Can GPT Sentiments Reveal the Future of Artificial Intelligence?

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ABSTRACT

The present language models are increasingly becoming tools or instruments for different machines to understand, decipher and predict human languages as components of contextually applicable human form of communication. This study attempts to figure out the progress of language models commonly described as GPTs or Generative Pre-trained Transformers. R4.2.2 console programming was used to locate keywords in the topics of GPT among 72 blogs that appeared in OPENAI website. The main terms identified included "learning," "openAI", "models," and "model." Moreover, correlation analysis revealed associations between terms like "appreciated," "creativity," "flex," "combine," and "connections. Scholars, researchers, and professionals working on business and information technology applications can add to their knowledge base from reading this article.

1.0 Introduction

1.1 History

OpenAI represents a groundbreaking attempt in artificial intelligence research, consisting of a for-profit subsidiary, OpenAI LP, and its overarching non-profit entity, OpenAI Inc. Established in late 2015 in San Francisco by visionaries including Elon Musk and Sam Altman, the organization was founded on a remarkable $1 billion commitment to fostering the development of AI systems that are both safe and universally beneficial. Although Musk stepped down from the board in February 2018, he remained a financial supporter of the initiative. In 2019, the enterprise managed a substantial boost with a $1 billion investment from Microsoft and Matthew Brown Companies.

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The headquarters, located in the historic Pioneer Building within San Francisco's Mission District, reflects the innovative spirit at the heart of OpenAI's mission. [OpenAI, Wikepedia].

1.2 General understanding of GPT Model

GPT stands for Generative Pre-trained Transformer Machines that predict words are language models. It is usually trained on a vast amount of text, so when it encounters new text, it suggests potential next words. It grows more inventive the more text you train it with. Typically, language models are trained to do a single task, such as text production, summarization, categorization, etc. Predictive text is an input technology that simplifies typing on digital devices by offering word suggestions based on what the user is likely to type next. It draws on the context of the surrounding text and the initial letters entered to generate accurate predictions, making the typing process more efficient [Amazon news].

1.3 Types of GPT

1.3.1 Transformers

A transformer models input using an encoder stack and output using a decoder stack (using input data from the encoder side (GitHub, 2022).

1.3.2 GPT-2

In situations where there is no input data and the objective is to predict the "next word," the Encoder component of a transformer model can be eliminated. Therefore, the focus is solely on generating one word at a time, which forms the core of what we refer to as GPT (GitHub, 2022).

1.3.3 BERT

The transformer's decoder, which is integral to BERT, may not be essential if the sole objective is to train a language model that serves as input for other tasks (GitHub, 2022).

1.3.4 GPT-3

GPT-3, or the third-generation Generative Pre-trained Transformer, is a neural network-based machine learning model developed by OpenAI, trained extensively on data sourced from the internet. This model can generate diverse and coherent text outputs with remarkable accuracy, requiring only minimal text input to produce substantial amounts of meaningful content. GPT-3 operates with an impressive 175 billion machine learning

parameters, significantly surpassing its predecessor, Microsoft's Turing NLG model, which contained 10 billion parameters [GitHub]. As of early 2021, GPT-3 stands as the largest neural network ever constructed, setting a new benchmark for generating human-like text. The advanced architecture of GPT-3 enables the production of high-quality written material, including articles, poetry, narratives, news pieces, and conversational dialogues, demonstrating its superiority in natural language processing tasks. [GitHub].

2.0 Literature Review

2.1 Academics

In a study conducted by Zhai (2002), the potential of ChatGPT was investigated through its application in developing the academic article *Artificial Intelligence for Education*. The outcome indicates that ChatGPT can assist researchers in crafting papers that are systematic, coherent, partially accurate, and informative. However, the study emphasizes the need for researchers to design AI-driven learning challenges that actively engage students in solving real-world problems to achieve educational objectives. Additionally, some concerns were raised regarding the potential misuse of ChatGPT by students to outsource their assessment tasks. Given that AI cannot substitute for human creativity and critical thinking, the article emphasizes the necessity of adopting new forms of evaluation to address these challenges (Zhai, 2022).

