of disciplines, intended for use as a primary research tool in the frontier sciences. The article summarizes the technology approach of both ChatGPT and UnityGPT, and their relative strengths and weaknesses.

KEYWORDS

Artificial Intelligence (AI), Natural Language Models (LLM), ChatGPT, UnityGPT, Frontier Sciences, Parapsychology, Information Synthesis.

https://doi.org/10.31275/20233193

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INTRODUCTION

Recent advancements in artificial intelligence (AI) have catalyzed intense debate about their potential impacts on information dissemination and research dynamics (Dwivedi et al., 2023). One of the most notable developments in this domain is OpenAI's natural language model, ChatGPT, which has seen swift integration into various research contexts (Sallam, 2023). The model's rapid adoption—illustrated by its growth from 13 million daily active users in January 2023 to 55 million by June 2023 (Brandl, 2023) —is a testament to its integration into diverse information-seeking contexts. However, its rapid adoption also raises timely questions about the balance between AI's potential for fostering novel insights and the significant challenges it presents, especially concerning authenticity, academic integrity, representation and bias, and broader ethical implications concerning human agency in decision-making processes (De Angelis et al., 2023; Eke, 2023; Momen et al., 2023; Ray, 2023).

Nevertheless, the capabilities of powerful large language models (LLMs) like that which powers ChatGPT open unprecedented research avenues, even in niche fields such as parapsychology. The strength of these models stems from the vast volumes of data on which they are trained. For instance, ChatGPT's training draws from an extensive cache of internet textual data up to 2021 (Schade, 2023; Somoye, 2023). However, while the enormity of the training data enables the model to generate an impressive rendering of human language, opinions of the training data become opinions within the responses. For example, publication bias against marginalized scientific research results in that research being excluded as training data which affects the model's responses. As tools like ChatGPT become research mainstays, there's a concurrent risk of entrenching the current orthodoxy into the knowledge infrastructure of the future.

An alternative AI tool called UnityGPT was specifically developed for heterodox research. This review introduces UnityGPT and is co-authored with insights from its creator. The aim is to spotlight its usefulness as a research assistant for frontier sciences and to summarize its mechanics and relative advantages and drawbacks vs. ChatGPT. There is a focus on parapsychology as an example.

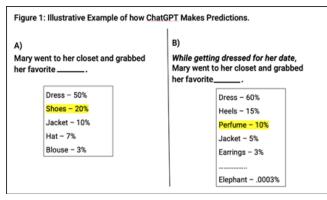


Figure 1: Illustrative Example of How ChatGPT Makes Predictions.

ChatGPT predicts sentence completions based on contextual cues, much like a human reader would.

- 1A). From cues like a woman's name and "closet," the model leans toward stereotypically feminine items typical of a closet.
- 2A). Additional context nudges the probabilities towards date-associated items found in a closet. Though syntactically fitting, words like "elephant" fit the syntax, they are also highly unusual given the context and, therefore, very unlikely to be selected.

Note: this is a hypothetical example for illustration, but the actual items and probabilities selected by GPT would likely differ from those shown.

ChatGPT

The potentially transformative power of ChatGPT is difficult to comprehend at this early stage. At best, we're only scratching the surface of what this technology might offer, both as an asset and a liability. As an illustration and in the interest of transparency, while the content and ideas of this manuscript are original, ChatGPT was utilized extensively in formatting the structure of this document, rephrasing ideas, and proofreading of text to an extent that would ordinarily warrant co-authorship. However, since authorship traditionally implies accountability, prevailing ethical standards advise against such attribution (Flanagin et al., 2023; Stokel-Walker, 2023). Yet the creative facilitation and augmenting utility of ChatGPT as a writing accelerator cannot be easily overstated. While extensive literature dives deep into the multitude of applications and ramifications of ChatGPT (Sallam, 2023), it deviates from the primary focus here. Therefore, this review will succinctly address a couple of pivotal considerations.

At first glance, ChatGPT mesmerizes with its seemingly boundless reservoir of knowledge and information. Users can query on basically any subject, and the model instantly generates highly intelligible and seemingly credible responses. As such, more and more users are relying on the platform as an information source (Grigutytė, 2023). Even specialized platforms for domain-specific knowledge, such as Stack Overflow for software developers, have seen precipitous drop-offs of usage as more users turn to ChatGPT for rapid, comprehensive, and articulate solutions to challenging technical questions (Anderson, 2023). However, it's crucial to dispel a common misconception: ChatGPT is not, in fact, a repository of knowledge. Fundamentally, it operates as an intricate prediction model, deriving its responses from patterns of word co-occurrence and thematic relationships within its training data (Roose, 2023). Therefore, the reliance on ChatGPT as an authoritative resource can be problematic as the platform is prone to produce unreliable information. For example, despite the uptick in user-preference for the model over traditional sources such as Stack Overflow, a recent analysis found ChatGPT's solutions tended to be overly verbose and riddled with errors and inaccuracies (Kabir et al., 2023).

