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THREE MUSKETEERS IN TRIO COMBINATION MESMERISES THE WORLD BY ARTIFICIAL INTELLIGENCE, CHATGPT & CHATBOT

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ABSTRACT

Using AI chatbots can be more cost-effective than hiring and training additional employees. Improved content quality. Writers can use ChatGPT. The primary characteristic of ChatGPT i.e Automation helps businesses slash their labor expenses at the same time increase accuracy and reduce. Businesses can save money on staffing costs by automating the customer service process. Handles many customer queries and issues, reducing the cost. Can be a cost-effective solution for businesses and organizations that want to automate certain tasks or processes without the need for cost. Intelligent automation and ChatGPT are formidable technologies capable of revolutionizing the manner in which businesses operate. Businesses that adopt and are smooth. You can get the same results from ChatGPT as you would with a commercial AI copywriter. Even experiments have shown it can compose music. ChatGPT offers several advantages for businesses when it comes to communication. For one thing, the system is trained on a vast amount of data points. Discover how ChatGPT, an AI-powered chatbot, is transforming the way students learn and study. Automating customer service: Businesses in a variety of industries depend heavily on customer assistance. With its rapid responses, round-the-clock. Undoubtedly, effective customer service is the main incentive for business growth and customer satisfaction, especially when it's available 24/7. More examples are: troubleshooting issues, handling complaints, or offering recommendations. Businesses can use it to reduce the workload of customer service.

KEYWORDS: Open AI, ChatGPT, Chatbot, Quillbot.

INTRODUCTION

OpenAI is a U.S. based artificial intelligence (AI) research organization founded in December 2015, researching artificial intelligence with the goal of developing "safe and beneficial" artificial general intelligence, which it defines as "highly autonomous systems that outperform human's at most economically valuable work". As one of the leading organizations of the AI Spring, it has developed several large language models, advanced image generation models, and previously, released open-source models. Its release of

ChatGPT has been credited with starting the artificial intelligence spring. OpenAI offers text embedding models that take as input a text string and produce as output an embedding vector. Embedding are useful for search, clustering, recommendations, anomaly detection, classification, and more. Today, the ownership pie is divided between Microsoft (49%), other stakeholders (49%), and the original OpenAI non-profit foundation, which staunchly preserves its autonomy as the leading firm continues to write OpenAI history.



Figure-1: Founder of trio artificial intelligence.

In 1966, an MIT professor named **Joseph Weizenbaum** [Joseph Weizenbaum (8 January 1923 – 5 March 2008) was a German American computer scientist and a professor at MIT.] created the first chatbot. He cast it in the role of a psychotherapist. A user would type a message on an electric typewriter connected to a mainframe. After a moment, the “psychotherapist” would reply. **Sam Altman** [Samuel Harris Altman (Born April 22, 1985) is an American entrepreneur and investor best known as the CEO of OpenAI since 2019 (he was briefly fired and reinstated in November 2023).], the father of ChatGPT, has become the hottest face in the world of artificial intelligence, or AI. But his notoriety is nothing new: he has been in Silicon Valley's spotlight for nearly two decades already. Elon Musk cofounded OpenAI but left after his own failed coup. Now he has shared an unsigned letter containing unverified accusations against the recently fired CEO, Sam Altman. **Elon Reeve Musk** (Born June 28, 1971) is a businessman and investor. He

is the founder, chairman, CEO, and CTO of SpaceX; angel investor, CEO, product architect, and former chairman of Tesla, Inc.; owner, chairman, and CTO of X Corp.; founder of the Boring Company and xAI; co-founder of Neuralink and OpenAI; and president of the Musk Foundation.^[1]

The organization consists of the non-profit OpenAI, Inc. registered in Delaware and its for-profit subsidiary OpenAI Global, LLC. It was founded by Ilya Sutskever, Greg Brockman, Trevor Blackwell, Vicki Cheung, Andrej Karpathy, Durk Kingma, Jessica Livingston, John Schulman, Pamela Vagata, and Wojciech Zaremba, with Sam Altman and Elon Musk serving as the initial board members. Microsoft provided OpenAI Global LLC with a \$1 billion investment in 2019 and a \$10 billion investment in 2023, with a significant portion of the investment in the form of compute resources on Microsoft's Azure cloud service.