In their study, Lund & Ting (2023) present a comprehensive overview of key concepts related to ChatGPT, an open-source application developed by OpenAI, and the GPT technology that underpins its functionality. The article probes into the evolution and mechanics of GPT, concentrating on its generative pre-trained transformer model, its versatile capabilities in performing diverse language-based tasks, and the application of this technology within ChatGPT as a sophisticated conversational agent. The authors also incorporate an interview with ChatGPT, studying its potential impact on academic institutions and libraries. The conversation highlights various benefits, including improved search and discovery functions, enhanced reference and information services, advancements in cataloging and metadata generation, and support for content creation. However, the article also addresses critical ethical concerns, such as issues of bias and privacy, that raise concerns for careful consideration in the deployment of such technologies. (Lund & Ting, 2023).

Aydn & Karaarslan (2022) in his study mentioned that the relevant work in the chosen subject must be summarized in literature review articles. He observed that it would take too much time and effort to discuss all relevant research. Instead, he suggested how potential applications of AI in this such as OpenAI ChatGPT artificial intelligence

application, can be utilized to produce a literature review paper. The results seem encouraging although when the Ithenticate tool was used to examine the paraphrased passages, substantial similarities could be found.

This study attempted to show how the compilation and expression of knowledge can be accelerated with the help of artificial intelligence. This showed the possibility of future academic publishing process taking less human effort, and allowing academics to focus more on their studies (Aydın & Karaarslan, 2022). Ventayen & Magno (2023) developed an artificial intelligence (AI) model known as ChatGPT, qualified of performing advanced cognitive tasks, which has recently gained significant popularity among academics. However, this functionality raises alarms about the potential for academic dishonesty, particularly regarding students who use ChatGPT to generate essays and assignments, especially in higher education environments where such tasks are common. This poses a threat to the integrity of academic submissions. The study employed tools such as Ouriginal by Turnitin and a paraphrasing tool to evaluate the similarity index of content generated by ChatGPT. During the assessment, references to research papers published by Pangasinan State University were discovered in the ChatGPT-generated content. The similarity index of the results exceeded the university's acceptable threshold, thus weakening the integrity of academic research. (Ventayen, 2023).

2.2 Legal

In his research, Perlman (2002) meant to demonstrate the remarkable complexity of ChatGPT and its potential implications for legal services and society as a whole. A sizable portion of the document was generated in just over an hour using prompts provided to ChatGPT. While the abstract, introduction, outline headings, conclusion, and prompts were written by a human, the remaining content was produced exclusively by ChatGPT without any further human alterations. This work suggests that ChatGPT could radically transform the way we approach and generate knowledge, seek legal and other services, and prepare individuals for employment. Nevertheless, it also presents emerging issues, including the role of knowledge workers in society, the questions of proper attribution of authorship, and the extent to which we should depend on technology for such tasks. (Perlman, 2022).

Armstrong (2023) tasked ChatGPT with staging a variety of routine legal research and writing tasks over the course of an engaging day. While some of the responses were commendable, others fell significantly short of expectations. The focus of the study was on ChatGPT's understanding of the law and its limitations, particularly its inability to conduct effective legal research (Armstrong, 2023). Moreover, the tool's inclination for confidently generating responses that cite incorrect, or fabricated case law and statutes

was a key concern. This article investigates both the risks and potential benefits of using ChatGPT in legal contexts, highlighting its ability to create prompt and fact patterns for legal writing assignments. In a related discussion, Tu *et al.*, (2022) explored the widespread use of artificial intelligence (AI) tools, such as GPT-3, and related technologies. They discovered how these tools can shift power dynamics from the public to patent creators, addressing concerns regarding the enablement, utility, and definiteness requirements that help ease the risk of unjustified patent expansions facilitated by the pervasive use of AI. (Tu *et al.*, 2022).

