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Analysing Chatbotvs Chatgpt: Narrative Review

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ABSTRACT: Two main techniques have evolved as conversational AI continues to develop: sophisticated language models such as ChatGPT and conventional rule-based chatbots. This paper critically looks at the main distinctions between traditional chatbots that use simple machine learning algorithms or programmed answers and ChatGPT, a large-scale transformer model. ChatGPT excels in creating open-ended, context-aware conversations, whereas typical chatbots are made for task-specific interactions that are frequently constrained by specified intents. The evaluation outlines each of its advantages and disadvantages in a number of areas, such as application potential, flexibility, and user experience. We also discuss technical issues including scalability, training data needs, and underlying systems. Additionally, each system's ethical implications are examined, with a focus on biases, dependability, and user privacy. chatbots like ChatGPT that have the adaptability of generative models.The paper ends with a discussion of conversational AI's future paths, highlighting the rising significance of hybrid models like ChatGPT, which combine the adaptability of generative models with the accuracy of conventional chatbots.

KEY WORDS: Chatbot, Chat GPT, Artificial Intelligence, Dentistry

I. INTRODUCTION:

Artificial intelligence is the technology that enables machines to mimic human thought processes and think like humans. It allows computers to carry out a wide range of complex tasks with little to no human supervision or the ability to learn from mistakes and perform better when given access to large amounts of data[1].

A chatbot is a computer program or software that mimics human communication via text or voice exchanges. Chatbot GPT is a potent artificial intelligence (AI) language model that can comprehend, interpret, and produce text replies that resemble those of a human being. The GPT-3 architecture serves as its foundation. By providing students with individualized learning experiences, this game-changing technology creates new opportunities for improving dentistry education[2].

ChatGPT 'chat generative pre-training transformer' is developed by open AI. It is the type of AI that is trained to understand and generate human language. Which allows a user to ask questions using conversational or natural language[3].

Artificial intelligence is used in fields of dentistry and medicine for medical image analysis, data mining, and natural language processing while history-taking [1]. Dental practitioners may utilize artificial intelligence (AI) as an additional tool to reduce effort and improve diagnosis, decision-making, treatment planning, outcome prediction, and illness prognosis precision and accuracy [4]. AI-assisted image processing and analysis is possible due to the ability of AI algorithms to be trained to interpret CBCT images for dental issues. This involves determining the alignment, position, and quality of bone for implant implantation [5].

By automating some processes, chatbot technology like GPT has the potential to significantly change medical writing and increase its efficacy[2].Chatbots have been introduced as a novel approach to enhance person-centered health care in recent decades. Specifically, they have been shown to increase access to and the quality of services and health information while using fewer human resources, especially when it comes to improving the efficiency of delivery of primary health care services like health education and counselling support[4].Software applications called chatbots use text or audio communications to

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simulate human conversations. A collection of machine learning approaches, such as natural language processing or rule-based algorithms, might be used by the technology to automate certain dialogue segments. Though they're not common in dentistry, chatbots are employed in many other healthcare areas [6].