Figure-2: Software technologies in artificial intelligence.

ChatGPT (Chat Generative Pre-trained Transformer) is a chatbot developed by OpenAI and launched on November 30, 2022. Based on a large language model, it enables users to refine and steer a conversation towards a desired length, format, style, level of detail, and language. ChatGPT release date is 30 November 2022. Successive prompts and replies, known as prompt engineering, are considered at each conversation stage as a context. ChatGPT is owned by OpenAI, the company that developed and released it. OpenAI is a company dedicated to AI research. It started as a nonprofit company in 2015 but transitioned to for-profit in 2019. ChatGPT is a natural language processing tool driven by AI technology that allows you to have human-like conversations and much more with the chatbot. The language model can answer questions and assist you with tasks, such as composing emails, essays, and code. It's currently open to use by the public for free. ChatGPT is

generally safe to use for common questions and general needs. But, we do not recommend using it with personal or proprietary business information. Whether you are using ChatGPT-4, Bard, Perplexity AI, or any other ChatGPT alternative – you should be cautious of what data you are putting into your prompts.

By January 2023, it had become what was then the fastest-growing consumer software application in history, gaining over 100 million users and contributing to the growth of OpenAI's valuation to \$29 billion. ChatGPT's release spurred the development of competing products, including Bard, Ernie Bot, LLaMA, Claude, and Grok. Microsoft launched its Copilot based on OpenAI's GPT-4. Some observers raised concern about the potential of ChatGPT and similar programs to displace or atrophy human intelligence, enable plagiarism, or fuel misinformation.



Figure-3: Three musketeers of modern generation.

ChatGPT is built upon either GPT-3.5 or GPT-4, both of which are members of OpenAI's proprietary series of generative pre-trained transformer (GPT) models, based on the transformer architecture developed by Google—and is fine-tuned for conversational applications using a combination of supervised learning and reinforcement learning. ChatGPT was released as a freely available research preview, but due to its popularity, OpenAI now operates the service on a freemium model. It allows users on its free tier to access the GPT-3.5-based version, while the more advanced GPT-4-based version and priority access to newer features are provided to paid subscribers under the commercial name "ChatGPT Plus."

Importance: Imagine having a conversation with a chatbot that feels almost human. That's exactly what OpenAI ChatGPT brings to the table. The remarkable technology of Generative Pre-trained Transformer (GPT) powers it. AI ChatGPT utilizes Natural Language Processing (NLP) techniques. These help it to learn from past conversations and generate response options. It is trained on massive amounts of human interaction data. This results in an AI that can understand and have conversations like humans. It was released as a free research preview/prototype in November 2022. It is powered by a machine learning model called GPT-3, developed by OpenAI.^[2]

OpenAI: The adoption of AI is increasing across different domains by leaps and bounds. Entrepreneurs and professionals including app developers have started using various AI models for performing various tasks. One of the most advanced AI platforms available for them is OpenAI. As the most funded AI and ML (Machine Learning) platform in the world, OpenAI has started enhancing its scope across different sectors. One of these sectors is mobile app development. Though the usage of OpenAI is increasing in the mobile app development process, many developers ask a question- Is OpenAI the right model for the app development process? Let's go through the pros and cons of OpenAI from the perspective of mobile app development to get an answer to this question.

What is OpenAI and Its Significance in Development Process? Founded in 2015, OpenAI is an AI-based research organization consisting of highly skilled scientists, engineers, and research scholars dedicated to opening new horizons for AI technology that remain beneficial for people. It aims to create a world where AI-driven technologies are used ethically and in a transparent way. Be it Natural Language Processing (NLP), robotics, or computer vision, OpenAI ensures the safe and beneficial use of all advanced technologies. Deep learning, machine learning, and robotics are some of the core areas on which OpenAI focuses. It has developed several innovative models to serve this purpose to date. These models are GPT-3, DALL-E, and CLIP. Software developers and expert professionals can use these models in various applications including chatbots and virtual assistants for content creation and image recognition. Integrating the API of OpenAI into the app can enable you to offer advanced AI capabilities to users with a personalized approach. Also, It plays a vital role in increasing the scalability, efficiency, and productivity of the company by promoting automation. Also, OpenAI's API is open and collaborative in nature. As a result, developers can easily share and collaborate on their tasks with others. It further boosts innovation and digital transformation.

