**Abstract:**

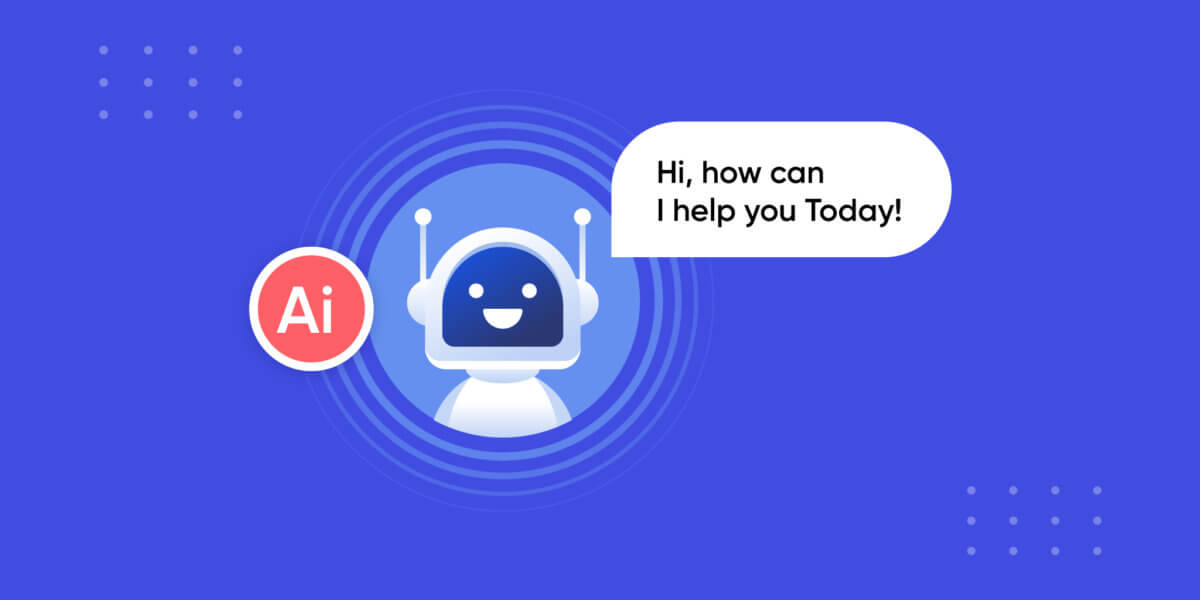
Chatbots are computer programs that communicate with humans using natural language or text, making them seem like real people. They use AI algorithms to create appropriate responses. Older chatbots relied on rule-based or generative-based models, which gave the impression of intelligence using simple pattern matching and string processing techniques. However, newer chatbots use more sophisticated knowledge-based models. This paper will explore chatbot classification, design methods, and dealing with the context of a conversation and its impact on human societies.

**Keywords:**

1. **Introduction**

**1.1 Introduction to Chatbot and its History:**

Chatbot is an artificial intelligence program which was created as a machine that can converse with humans through text or voice exchanges, mimicking natural dialogue structures. The word "chatbot" itself combines "chat" and "robot," highlighting the machine's capacity for conversation with people.



We live in an age where chatbots are being used extensively in a range of industries, from entertainment to healthcare. However, the customer service sector is one such field where AI-powered chatbots have become a promising technology for service providers to offer their customers automated products. The COVID-19 pandemic has further accelerated the development of this specific IT-based service, with AI chatbot technology being introduced to numerous businesses in 2021. These chatbots can now mimic human behavior and engage in conversational situations that can help organizations provide excellent customer service **[1]**.

Chatbots have been around for quite some time now, with the release of Joseph Weinbaum’s ELIZA program in 1966. Back then, users were easily fooled into thinking they were talking to a real person. But now, we have come a long way in developing chatbots that are more advanced and able to provide better customer service. Earlier chatbots like ELIZA lacked conversational retention as they relied on keyword matching with little contextual recognition. ELIZA would search user input for keywords, then convert the sentence into a script using associated rules for that keyword. The SCRIPT is a combination of data keywords and their transformation rules for a specific conversation class. A.L.I.C.E., known as Artificial Language Internet Computer Entity, is another chatbot that has won the prestigious Loebner Prize three times for its clear speaking abilities **[2]**. A.L.I.C.E. was created using the Artificial Intelligence Markup Language (AIML), which was developed over the last decade **[3]**.