Another article by Graham & Iacopetta (2009 investigated how closely general-purpose technology and nanotechnology resemble one other (GPT). The features of GPTs reported in the past literature using patented nanotechnology innovations from 1975 to 2006, and discovered evidence that nanotechnology exhibits both "pervasive" adoption and "spawning" of follow-on innovation. The first findings included the fact that language models have the potential to both empower consumers and transmit harmful stereotypes and bad information. The findings further discovered the advantages of language models in fulfilling legal responsibilities, such as understanding consumer contracts, while addressing the challenges inherent in these applications through a combination of robust engineering practices and effective governance frameworks (Graham & Iacopetta, 2014).

Smulders & Bretschger (2000) explored the application of GPT in understanding the dynamics of production-related pollution. Their study emphasized the need for regulatory intervention when pollution levels become excessively severe. Additionally, this model provided deep insights into the inverted U-shaped relationship observed in empirical studies of various pollutants, commonly known as the Environmental Kuznets Curve (EKC) (Smulders & Bretschger, 2000). Kreps & Kriner (2023) stated that Modern machine learning techniques have produced natural language models that can replicate the style and content of human writing. They examined the threat that artificially produced material, such that created by GPT-3, poses to democratic representation by determining the degree to which such information might be mistaken for constituent emotion (Kreps & Kriner, 2023).

Van der Kooij & Van der Kooij (2017) analyzed the transformative impact of electricity as a General-Purpose Technology (GPT-E) during the Second Industrial Revolution, describing it as a meta-technology that significantly drove economic growth. The foundational elements of this technological revolution were General Purpose Engines (GPEs), fueled by key inventions such as the electric motor, dynamo, electric light, telegraph, and telephone. These GPEs served as the cornerstone innovations around which clusters of subsequent innovations emerged, further amplifying their economic and societal influence. ((van der Kooij & van der Kooij, 2017), van der Kooij & van der Kooij,

2023)). In another paper, Macey-Dare (2023) used ChatGPT, to conduct around 150+ words of in-depth analysis and prediction on the following overlapping topics regarding ChatGPT's and successor generative AI systems' likely effects on the changing practice of law and the traditional legal professions (Macey-Dare, 2023). An article by Gunder (2023), was the first to examine the historical restrictions on the ability to represent oneself in court and to consider how those restrictions may affect litigants who want to employ cutting-edge artificial intelligence technology to support their court appearances. He argued that a litigant who wants to use artificial intelligence to aid in their pro se appearance in court would not follow the rules of the right to self-representation as they have been historically established (Gunder, 2023).

2.3 Technology use

A study by Jackson & Saenz (2022) was the first effort to use Natural Language Processing to automate the creation of simulation models of crucial logistics-related systems. Their research demonstrated that, when provided with a verbal description, a framework constructed upon the optimized GPT-3 Codex—a Transformer-based language model—was capable of generating functionally accurate simulations for queuing and inventory control systems. The conclusion, in conjunction with the rapid advancements in language model technology, advocate the potential for significant simplification in the development of simulation models. This advancement allows specialists to transfer their focus toward comprehensive problem-solving and high-level analytical tasks, thereby developing efficiency and innovation in the field. (Jackson & Saenz, 2022). Beerbaum (2023) was of the opinion that generative AI, developed by OpenAI and powered by its foundational Generative Pre-trained Transformer (GPT) technology, is projected to experience substantial growth in the coming years. However, the capacity of such models to produce misinformation devoid of factual accuracy has steered many studies to conclude that ChatGPT may be unfitting for certain applications. To address this concern, the study assumes a comparative analysis of five existing generative AI systems to evaluate whether these limitations are broadly pertinent to the technology as a whole or are depending upon the specific methodologies and rule-sets employed by all such systems (Beerbaum, 2023).