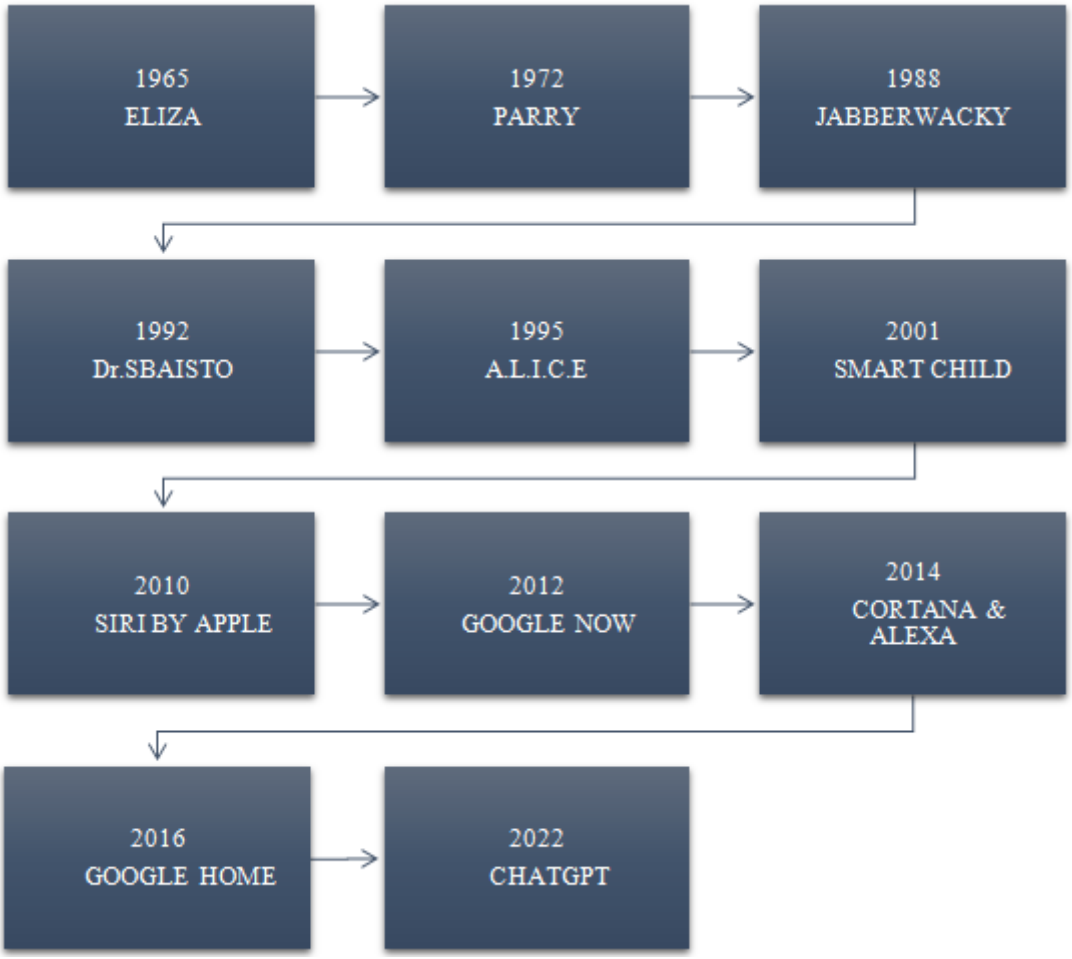
APPLICATION IN HEALTH CARE AND MEDICINE:

ChatGPT can be used in the fields of healthcare and medicine to:

(i) help doctors diagnose problems by examining patient information, medical history, and symptoms. Provide patients with easily understood medical information and advice;

(ii) summarize and synthesize medical research to inform evidence-based practice; (iii) create personalized treatment plans based on each patient's needs and preferences; (iv) streamline communication and information sharing among healthcare professionals to foster collaboration[7].

A BRIEF HISTORY OF CHATBOTS:[8]