To grasp how ChatGPT responds to queries, consider its underlying mechanism. It discerns the semantic essence of a user's input and crafts a response based on associative strength to that input. For instance, a query about "cats" won't typically yield a response about "airplanes" unless contextualized, perhaps in a question about "traveling with pets" (see Fig 1.). This associative mapping, or "semantic proximity," hinges on word and topic co-occurrence patterns in its training data, which predominantly stems from the internet as of 2021. Instead of retrieving a definitive "correct" answer, ChatGPT probabilistically generates a response based on the frequencies of word patterns observed during its training (Roose, 2023). Due to this probabilistic nature (and adjustable parameters like "temperature."¹), slight variations can emerge in responses to identical prompts. While often insightful, ChatGPT is far from infallible. Its predictions, though frequently accurate, can occasionally veer into the realm of unfounded conjecture, i.e., "hallucinations" (Bang et al., 2023).

Another prevailing misapprehension is the belief that ChatGPT's output mirrors an objective external reality. In truth, it is a mere reflection of its training corpus—primarily, the internet—and, as such, is heavily influenced by prevalent biases and dominant thought patterns. While developers have invested significant effort into fine-tuning ChatGPT and placing guardrails to reduce these biases, achieving a comprehensive neutrality remains an aspiration (Hemmatian & Varshney, 2022).

This inherent bias represents substantial obstacles for parapsychological researchers hoping to source objective insights from ChatGPT. Given its foundational training data, the model will naturally be inclined towards the prevailing scientific orthodoxy and the material reductionist philosophy of the times. Many researchers, either implicitly or overtly, adopt this framework, which is inevitably reflected in the language in the works they produced (Butzer, 2020). Notably, discourse surrounding parapsychology often harbors a dismissive or patronizing undertone (See: Panel 1 of Appendix Fig. 3) (Cardeña, 2015; Carr, 2019; Mousseau & Méheust, 2003). As a result, ChatGPT's responses concerning parapsychological subjects are likely to be marred by a biased, materialistic lens, leading to potentially skewed or incomplete insights. Notably, users can revise their prompts to request ChatGPT to offer a more impartial response that is less dismissive of parapsychological research, for example. However, this requires a degree of query savvy and places a higher burden on the part of the user. Likewise, as a strategy, it is unlikely to be employed by someone who is not already amenable to unconventional scientific approaches, etc.

In light of these concerns, one might ask: What are ChatGPT's strengths, and how can they be leveraged for parapsychological research? Among LLMs, ChatGPT is unparalleled for crafting coherent, contextually-aligned responses to user prompts. Its strengths aren't just confined to generating structured language; it can spur creative brainstorming, draw connections between seemingly unrelated subjects, enhance text editing, facilitate proofreading, and adeptly rephrase user inputs, making it a useful tool for ideation. Moreover, by harnessing OpenAI's API, these language capabilities can be utilized by other applications. This is the case with UnityGPT.

UnityGPT

Like ChatGPT, UnityGPT allows users to ask questions and receive answers that are the result of a sophisticated synthesis of large bodies of text. Unlike ChatGPT, UnityGPT utilizes a custom "library" of training data paired with OpenAI's underlying LLM (GPT-3.5 Turbo) to generate responses. This library is composed of large quantities of published research into what is generally regarded as "unconventional" topics, ranging from parapsychology to ufology to medical research, amongst others (*UnityGPT*, n.d.). For example, every research article from the Journal of Scientific Exploration from its inception to 2023 (36 volumes) was included in this training library.

To understand how this system works, it's necessary to understand vector embeddings. Domains of computer science that deal with semantics and natural language processing (NLP) have devised clever ways of representing direct and implied meaning between words and phrases. One such method is the use of vector embeddings. To create a vector embedding, a program is used to convert a chunk of text into a mathematical object, where each word (or unit of text) is represented as vectors between one another. The angle formed by two vectors is a representation of the semantic similarity between those words; the smaller the angle, the more semantically similar those words are. This angle is stored as a cosine value.

Each word introduces a new dimension in that object; a 500-word embedding is actually a 500-dimensional object (so called "high-dimensional space"). Although impossible to imagine, the embedding is easy to represent and store efficiently as a collection of cosines.

In this way, vector embeddings capture the semantic meaning between the words. Stated another way, the particular "shape" of the vector embedding is also the hidden meaning and concepts between the words from which it is composed (Çelik, 2022).

The research library utilized by UnityGPT is actually a collection of roughly 80,000 vector embeddings (each roughly the size of one paragraph), which is stored in a specialized vector database. The question-answer mechanism works as follows:

Step 1. User asks a question by typing it into a search bar using natural language. This text is itself converted to a vector embedding using the same codex

as that which was used for the training library.