The following status show the importance and increasing scope of OpenAI.^[3]

Interesting Stats of OpenAI

- The monthly number of active users stood at 21.1 million in 2022
- It is one of the most innovative AI concepts that has raised over \$1 billion in funding
- Users of as many as 156 countries access the OpenAI platform
- Male users' percentage is over 65% which is two times that of female users
- The technical sector is the biggest user of OpenAI with over 251 companies using it followed by the education sector which has 209 institutions using it.

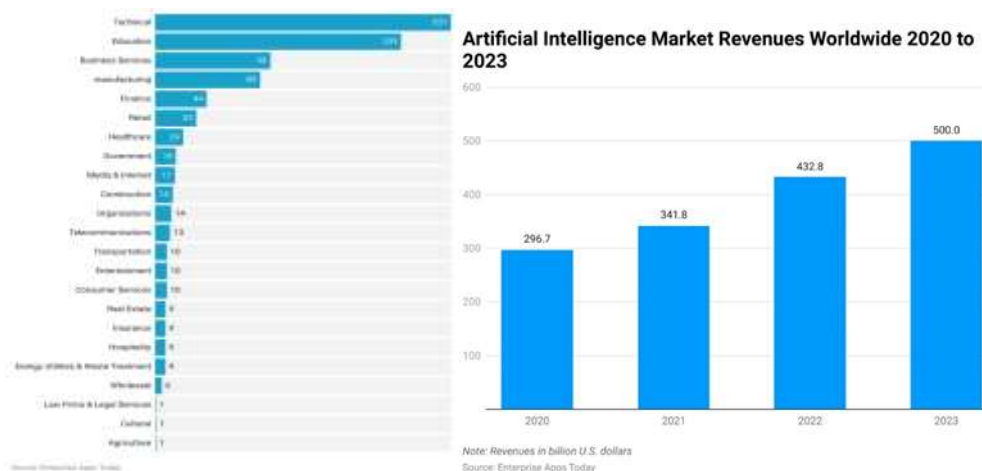


Figure-4: Histogram of AI survey.

Open AI Survey: AI has the capability to perform anything as instructed by humans. As this concept evolves, its market revenue steadily increases. Alexa, Google now, Siri, and Cortana are some examples of AI. We can expect that AI technology will cross USD 500 billion in the year 2023.

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Artificial Intelligence Market Revenues

Though OpenAI helps all the core industry sectors, here we will see its advantages and disadvantages from the mobile app development domain's perspective.

Pros of OpenAI in Mobile App Development: Mobile app development is thriving at a rapid pace and requires a touch of innovation while meeting the deadline. Here are some of the top benefits of OpenAI in mobile app development.

Increased Speed: Reduced development time is one of the major benefits of OpenAI-backed mobile app development. A custom software development company can automate certain tasks to increase the app development speed with the help of OpenAI. What's more, OpenAI also assists app developers in automating app testing.

Streamlined Operations: OpenAI has various pre-trained models and inbuilt ML algorithms that can automate certain tasks. For example, image recognition, sentiment analysis, and text summarisation are some of the activities that OpenAI can perform effectively. Let's take an example of GPT-3, an OpenAI feature based on NLP (Natural Language Processing), which can understand specific language patterns and answer customer queries automatically.

Enhanced Security: OpenAI has a machine-learning model that helps developers detect security threats like malware and unauthorized access to prevent applications from any damage. Also, OpenAI comes with advanced safety features like biometric authentication and data encryption that offer additional security to apps.

Predictive Analytics: AI has a revolutionary feature known as Predictive Analytics. OpenAI offers this feature to enable users to analyse data and make accurate predictions using their mobile apps. The predictive analytics feature is also useful in improving the performance of chatbots and voice assistants that work on AI. It is also useful in forecasting sales and the shopping behaviour of customers.

Improved Efficiency: AI is designed to automate several tasks and as a result, mobile apps with OpenAI API can work more efficiently while bringing automation to certain tasks. For example, it can automate the response to customer service inquiries. It can reduce the workload on the support staff while improving their efficiency.