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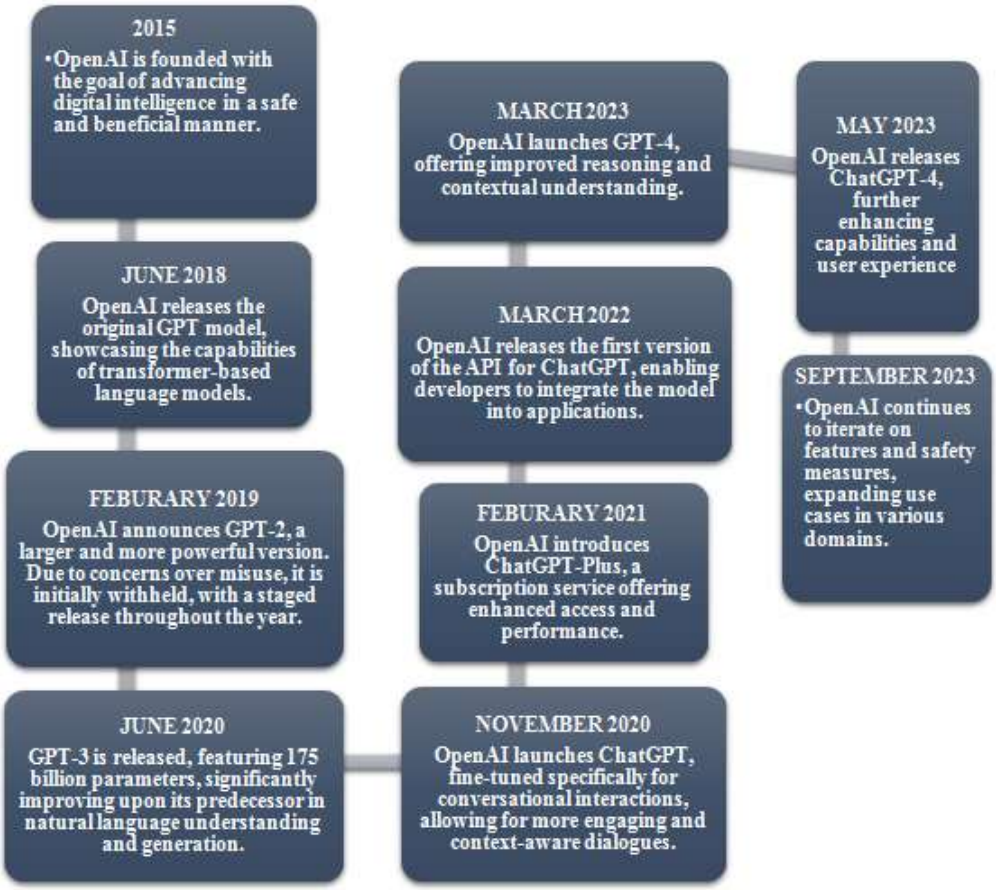
BRIEF HITORY OF CHATGPT:[9]



WHAT IS CHATBOT AND HOW IT WORKS?

A chatbot is essentially a computer program which can read as well replicate Human communication through speech or writing. This software allows users to interact with digital gadgets in a manner similar to that of a real person. Chatbots come in two different Flavors: simple one-line programs that answer simple questions, or sophisticated digital assistants that gather and analyze data, learn over time, and evolve to offer ever-more-individualized services[10].

Furthermore, a chatbot is computer software that uses natural language processing and artificial intelligence to mimic spoken or written human interaction. Any popular messaging app may incorporate it and utilize it to answer consumer questions, automate answers, or provide information.

A chatbot, to put it technically, is a piece of computer software that mimics human speech to respond to customer requests. When a lead or client contacts through any channel, the chatbot is ready to welcome and help. Customers may get help from them if needed with sending emails, filing support requests, and connecting with live representatives [11].

A machine learning-based chatbot features asynthetic neural network inspired by the neural nodes seen in the human brain. When it comes to new conversations and vocabulary, the bot is designed to pick up new skills on its own. Essentially, the quantity of questions a chatbot can answer and the precision of each answer it provides rise with each new voice or text conversation it hears[12].

These days, chatbots are widely used. They are present in a wide range of products and services, including commercial messaging systems like Slack, consumer-facing SMS, WhatsApp, and Facebook Messenger applications, and smart speakers for homes. The latest generation of AI chatbots, also referred to as "virtual agents" or "intelligent virtual assistants," able to understand natural language exchanges utilizing advanced language models and trigger appropriate responses automatically. Virtual agents, in addition to well-known IVTs aimed at consumers, such as Apple's Siri and Amazon's Alexa, are increasingly being

used in corporate environments to assist customers and employees[13].