- **Step 2**. This user embedding is then used to query against the vector database, with the instructions to find those library embeddings that are the greatest cosine similarity (the more similar the geometry of the query and library embeddings, the more similar the semantic meaning).
- **Step 3**. The top 10 embeddings from the library which are nearest in shape to the query are retrieved. These embeddings and the query are then translated back into English, and sent to OpenAI's GPT 3.5 Turbo LLM via API, along with a universal "system prompt" to utilize the context contained within the library source materials to synthesize a detailed response to the query.
- **Step 4**. The answer is then returned to the user, along with the references to the source documents utilized as context for the response. (see Fig 2).

How does UnityGPT stand apart from popular platforms like Google Scholar or Wikipedia? Beyond the challenge that many unconventional research journals are overlooked by standard search engines, platforms like Google Scholar, although invaluable, present users with an array of potential matches based on keyword relevance. This often results in researchers having to wade through numerous abstracts and papers to evaluate the applicability to their query. UnityGPT, however, is focused on searching within the "meaning space" which can be helpful both in finding relevant information that may not contain user keywords but also can efficiently surface unexpected connections between distinct silos. These connections are often useful clues to the frontier scientist, particularly those focused on building broader theoretical models.

In contrast to tools like Google Scholar, UnityGPT's source identification can dramatically reduce research hours for users. (For a practical illustration using the example of "remote viewing," please see the Appendix.)

Furthermore, the "synopsis" response provided by UnityGPT is without the potential interpretive bias of human sources of synopsis, such as those that can afflict Wikipedia. Wikipedia, in particular, is known to exhibit a strongly dogmatic stance against frontier sciences and has mischaracterized and undermined ideas falling outside of the scientific orthodoxy (Martin, 2021; Weiler,

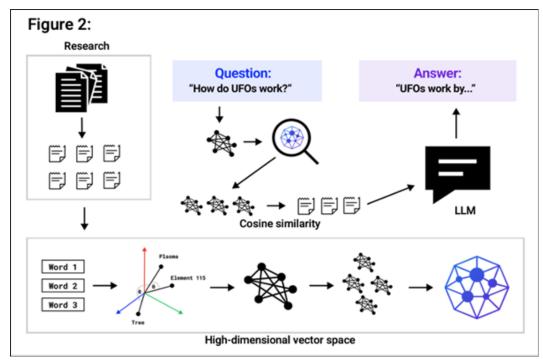


Figure 2. Schematic Illustration of UnityGPT's Mechanism for Generating Semantically Relevant Outputs. Initially, source documents are segmented into text blocks, which are then transformed into vectors within a high-dimensional space. These vectors capture semantic relationships between different text blocks based on cosine similarity. Upon receiving a user's query, it too is vectorized and matched to the most semantically relevant source documents using the same cosine similarity approach. The top-matching document segments, along with the user's original prompt, are then processed by GPT 3.5 Turbo. This produces a natural language response, accompanied by citations for the source material. **This figure was adapted from a presentation on UnityGPT delivered by its creator, Adam Curry to the 2023 Contact in the Desert annual conference.

2013). This is fueled, in part, by highly-organized groups of skeptical activists who police and edit content (Skeptical About Skeptics, n.d.).

DISCUSSION

With its intuitive interface, precise responses, direct citations to source materials, and continually updated knowledge base, UnityGPT is poised to become the go-to research tool within the frontier sciences. The simplistic design facilitates easy information retrieval, and the model's output includes a detailed synopsis of the relevant literature in plain and understandable language. Unlike conventional platforms, UnityGPT does not link users to semi-static pages of content based on a query but rather finds the most relevant content and generates a synopsis dynamically. This marks a marked improvement over traditional forms of search as it allows the model to return more targeted and digestible responses that remain closer to the original materials from which they are derived.

Moreover, the model's extensive and ever-growing library contains many rare and often unknown materials that lie far outside the purview of traditional search mediums. These materials span a range of esoteric subjects that are typically researched or discussed only in niche, discontinued, or otherwise obscure periodicals. UnityGPT, therefore, aims to deliver a more comprehensive and ideologically-balanced alternative for information on controversial or esoteric subjects.

These factors combined place UnityGPT in a position to better service even the conventional scientist who may be seeking direct access to an even-handed summary of the extant research on any arcane topic. However, this utility is also proving invaluable for citizen scientists and the broader populace seeking insights into unconventional scientific concepts devoid of the biases typically displayed in traditional mediums. UnityGPT acts as a portal into a vast network of nontraditional thought, fostering new perspectives and insights. It epitomizes how the overarching capabilities of large language models, like ChatGPT, can be tailored for niche applications, maximizing strengths and mitigating weaknesses. Predicting the future in this rapidly advancing domain remains intractable, yet it is easy to become enthusiastic about the promise of such tools for reshaping our information synthesis and scientific methodology.