Competitive Edge: Customized mobile apps with an integrated OpenAI API can give your company an edge over competitors who have not given the power of AI to their apps. Talking about developers, they can create more sophisticated and advanced apps than their competitors and thereby get a chance to stand out in a crowd.^[4]

Cons of OpenAI in Mobile App Development

More Complexity: The AI-powered mobile app development process is highly complicated. OpenAI API integration is also complex and time-consuming, particularly for mobile app developers who have no idea of AI technologies. AI models need specialized expertise in developing, training, and testing. Entry-level and at times, experienced app developers find it cumbersome.

Error in Predictions: OpenAI is based on AI and it is prone to make erroneous predictions sometimes. Also, as it is trained on large data sets or data pools, chances are high that it comes up with inaccurate and biased predictions. Moreover, OpenAI lacks interoperability and is run by humans, so there is a high chance of human errors also remaining in the process.

Higher Cost: It is the biggest disadvantage of using OpenAI in app development. Whether developers want to integrate OpenAI into the app during the development or customisation phase, it always increases the cost significantly. The reason is simple- OpenAI requires significant computational resources and users need to pay to use these resources which makes the maintenance of such mobile apps more difficult for developers.

Data Privacy-related Concerns: OpenAI has various privacy and security-related concerns because it is trained on large data sets that contain a lot of confidential and sensitive information. Also, APIs based on OpenAI can transmit sensitive data and as a result, the application remains vulnerable to a data breach. When you hire mobile app developers, they need to remain cautious and take precautionary measures to mitigate privacy and security concerns.

Limited Interpretability: OpenAI models can pose a challenge to interpret especially for end-users or developers who want to understand the underlying technology. Mobile app developers also find it challenging when it comes to explain the app's functionality with the OpenAI API or why the app has made certain decisions.^[5]

Concluding Lines: OpenAI has taken our world by storm. It has started bringing revolutionary changes to various industry sectors, and mobile app development is no exception! However, you need to consider both pros and cons before integrating it into a customised enterprise application. How about consulting a reputed custom software development company to discuss the scope of OpenAI in your upcoming application?

Chatbot: A chatbot is a software or computer program that simulates human conversation or "chatter" through text or voice interactions. Users in both business-to-consumer (B2C) and business-to-business (B2B) environments increasingly use chatbot virtual assistants to handle simple tasks. Adding chatbot assistants reduces overhead costs, uses support staff time better and enables organizations to provide customer service during hours when live agents aren't available.

How do chatbots work? Chatbots have varying levels of complexity, being either stateless or stateful. Stateless chatbots approach each conversation as if interacting with a new user. In contrast, stateful chatbots can review past interactions and frame new responses in context. Adding a chatbot to a service or sales department requires low or no coding. Many chatbot service providers allow developers to build conversational user interfaces for third-party business applications.

A critical aspect of chatbot implementation is selecting the right natural language processing (NLP) engine. If the user interacts with the bot through voice, for example, then the chatbot requires a speech recognition engine.

Business owners also must decide whether they want structured or unstructured conversations. Chatbots built for structured conversations are highly scripted, which simplifies programming but restricts what users can ask. In B2B environments, chatbots are commonly scripted to respond to frequently asked questions or perform simple, repetitive tasks. For example, chatbots can enable sales reps to get phone numbers quickly.

Why are chatbots important? Organizations looking to increase sales or service productivity may adopt chatbots for time savings and efficiency, as artificial intelligence (AI) chatbots can converse with users and answer recurring questions.

As consumers move away from traditional forms of communication, many experts expect chat-based communication methods to rise. Organizations increasingly use chatbot-based virtual assistants to handle simple tasks, allowing human agents to focus on other responsibilities.

How do businesses use chatbots? Chatbots have been used in instant messaging apps and online interactive games for many years and only recently segued into B2C and B2B sales and services. Organizations can use chatbots in the following ways.

Online shopping. In these environments, sales teams can use chatbots to answer noncomplex product questions or provide helpful information that consumers could search for later, including shipping price and availability.

Customer service. Service departments can also use chatbots to help service agents answer repetitive requests. For example, a service rep might give the chatbot an order number and ask when the order shipped. Generally, a chatbot transfers the call or text to a human service agent once a conversation gets too complex.