WHAT IS CHATGPT AND HOW IT WORKS?

OpenAI created the state-of-the-art conversational bot ChatGPT, which is driven by artificial intelligence. It is based on the GPT (Generative Pre-trained Transformer) architecture, which is well known for its language creation and interpretation capabilities, and marks a substantial leap in natural language processing (NLP)[13].

Having text-based interactions with users in a way that is incredibly natural and human-like is ChatGPT's main purpose. ChatGPT is not dependent on predetermined decision trees or particular rules, in contrast to standard chatbots that frequently use rule-based scripts. It uses generative AI techniques instead, which allow it to produce replies dynamically based on input. This implies that ChatGPT may respond to user inquiries, hold free-flowing discussions on a variety of subjects, and offer contextually appropriate information[14].

The unique feature of ChatGPT is its capacity for multi-turn talks, comprehending not only individual questions but also the whole context of the exchange. This makes it suited for a wide range of applications by enabling more meaningful and cohesive interactions. ChatGPT may help with a number of activities, including producing text material (such as articles or reports), delivering information, making suggestions, answering queries, and even mimicking discussions for different uses[15].

Additionally, ChatGPT is adjustable to a variety of businesses and use cases, as it may be tailored for certain domains or applications. It may be included in apps, websites, or customer service platforms to improve user interfaces and automate a number of communication processes.

In summary, ChatGPT is a fantastic development in conversational AI, providing a flexible and effective platform for companies, developers, and individuals wishing to communicate with computers in a natural textual manner. Its real-time language understanding, generation, and adaptation capabilities provide a plethora of opportunities for enhancing customer service, content creation, personal help, and much more[13].

DIFFERENCE BETWEEN CHATBOT AND CHATGPT:

1) ACCURACY, FLEXIBILITY AND PREDICTABILITY:

ChatGPT: Provides flexible, context-sensitive answers, but if not adjusted it can be unexpected. Lack reliance on pre-established templates, allowing them to produce answers to wide range of queries[16].

Chatbot: In chatbot there will be lack flexibility but give dependable and consistent answers, but they are limited to using only their trained set. In rule based chatbots, restricted by their background knowledge. A chatbots won't provide a pertinent response if an input doesn't fall under the scope of a present keyword[17].

2) DEVELOPMENT AND MAINTANANCE:

ChatGPT: Needs initial instruction it adjusts more readily to novel situations[16]

Chatbot: Demands ongoing manual changes in order to accommodate new circumstances[16].

3) USER DEMANDS:

ChatGPT: Capable of producing more organic and captivating interactions.Personalized, dynamic replies result in a higher level of interaction.

Chatbot: May feel repetitive and rigid to users.Insufficient complex customization results in a lower quality of engagement[17].

4) ARCHITECTURE AND DESIGN:

Rule basedChatbot: Utilize matching models and knowledge bases to find pre-written answers for a given term in a database.

AI Chatbot: Make use of machine learning (ML) models to provide answers that are particular to the training data.

ChatGPT: A sophisticated language model based on the Transformer that creates new answers depending on patterns it discovers by analyzing a large quantity of data[16].

5) CONVERSATIONAL DEPTH:

Rule based Chatbot: Insufficient reasoning goes into providing pre-programmed responses, interactive buttons, or live chat support.

AI Chatbot:provides as much detail as its machine learning techniques and training data permit. It could respond to inquiries concerning dogs, for example, if it had been trained on dog-related data. However, because it is limited to knowing only dogs, it is unlikely to respond if you asked it to name any other kind of animal[17].

ChatGPT:provides greater complexity than an AI chatbot and has the ability to link different subjects [16].