**1.2 Significance of chatbots:**

Different industries use chatbots to mean different things. Here are some of the main definitions of chatbots:

* Enhancing User Satisfaction: Chatbots respond to customer inquiries quickly and personally, enhancing their overall experience. According to a study, more than 70% of businesses reported higher customer satisfaction after implementing chatbots.
* Optimized performance: The workload of human agents is reduced because chatbots can handle numerous requests at once. A human agent would need hours to respond to hundreds of requests, but chatbots can do it in a matter of seconds.
* Anytime access: Chatbots are accessible around-the-clock and offer users support. This is crucial for international businesses that can support clients in various time zones.
* Optimized data mining: Chatbots can gather useful information about consumer preferences and behavior for use in enhancing goods and services **[4]**.
* Budget Savings: Businesses can significantly reduce costs by replacing human agents with chatbots. A recent study by Juniper Research estimates that chatbots could save businesses over $10 billion by 2022 **[5]**.

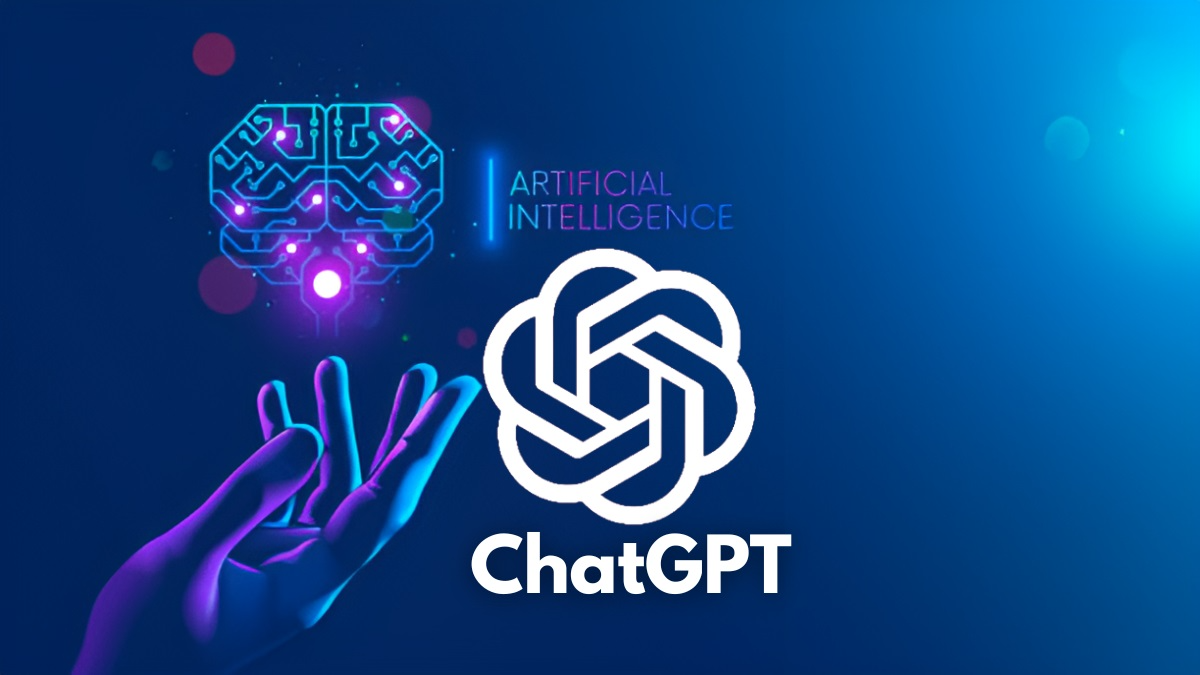
**1.3 Types of Chatbot:**

We've got a bunch of chatbots to choose from, but they can be broken down into two main categories:

1. Linguistic-Based Chatbots**:** Linguistic-based chatbots function based on a certain set of rules and are designed to answer specific commands or inquiries. Unfortunately, Linguistic-based chatbots have their limitations and can only provide predefined responses to a limited amount of questions.
2. Machine Learning Chatbots**:** Machine Learning Chatbots utilize advanced technology such as artificial intelligence and natural language processing to comprehend and respond to user input. With the ability to learn from interactions, Machine Learning Chatbots continually enhance their responses over time, expanding their capabilities to handle a broader spectrum of queries and conversations than their rule-based counterparts. **[6]**