Virtual assistants. Chatbots can also act as virtual assistants. Apple, Amazon, Google and Microsoft all have forms of virtual assistants. Apps, such as Apple's Siri and Microsoft's Cortana, or products, like Amazon's Echo with Alexa or Google Home, all play the part of a personal chatbot.^[6]

How are chatbots changing businesses and CX? The rapidly evolving digital world is altering and increasing customer expectations. Many consumers expect organizations to be available 24/7 and believe an organization's CX is as important as its product or service quality. Furthermore, buyers are more informed about the variety of products and services available and are less likely to remain loyal to a specific brand. Chatbots serve as a response to these changing needs and rising expectations. They can replace live chat and other forms of contact, such as emails and phone calls.

Chatbots can enhance CX in the following ways

- Reduce customer wait times and provide immediate answers;
- Offer customers 24/7 support;
- Remove the potential for unpleasant human-to-human interactions that moods and emotions of both the service or sales representative and the customer dictate;
- Reduce wait times and streamline conversations to minimize the potential for customers' stress and annoyance;
- Improve the redirection of customer queries;
- Add customized elements to the chatbot to advance brand personality; and
- Personalize CX with AI-enabled chatbots.

Additionally, major technology companies, such as Google, Apple and Facebook, have developed their messaging apps into chatbot platforms to handle services like orders, payments and bookings. When used with messaging apps, chatbots enable users to find answers regardless of location or the devices they use. The interaction is also easier because customers don't have to fill out forms or waste time searching for answers within the content.

What are the benefits of using chatbots? In addition to chatbots' benefits for CX, organizations also gain various advantages. For example, improved CX and more satisfied customers due to chatbots increase the likelihood that an organization will profit from loyal customers.^[7]

Other benefits include the following

- Can hold multiple conversations at once. Chatbots can converse simultaneously with thousands of buyers. This increases business productivity and eliminates wait times.
- Cost-effective. A chatbot is a faster and cheaper one-time investment than creating a dedicated, cross-platform app or hiring additional employees. In addition, chatbots can reduce costly problems caused by human error. User acquisition costs also decrease with a chatbot's ability to respond within seconds.
- Saves time. Chatbots can automate tasks performed frequently and at specific times. This gives employees time to focus on more important tasks and prevents customers from waiting to receive responses.
- Proactive customer interaction. In the past, organizations relied on passive customer interaction and waited for buyers to reach out first. With chatbots, organizations can interact proactively, as bots can initiate conversations and monitor how customers use the websites and landing pages. Organizations can then use the information gathered from monitoring to offer specific incentives to buyers, help users navigate the site and answer future questions.
- Monitors and analyzes consumer data. Chatbots collect feedback from each interaction to help businesses improve their services and products or optimize their websites. Bots can also record user data to track behaviors and purchasing patterns. This information can offer organizations insight into how to better market their products and services, as well as common obstacles that customers face during the buying process.
- Improves customer engagement. Most companies already engage their customers through social media. Chatbots can make this engagement more interactive. Buyers rarely talk to the people within businesses, so chatbots open a communication channel where customers can engage without the stress of interacting with another person.
- Eases scalability to global markets. Chatbots can solve customer concerns and queries in multiple languages. Their 24/7 access enables customers to use them regardless of time or time zone.
- Expands the customer base. Chatbots can improve lead generation, qualification and nurturing. Chatbots can ask questions throughout the buyer's journey and provide information that may persuade the user and create a lead. Chatbots can then provide potential customer information to the sales team, who can engage with the leads. The bots can improve conversion rates and ensure the lead's journey flows in the right direction -- toward a purchase.
- Measures lead qualifications. Chatbots can help sales teams determine a lead's qualifications using identified key performance indicators, such as

budget, timeline and resources. This can prevent companies from wasting time on unqualified leads and time-consuming customers.

What are the challenges of using chatbots? While chatbots improve CX and benefit organizations, they also present various challenges.^[8]

These challenges include the following:

- New technology, new obstacles. Chatbot technology is still new and faces obstacles that organizations may not know how to handle. While AI-enabled bots can learn from each interaction and improve their behaviors, this process can cost organizations a lot of money if the initial interactions cause customers to disengage and turn away.
- Security. Users must trust the chatbot enough to share personal data. Therefore, organizations must ensure they design their chatbots to only request relevant data and securely transmit that data over the internet. Chatbots should have secure designs and be able to prevent hackers from accessing chat interfaces.
- Varieties in how people type their messages. This can lead to misunderstood intentions. Chatbots must handle both long and short sentences, as well as chat bubbles with lengthy content versus multiple short submissions.
- The different ways in which humans talk. Chatbots can struggle to understand these variations. For example, the user may use slang, misspell words or use acronyms. Unfortunately, NLP is limited and cannot fully resolve this challenge.
- Unpredictable human behavior, moods and emotions. Humans are random and emotions and moods often control user behavior, so users may quickly change their minds. After initially asking for a suggestion, they might want to give a command instead. Chatbots must adapt to and understand this randomness and spontaneity.
- User satisfaction. Users always want the best experiences but are rarely satisfied. They always want the chatbot to be better than it currently is. This means organizations employing chatbots must consistently update and improve them to ensure users feel like they're talking to a reliable, smart source.

Future of chatbots: Many experts expect chatbots to continue growing in popularity. In the future, AI and ML will continue to evolve, offer new capabilities to chatbots and introduce new levels of text and voice-enabled user experiences that will transform CX. These improvements may also affect data collection and offer deeper customer insights that lead to predictive buyer behaviours. Voice services have also become common and necessary parts of the IT ecosystem. Many developers place an increased focus on developing voice-based chatbots that can act as conversational agents, understand numerous languages and respond in those same languages.^[9]

How have chatbots evolved? Chatbots such as ELIZA and PARRY were early attempts to create programs that could at least temporarily make a real person think they were conversing with another person. PARRY's effectiveness was benchmarked in the early 1970s using a version of a Turing test; testers only correctly identified a human vs. a chatbot at a level consistent with making random guesses. Chatbots have come a long way since then. Developers build modern chatbots on AI technologies, including deep learning, NLP and machine learning (ML) algorithms. These chatbots require massive amounts of data. The more an end user interacts with the bot, the better its voice recognition predicts appropriate responses. Chatbot use is on the rise in business and consumer markets. As chatbots improve, consumers have less to quarrel about while interacting with them. Between advanced technology and a societal transition to more passive, text-based communication, chatbots help fill a niche that phone calls used to fill.

Types of chatbots

As chatbots are still a relatively new business technology, debate surrounds how many different types of chatbots exist and what the industry should call them.

Some common types of chatbots include the following

- Scripted or quick reply chatbots. As the most basic chatbots, they act as a hierarchical decision tree. These bots interact with users through predefined questions that progress until the chatbot answers the user's question.
- Similar to this bot is the menu-based chatbot that requires users to make selections from a predefined list, or menu, to provide the bot with a deeper understanding of what the customer needs.
- Keyword recognition-based chatbots. These chatbots are a bit more complex; they attempt to listen to what the user types and respond accordingly using keywords from customer responses. This bot combines customizable keywords and AI to respond appropriately. Unfortunately, these chatbots struggle with repetitive keyword use or redundant questions.
- Hybrid chatbots. These chatbots combine elements of menu-based and keyword recognition-based bots. Users can choose to have their questions answered directly or use the chatbot's menu to make selections if keyword recognition is ineffective.
- Contextual chatbots. These chatbots are more complex than others and require a data-centric focus. They use AI and ML to remember user conversations and interactions, and use these memories to grow and improve over time. Instead of relying on keywords, these bots use what customers ask and how they ask it to provide answers and self-improve.
- Voice-enabled chatbots. This type of chatbot is the future of this technology. Voice-enabled chatbots use spoken dialogue from users as input that prompts responses or creative tasks. Developers can create these chatbots using text-to-speech and voice

recognition APIs. Examples include Amazon Alexa and Apple's Siri.

ChatGPT is an AI tool powered by Reinforcement Learning from Human Feedback (RLHF). To ensure that the responses given by the chatbot are more accurate, data is collected through a supervised and fine-tuned method.

- AI trainers compose conversations. In these they act as both the user and the AI assistant. Model-written suggestions help them to craft their replies.
- This new dataset is combined with existing Instruct-GPT data to form a dialog format.
- Quality assessment of the dialogue is monitored. This is using comparison data collected from conversations between the AI.