BENEFITS AND DRAWBACKS OF CHATGPT:

BENEFITS:

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Natural language understanding: More organic and interesting user interactions are made possible by ChatGPT's exceptional comprehension and generation of human-like language.
Adaptability: ChatGPT is always learning and adapting, so it can deliver current information and get better at responding over time.
Versatility: It may be used for a variety of purposes, including personal help, creative writing, customer service, and content creation.
Context awareness: ChatGPT is capable of comprehending context in discussions, which enables more thoughtful and contextually appropriate replies.
Multilingual Support: It is compatible with a number of languages, allowing a worldwide audience to use it[20,21].

DRAWBACKS:
Over-reliance on data: The data that was used to train ChatGPT may have biases or mistakes that affect the system's performance.
Lack of critical thinking: It is incapable of critical thought and actual comprehension, and it occasionally gives responses that seem reasonable but are inaccurate or illogical.
Potentially inappropriate content: ChatGPT may produce offensive or dangerous content if suitable screening and direction aren't provided.
Resource-intensive: Large amounts of computing power are needed to train and operate ChatGPT models, which makes them inaccessible to smaller businesses and individuals.
Ethical concerns: Concerns about bias, privacy, and the possibility of abuse in areas like social engineering and misinformation are among the ethical issues that arise while using ChatGPT [20,21].

BENEFITS AND DRAWBACKS OF CHATBOT:

Chatbots are an easy method as well provide support and client service every day of the week, at all times. In addition, they free up phone lines and are far less expensive over time than paying someone to help. Thanks to natural language processing and artificial intelligence, chatbots are becoming increasingly skilled at determining what customers want and providing them with the help they need. Chatbots are particularly useful to businesses since they can collect data on a variety of issues, including client questions, satisfaction levels, and response times [18,19].

Chatbots are still quite uncommon, though. They may not fully comprehend what a customer is saying even with natural language processing, leading them to answer incomprehensibly.

Furthermore, many chatbots have a limited vocabulary when it comes to inquiries. The comments you receive may leave you feeling let down due to their lack of emotion, compassion, and personalization. Not only do consumers find it frustrating when they can't communicate with a human, but chatbots may be expensive to put up and run, especially if regular customization and upgrading is needed [18,19].

CHATBOT PROS:
- Less expensive than hiring human labour;
- Available around-the-clock;
- Useful as a tool for marketing and sales

CHATBOT CONS:
- Maybe unable to comprehend consumer inquiries Is impersonal and devoid of feeling that installing
- Maintaining it might be costly or challenging [22].

TYPES OF CHATBOT:
- Rule-based chatbots
- Keyword recognition-based chatbots
- Menu-based chatbots
- Contextual chatbots
- Hybrid chatbots
- Voice enabled chatbots
- Declarative chatbots
- Predictive chatbots

AI IN DENTISTRY:

Artificial intelligence (AI) advancements have raised hopes and fears in the medical field, especially in the area of dentistry [23]. Dental care is changing as a result of artificial intelligence (AI), which makes procedures more precise, reduces mistakes, and needs fewer personnel. AI may help with clinical diagnosis and treatment planning, as well as scheduling appointments and other chores in the dental clinic. When it comes to identifying and categorizing malocclusion in orthodontics, AI has already demonstrated excellent accuracy, sensitivity, specificity, and precision. AI can also identify anomalies related to the teeth and maxillofacial region, including periodontal disorders, root caries, bony lesions, and face deformities. It can also automatically categorize dental restorations on panoramic radiographs [24]. Dentistry is now researching AI for a number of uses, with an emphasis on recognizing healthy and unhealthy structures, detecting illnesses, and predicting the outcome of treatments [25].

CHATGPT IN DENTISTRY:

Advanced linguistic prototypes, like ChatGPT, have the potential to significantly improve dental research and clinical applications. When used carefully, they have the potential to completely transform dental diagnosis and treatment planning. Furthermore, research utilizing a variety of medical examination data can support the goals of personalized care and precision medicine in dentistry. Furthermore, the application of multimodal large language models (LLMs) would improve medical efficiency and lower medical costs[26].Patients may receive individualized, trustworthy, and up-to-date dental health and hygiene information from ChatGPT. Because it offers a wealth of knowledge and information, it may also be used as an instructional tool by experts in the area and students. In addition, ChatGPT may help dentists with individualized patient care, scheduling, invoicing, diagnosis, and treatment planning. It can also help track patients' oral hygiene and health by sending out reminders and check-ins on a regular basis[27].