Rahaman *et al.* (2023) studied two prominent Artificial Intelligence (AI) competitors, Google's Bard, driven by the Language Model for Dialogue Applications (LaMDA), and OpenAI's Chat Generative Pre-trained Transformer (ChatGPT) are two protuberant competitors vying for supremacy in the AI market. LaMDA, a transformer-based neural language model, has been pre-trained on massive online conversational data to optimize its dialogue capabilities (Rahaman *et al.*, 2023). In contrast, ChatGPT, built

upon the GPT-3.5 architecture, incorporates a reinforcement learning framework enhanced with human feedback, enabling it to generate responses with greater contextual relevance and alignment with user expectations. The researchers learned that Google's Bard has seen a boost in search engine revenue despite not yet being accessible to the public. On the other hand, ChatGPT quickly simplifies a variety of processes including business, finance, marketing, entrepreneurship, accounting, education, healthcare, and many more (Rahaman *et al.*, 2023).

Benzon (2022) examined the capabilities of GPT-3, an artificial intelligence engine intended to generate text based on human input. While GPT-3 does not possess an understanding of the language it produces in the philosophical sense, its output often exhibits a prominent resemblance to human language, demonstrating a level of coherence and fluency that is both impressive and thought-provoking. The possibility rises when the mind as a high-dimensional environment is filled with signified, or objects that have meaning as compared to text that is made up of one-dimensional strings of linguistic forms, or signifiers (Benzon, 2022). The use of Semantic geometry, developed by Peter Gärdenfors, offers a method of thinking about the dimensions of mental space, the diversity of occurrences, and how the mind reflects the outside world. Yet, the absence of a sensorimotor system that has developed over millions of years limits artificial systems with some built-in restrictions (Benzon, 2022).

Avila-Chauvet *et al.* (2023) conferred the development of OpenAI ChatGPT, a chatbot created through fine-tuning of OpenAI's GPT-3 model. This artificial intelligence system can generate human-like conversational responses, a capability achieved through its training process, which combines reinforcement learning with human feedback. One of the most notable capabilities of ChatGPT rests in its ability to generate programming code in various open-source languages. This functionality aids the development of tools such as online behavioral challenges, including concurrent reinforcement schedules. By leveraging ChatGPT as a programming assistant, users can construct such challenges through coding in HTML, CSS, and JavaScript, showcasing the potential of this advanced artificial intelligence to streamline and enhance programming tasks (Avila-Chauvet *et al.*, 2023). We conclude that utilizing OpenAI ChatGPT enables for gaining thorough programming solutions and cutting the time connected with programming, even if the openAI cannot entirely replace programmers (Avila-Chauvet *et al.*, 2023).

Beerbaum (2023) highlighted the growing implication of robotic process automation (RPA) within the digital ecosystem, piloted by advancements in generative AI (GAI). Tools such as ChatGPT, used by OpenAI and powered by the Generative Pre-trained Transformer (GPT) framework, are prepared to play a pivotal role in the expansion of generative AI in the coming years. By emulating user communication with applications

and assisting with direct system access through APIs, GAI-powered RPA replaces tasks traditionally performed by humans. The study underlines the need to align the development of GAI with human values and investigates strategies for creating incentives to prevent these systems from becoming ethically contentious. A key finding of the research is that while transparency technologies provide a means to mitigate such risks, GAI-enabled RPA also raise significant ethical concerns. Notably, the entirety of the essay was composed by human authors (Beerbaum, 2023).