**1.4 ChatGPT and its History:**

ChatGPT (Chatter-based Group Problem Solving) is the model language that   OpenAI has created using Natural Language Processing (NLP) and deep learning. It is like a smart robot that can understand all sorts of topics and answer our questions in a human-like way. ChatGPT started as a prototype on November 30, 2022, and it was built with this fancy architecture called GPT-3.5. The best part is, with a massive amount of text to learn from, ChatGPT is always expanding its knowledge and abilities. Stanford University researchers made it to study how artificial intelligence can be used in human societies. It is like a science experiment that keeps getting smarter and better.

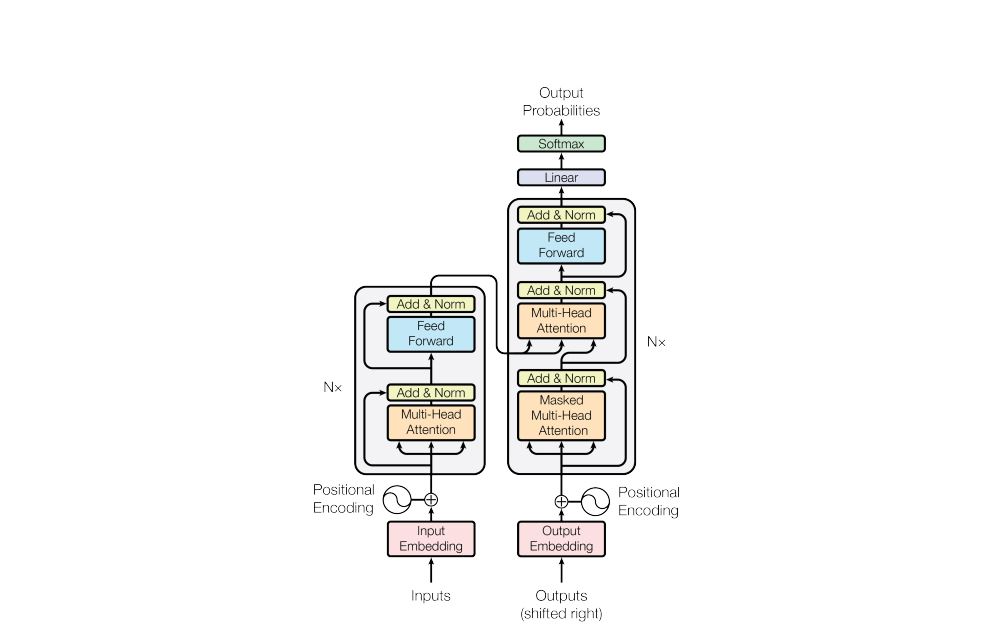


**Compared to normal chatbots:**

ChatGPT uses machine learning and natural language processing to provide responses that are more human-like and contextual. Unlike traditional chatbots that follow predetermined rules and responses, ChatGPT can comprehend and respond to more complex requests. Additionally, based on user interactions, ChatGPT can learn and develop over time, making it a more dynamic and adaptable chatbot **[6]**.

**1.5 Working Model of ChatGPT:**

ChatGPT is an intelligent chatbot that utilizes large-scale neural networks which have been trained on massive amounts of text data. When a user inputs a message or a query, ChatGPT carefully analyzes the input and generates a response based on its comprehension of the exchange **[7]**.

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* Data Processing: ChatGPT analyzes user requests or messages and transforms them into numerical representations that a neural network can comprehend.
* Tokenization: Tokenizing is used for the text entered. In other words, the program dissects it into its component words and analyzes them.
* Input embedding: The neural network's transform section receives a tokenized text.
* Encoder-decoder attention: A transformer transforms a text input into a probability distribution of every output that could be produced. The output is then created by this distro.
* Text generation and output: The neural network's final layer produces responses based on an understanding of the input and the conversation's context. The user sees the generated responses as chatbot responses after they have been translated into natural language.**[7]**

**Citations:**

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