ENDNOTES

¹ In large language models like ChatGPT, the 'model temperature' is a configurable parameter that influences the model's level of randomness when generating outputs (Marion, 2023). At higher temperatures, the

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in Figure 1

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APPENDIX

Comparative Outputs From ChatGPT, Google Scholar, and UnityGPT Based on the User Prompt "What is the leading research on remote viewing?"

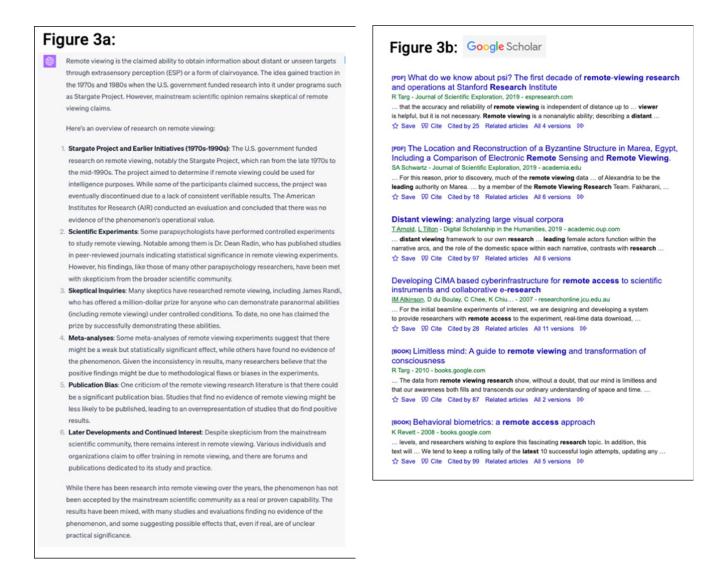


Figure 3a. ChatGPT's response suggests a slight bias against the topic of remote viewing. Although it ac-knowledges some prior research, it tends to focus on critiques. The answer mentions previous studies but does not provide citations or direct links.

Figure 3b. Google Scholar displays multiple links to published articles. However, several of these seem unrelated to the specific query about remote viewing.

Figure 3c: UnityGPT

According to my training, the leading research on remote viewing was conducted at the Stanford Research Institute (SRI) in the 1970s. Physicists Harold Puthoff and Russell Targ initially focused on this form of psi at SRI. and their work was continued by physicist Ed May and colleagues. They conducted rigorous demonstrations of remote viewing, which were published in various papers such as Targ & Puthoff 1977, Tart, Puthoff, & Targ 1980, Tart, Puthoff, & Targ 1979. Additionally, Stephan Schwartz independently developed remote viewing technology for archaeological work, which further demonstrated the practical application of remote viewing (Schwartz 1978, 1983). The research at SRI involved several basic experiments, including psychokinesis, development of the remote-viewing method, remote viewing in an electronically shielded room, identification and selection of psi-gifted individuals, training of psi-gifted individuals in remote-viewing methods, and applications of remote viewing to national security problems. A metaanalysis of the SRI data from 1973 to 1988 concluded that remote viewing can provide operational settings. Experienced viewers were found to be significantly better than the general population, and remote-viewing ability did not degrade over time (Targ 1996). It is important to note that there is no quantitative evidence at this time to support a training hypothesis for remote viewing (Mumford, Rose, & Goslin 1995). However, the extensive research conducted at SRI and other independent laboratories, such as Bisaha & Dunne 1979, Dunne & Bisaha 1979, Jahn 1982, and Jahn & Dunne 1986, has provided considerable scientific evidence for the reality of remote viewing. The successful replication of remote viewing experiments and the discovery of individuals with high-quality remote-viewing abilities have further strengthened the evidence (Targ 1996). In recent years, a protocol known as associative remote viewing (ARV) has shown promise as a practical application of remote viewing. This protocol, developed by Stephen A. Schwartz and adapted by Puthoff and Targ, involves using remote viewing to predict the outcome of an event with multiple discreet possible outcomes. This new protocol has been referred to as ARV and has been explored in a limited number of published investigations (Katz, Grgi?, & Fendley 2018). However, further research is needed to fully explore the potential uses of ARV and remote viewing in general (Smith, Laham, & Moddel). In conclusion, the leading research on remote viewing was conducted at the Stanford Research Institute in the 1970s, and it has provided rigorous demonstrations of the phenomenon. The practical applications of remote viewing have been demonstrated in various fields, such as archaeology, and the research has shown that experienced remote viewers can provide valuable intelligence

Figure 3c. UnityGPT provides a comprehensive overview of the topic. A source link beneath the description (not shown here) offers direct citations to the referenced research