Niszczota & Abbas (2023), combined a financial literacy exam with an advice-utilization job will allow us to evaluate GPT's suitability as a financial robo-advisor for the general public (the Judge-Advisor System). Advice-seeking grew as subjective financial understanding decreased. We talk about the danger of relying too much on the existing big language models and how their usefulness to lay people can alter (Niszczota & Abbas, 2023). The notion of "language games" was examined by Zautner (2022), in their work in relation to the development of large language models (LLMs) in artificial intelligence (AI). This article contends that LLMs, which are trained on human output, create feedback cycle of vacuity that eventually destroys the legitimacy of the human experience through a criticism of AI and its possible influence on the human condition. This study also connected the emergence of LLMs to the idea of hyper reality since the spread of AI raises concerns that it may blur the line between what is real and what is Artificial and lead to a simulation of reality (Zautner, 2022).

Habbat *et al.* (2022) discovered the significance of planning and booking as two major business applications of the modern internet. In the era of Web 2.0, user-generated content—such as comments, reviews, and travel reports—has emerged as a critical source of information. These reviews impart a level of accuracy and detail that surpasses traditional printed travel guides, making them indispensable for informed decision-making in hotel reservations and other travel-related activities. The home sites and catalogue descriptions of hotels, which portray actual guest experiences, have little impact on them. The results of applying the recommended strategy to many datasets in Arabic and French showed that, when compared to basic deep learning approaches employing different contextualized word embedding models, specifically GPT and BERT, the approach improved accuracy by 0.975 (Habbat *et al.*, 2022). Cardoso (2023), highlighted the need to encourage the implementation of a tool comparable to ChatGPT's for the government, which can be possible thanks to the merging of currently existing technology. The development of such a chatbot would enable access to both publicly available information and services provided by government entities by putting together open data, artificial intelligence, and smart contracts. (Cardoso, 2023).

2.4 Business

General purpose technologies (GPTs) are of strategic relevance to managers and decision-makers since they expand the production potential frontier as revealed by Goldfarb *et al.*, (2022). Empirical methods to discover GPTs are trailing while theoretical models that describe the traits, advantages, and strategies for generating and capturing value from GPTs have evolved dramatically. Based on such application training, it is highly plausible that a range of technologies, including machine learning and related data science methodologies, will be increasingly utilized in the future. (Goldfarb *et al.*, 2022). Kolt (2022) proposed that while language models hold the potential to empower consumers, they also bear the risk of offering misleading advice and reinforcing detrimental biases. (Kolt, 2021). On the other hand, Leippold (2023) investigated how easily adversarial assaults that modify financial texts can compromise financial sentiment analysis. Companies are changing their wording and disclosures to better accommodate AI processing as AI use in the financial industry grows, raising worries about the possibility of manipulation. Due to their apparent transparency, keyword-based techniques like using dictionaries are still often utilized in the finance literature for financial sentiment research. Yet, by effectively developing adversarial assaults using the complex transformer model, GPT-3, our research exposes the weakness of keyword-based techniques (Leippold, 2023).

As seen in literature reviews, we found the growing necessity of GPT in academics, legal work, technology and business. Therefore, it becomes imperative to understand the current sentiments with respect to GPT in modern times. We try to answer the following assumptions:

H1: High level of correlation exists between 'freedom' and 'research' in GPT.
H2: High level of correlation exists between 'freedom' and 'creativity' in GPT.

3.0 Analysis, Observations and Discussion

The text mining was conducted on 72 BLOGS that were collected from https://openai.com /blog from Dec 11, 2015, to mar 1, 2023 and analysis was conducted using R 4.2.2 VERSION. The results of the analysis were:

3.1 Frequency table

As seen in Figure 1, the word 'research' had the maximum frequency of 494 appearances followed by the word 'openai' with 441 appearances, 'learning' with '387' appearances, 'models' with 281 appearances, 'model' with '261' appearances and so on.

Figure 1: Frequency Table

	word	freq
research	research	494
openai	openai	441
learning	learning	387
models	models	281
model	model	266
will	will	257
can	can	251
view	view	218
language	language	206
point	point	203

Source: Author analysis

3.2 Wordspace and Barplot

As seen in Figure 2, a Word Space has been generated along with a bar plot which clearly signifies the dominance of the words research, openai, learning, users, models, model, will, can, view, language, point respectively in the report content as available.