ChatGPT offers several advantages for businesses when it comes to communication. For one thing, the system is trained on a vast amount of data points. So, it can provide near-instant responses to customer queries. This allows companies to offer a more responsive and personalized experience. Additionally, the technology works in real time. So, businesses no longer need to worry about responding to customer queries. This leaves them free to focus on other tasks.^[10]

1. Multilingual translation: The chatbot GPT can eliminate language barriers by providing translation services for different languages.
2. Personalization of customer service: Using a GPT chatbot can help to make customer service more efficient and customizable. It can quickly answer commonly asked questions and provide personalized customer service. It can also act as a first line of support so that customers do not have to wait for a live representative. A GPT chatbot can provide personalized experiences to customers. This is by considering customer data, preferences, and interests.
3. Automation of customer support: A GPT chatbot can enable the automation of customer support functions. Picture logging in customers into their accounts or giving FAQs. More examples are: troubleshooting issues, handling complaints, or offering recommendations. Businesses can use it to reduce the workload of customer service representatives. It handles simple tasks so they can focus on more complex issues.

Business use

1. Generating personalized responses to customer inquiries: Using a GPT chatbot can help to make customer service more efficient and customizable. It can quickly answer commonly asked questions and provide personalized customer service. It can also act as a first line of support so that customers do not have to wait for a live representative. Furthermore, businesses can use it to reduce the workload of customer service representatives.

2. Creating custom content: Businesses can use ChatGPT for dynamic marketing strategies and media campaigns. For example, they can generate custom content that's relevant to the customer's personal preferences. Through this approach, businesses can create more effective ads and ensure they reach the right customers at the right time. This way, they can get their message across in a more personalized manner. This increases the chances of conversion.
3. ChatGPT gives businesses the power to personalize ads and promotional material based on individual customer criteria. Through this approach, businesses can create hyper-targeted ads with greater accuracy. This is because they base them on the customer's specific interests or browsing history. This type of content creation can increase engagement and conversions. This makes it an effective marketing strategy. Additionally, through ChatGPT, businesses can easily track customer lifetime values. They can also monitor customer behavior in real-time. This gives them a better understanding of their audience.^[11]
4. Writing code: The capabilities of ChatGPT can be useful to you, whether you are a coder or just learning. If you need help figuring out how to create the code, ask the AI chatbot for assistance. Additionally, if you tell it whatever programming language to use, it will write the code for you.
5. Integrating with other services: Things like booking appointments or making purchases can be simpler. ChatGPT-3 can be coupled with other services like calendars, payment processors, and databases.

Security Considerations for ChatGPT Solutions

When it comes to using any type of AI-driven communication tool, security is always a top priority.

Encryption: User data should be encrypted and stored securely. This ensures protection both on the server side and during transit across networks.

- Suspicious Activity Detection: The ChatGPT solution should have mechanisms in place. These detect and identify any suspicious activity. Users should be notified promptly in case of any anomalies or unusual behavior.
- Regular Maintenance: Regular maintenance of the system is crucial. This is to identify and address any potential bugs or security vulnerabilities. This helps ensure a secure and reliable environment for users.
- Monitoring: Continuous monitoring of the ChatGPT solution is necessary. This is to proactively detect and mitigate any security risks. This includes monitoring access logs, user interactions, and system behavior for potential threats or breaches.
- Prompt Issue Resolution: Any identified security issues or vulnerabilities should be addressed promptly. You can achieve this through timely updates, patches, and fixes to maintain a secure environment.

- User Education: Educating users about best practices for security, is essential to enhance overall security posture. Examples are strong password management and awareness of potential phishing attempts. Regular training and awareness programs can help promote a security-conscious culture.
- Compliance: The ChatGPT solution should comply with relevant data protection and privacy regulations. This is to ensure the safeguarding of user data and privacy rights.
- Data Retention: Implementing appropriate data retention policies helps to minimize the risk of data exposure. It also ensures compliance with applicable regulations.
- Access Controls: Robust access controls, including authentication and authorization mechanisms, should be implemented. These are to restrict access to sensitive user data and system functionalities.
- Third-Party Audits: Regular audits and security assessments by independent third parties are vital. These can provide assurance regarding the robustness of the ChatGPT solution's security measures.^[12]

The Future of AI-Powered Conversation Technology with ChatGPT

- ChatGPT is revolutionizing the way we communicate with AI-driven technologies. It provides more natural and immersive conversations that simulate human interaction.
- This type of technology also enables more personalized customer service experiences. It also powers streamlined communication processes.
- It has great potential to quickly analyze vast amounts of data. So, it's easy to see why ChatGPT is quickly becoming a popular choice for many companies. Of course, these are companies looking for AI-fueled communication solutions.