It is essential to recognize the limits of ChatGPT, despite its significant value for dental professionals and patients alike. It can offer precise guidance and information, but it is unable to offer individualized medical attention, psychological support, or medical care. So, rather than taking on the role of in-person care, ChatGPT should be viewed as an additional tool in dentistry. It's important to weigh the benefits and drawbacks of utilizing ChatGPT in dentistry and use it wisely in order to provide the greatest results for patients [28].

CRITICAL CONCERNS:

In the fields of dentistry and medical care, ChatGPT is a very beneficial chatbot with several applications. But it has drawbacks and restrictions of its own. Because ChatGPT requires gathering and preserving patient data and medical history in order to carry out its necessary function, using it may put patients' privacy in danger [29].There is nothing like human empathy or compassion in ChatGPT. As such, ChatGPT is unable to assume the emotional role of a human. Therefore, using it in therapy or counselling is not beneficial [30].

In spite of its benefits, ChatGPT has manyconstraints. One disadvantage is that it may yield responses that seem accurate but aren't. This phenomenon, known as the hallucination effect, is a known problem in several natural language processing methods. Moreover, ChatGPT prefers to follow directions instead of having a real discussion. For instance, ChatGPT could assume the required response when there isn't enough user input and ask for clarification instead [31]. The main barriers to ChatGPT's usage in clinical settings are related to its limited capacity for situational awareness, logical deduction, and reliable outcome production. These flaws can endanger the patients. ChatGPT appears to be sufficiently trained with pertinent data, even without direct access to medical databases. ChatGPT can deliver believable answers to the majority of questions despite not having had any particular training in clinical guidance [32].

FUTURE RECOMMENDATIONS:

AI is probably going to have a big impact on a lot of different areas in the medical and dentistry sectors in the next few years [33]. In addition to helping with disease diagnosis and prognosis and further providing a more personalized treatment plan, ChatGPT can process information at a speed that is unmatched and benefit the health care industry by providing a more objective and evidence-based approach to decision-making and lowering the likelihood of human error [34]. Though it has both advantageous and potentially disadvantageous aspects, ChatGPT is a two-edged tool. Thus, it should not be taken lightly since ChatGPT may still provide false information and have negative consequences for healthcare, including bias, prejudice, and privacy issues [34,35].When applying them in clinical practice, these restrictions need to be carefully considered. Consequently, more study is needed to determine how ChatGPT's evaluation tools affect quality and efficiency [35].

When it comes to medical education, ChatGPT needs to be extremely accurate in order to avoid mistakes that might seriously jeopardize the patient's safety. Even though ChatGPT contains a lot of data, students from disadvantaged backgrounds can find it hard to recognize when it might be giving them false information. Therefore, responsible staff should develop and extensively test explicit instructions and verification methods. There is a worry that ChatGPT might become the main informational resource for students and that it could encourage academic dishonesty. By using plagiarism detection tools that can identify AI material, this may be avoided [36]. It is suggested that human involvement be maintained while integrating AI technology into the healthcare system's workflow. Thus, in order to reduce the possibility of inaccuracy, the output may be verified and monitored by human healthcare professionals [37].

II. CONCLUSION:

AI has made significant strides in dentistry, particularly in research, as this review demonstrates. Because ChatGPT offers a multitude of services, including treatment planning and hygiene and tracking of oral health, it possesses the ability to revolutionize the dentistry and healthcare industries. Still, vigilance is required, and regulations must be created to lessen the risks. Furthermore, given the numerous ethical difficulties and incorrect reference creation, it is advised that this chatbot be continuously monitored, particularly in the research sector.

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