Figure 2: Word Space and Bar Plot Based on Content Appearances
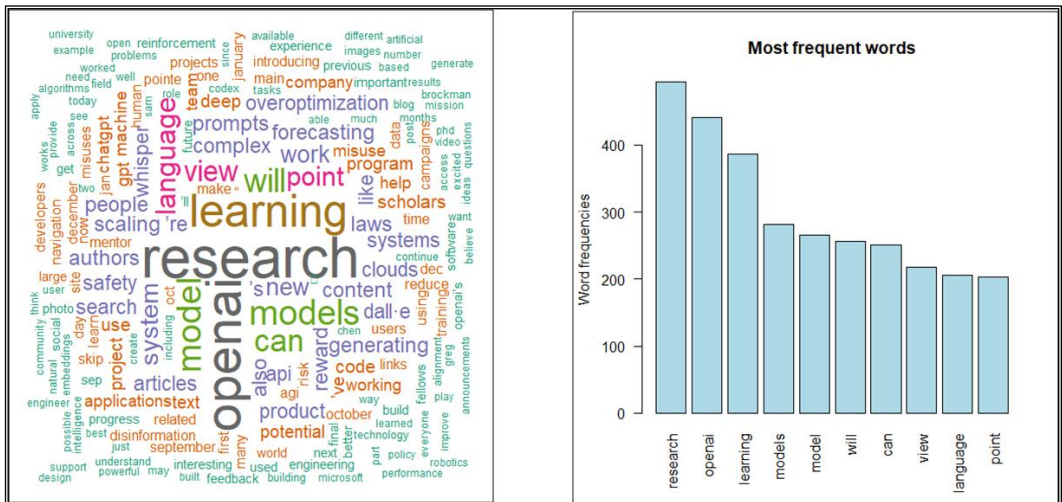
Source: Author analysis

3.3 Correlation analysis

As seen in Figure 3, the word 'freedom' has 71 % correlation with the word 'appreciated' which implies the high level of associative-ness of 'freedom' and

'appreciated' appearing together. Similarly, the word 'creativity' has 50 % correlation, the word 'flex has 50% correlation, the word 'Bach has 50 % correlation, the word 'combine has 50 % correlation and so on.

Figure 3: Correlation Percentages at Minimum of 30%,
Level for "freedom "keyword

```
$freedom
  appreciated   creativity"            flex          bach      combines    connections     fulfilling
         0.71         0.50            0.50          0.50          0.50           0.50           0.50
    human-like    intractable      mastering  unimaginable   worldexpert         ahead"         embark
         0.50         0.50            0.50          0.50          0.50           0.50           0.50
  selfdesigned     skillsets        generous         life"       uniquely         pursue     appreciate
         0.50         0.50            0.50          0.50          0.50           0.38           0.35
         ready   highquality        contrast         stuck         team"        climate         turing
         0.35         0.35            0.35          0.35          0.35           0.35           0.35
    affordable    disciplines      implement
         0.35         0.35            0.32
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Source: Author analysis

4.0 Results and Conclusion

1. The word 'research' had the maximum frequency of 494 appearances followed by the word 'openai' with 441 appearances, learning with '387' appearances, models with 281 appearances, model with '261' appearances and so on.
2. Word Space has been generated along with a bar plot which clearly signifies the dominance of the words research, openai, learning, users, models, model, will, can, view, language, point.
3. The word 'freedom' has 71 % correlation with the word 'appreciated' which implies the high level of associative-ness of 'freedom' and 'appreciated appearing together. Similarly, the word 'creativity' has 50 % correlation.

As evident from the research findings, we discover a high level of correlation of the word 'freedom' with 'research' and 'creativity'. This means that both of our hypotheses 'H1' and 'H2' stand as true. Academics, researchers, and professionals working with business and information technology applications can all benefit greatly from reading the findings of this research article.

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