CONCLUSION

Latest technology reflects on three devices: Chatbot, ChatGPT & Open AI; the modern tool that fuels the artificial intelligence to develop the multilingual translation, Personalization of customer service & Automation of customer support. Quill offers prompts and exercises and delivers instant AI-powered feedback to help students write, revise, and revise again until they are able to produce succinct, powerful sentences. An expressive, performant, modern functional programming language. QuillBot's AI trains on datasets, which show it the right and wrong ways to write. A dataset is a collection of information (in QuillBot's case, information on grammar, spelling, punctuation, tone, sentence structure, and clarity) that can be read as a single unit of information by a computer.

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Embrace of artificial intelligence with machine learning outputs extravaganza outcome: World Journal of Pharmaceutical and Life Sciences: 10(1), 172-177, 2024. (ISSN: 2454-2229, Impact Factor: 6.129, Index Copernicus Value: 76.2) [Scopus Journal, UGC-CARE approved Journal, Web of Science Journal] [BEST PAPER AWARD].

https://www.wjpls.org/home/article_abstract/3214



AI picture of Sourav Hatui

The entire projects on AI+ML and Chatbot+ChatGPT and OpenAI have been guided by eminent professor Dr Dhrubo Jyoti Sen of the same temple of learning.

REFERENCES

1. Caldarini, Guendalina; Jaf, Sardar; McGarry, Kenneth "A Literature Survey of Recent Advances in Chatbots". Information. MDPI, 2022; 13(1): 41-56.
2. Adamopoulou, Eleni; Moussiades, Lefteris "Chatbots: History, technology, and applications". Machine Learning with Applications, 2020; 2: 100006.
3. Turing, Alan, "Computing Machinery and Intelligence", Mind, 1950; 59(236): 433-460.
4. Weizenbaum, Joseph, "ELIZA - A Computer Program For the Study of Natural Language Communication Between Man And Machine", Communications of the ACM, 1966; 9(1): 36-45.
5. Kolodner, Janet L. "Maintaining organization in a dynamic long-term memory". Cognitive Science, 1983; 7(4): 243-280.
6. The Lancet Digital Health "ChatGPT: friend or foe?". The Lancet Digital Health, 2023; 5(3): e102.
7. Kung, Tiffany H.; Cheatham, Morgan; Medenilla, Arielle; Sillos, Czarina; Leon, Lorie De; Elepaño, Camille; Madriaga, Maria; Aggabao, Rimel; Diaz-Candido, Giezel; Maningo, James; Tseng, Victor. "Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models". PLOS Digital Health, 2023; 2(2): e0000198.
8. Gilson, Aidan; Safranek, Conrad W.; Huang, Thomas; Socrates, Vimig; Chi, Ling; Taylor, Richard Andrew; Chartash, David. "How Does ChatGPT Perform on the United States Medical Licensing Examination? The Implications of Large Language Models for Medical Education and Knowledge Assessment". JMIR Medical Education, 2023; 9(1): e45312.
9. Abdel-Messih, Mary Sabry; Boulos, Maged N. Kamel "ChatGPT in Clinical Toxicology". JMIR Medical Education, 2023; 9(1): e46876.
10. Haver, Hana L; Ambinder, Emily B; Bahl, Manisha; Oluyemi, Eniola T; Jeudy, Jean; Yi, Paul H. "Appropriateness of Breast Cancer Prevention and Screening Recommendations Provided by ChatGPT". Radiology, 2023; 307(4): 230424.
11. Ayers, John W.; Poliak, Adam; Dredze, Mark; Leas, Eric C.; Zhu, Zechariah; Kelley, Jessica B.; Faix, Dennis J.; Goodman, Aaron M.; Longhurst, Christopher A.; Hogarth, Michael; Smith, Davey M. "Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum". JAMA Internal Medicine, 2023; 183(6): 589-596.
12. Howard, Alex; Hope, William; Gerada, Alessandro "ChatGPT and antimicrobial advice: the end of the consulting infection doctor?". The Lancet Infectious Diseases, 2023; 23(4): 405-406.