





CAAS (Chatbot as a Service): Sector-Wise Survey

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Abstract. The worldwide chatbot and voice Bot market share were worth USD 526 million in 2021 even more than that. A chatbot system application uses conversational counterfeit insights (AI) innovation to re-enact a discussion (or chat) with a client using informing apps, websites, mobile apps, or the phone. Chatbots are not related as a single or specific category but they expanded along a more extensive range. Chatbot applications and systems have been expanded over a long period, well-known prime examples include ELIZA, ALICE, and HeX. However, human computation lacks the speed of information processing, and it is inevitable to process a large number of user requests. A comprehensive and systematic methodological review of the literature on this topic was performed using a two-step approach. First, relevant keywords, synonyms, and search strings are identified to search for relevant research papers on the chatbot. The second step is article selection and investigation of papers, classifying papers into sub-categories based on aspects of the chatbot system.

For the review purpose, initially 183 articles have been encompassed according to the eligibility criteria for inclusion. Afterward, the full text of articles deemed eligible was further assessed for inclusion. Based on IC and EC, we have identified 42 articles for inclusion in the collection; Following Sectors covered in this article, such as CAAS (Chatbot as a service) in Education Sector, CAAS (Chatbot as a service) in Health Sector, CAAS (Chatbot as a service) in Ecommerce Sector, CAAS (Chatbot as a service) in General Use. There are two main points in this area of research: how well chatbots can understand user messages and how well chatbots can provide context-correct answers.

Keywords: Chatbot · AI · NLP · Finance · Health · Education · E-commerce · Metrics · Rule-Based · Machine Learning · Intent · Response · Domain · Task-based conversation Voice Based Conversation · bot system · social media

1 Introduction

1.1 Value of a Chatbot System in the Market

The worldwide chatbot market measure was worth USD 526 million in 2021. It is anticipated to reach USD 3,7023 million by 2030, growing at a CAGR of 24.1% amid the estimated period (2022–2030).

A chatbot system uses conversational artificial intelligence (AI) innovatively to re-enact a discussion (or chat) with a client using informing apps, websites, mobile apps, or the phone. In real-time, client interactions are prepared through rule-based dialect applications that perform live chat capacities. One of the foremost noticeable components of chatbots is that, in contrast to applications, they don't have to be downloaded, and don't utilize any memory on the phone. Another advantage is that numerous bots can be combined into one discussion simultaneously.

A chatbot can progress and engage in a client's intelligent discussion whereas requiring less intervention from human representatives [1]. It evacuates the boundaries to giving benefits to clients that can show up when there's a more prominent request than the capacity to meet it. Clients can get moment responses to their questions instead of holding up on hold. By bringing down the bother of the client's involvement with a company's administration, brand encounters can be moved forward. Chatbot virtual associates are getting to be progressively prevalent among clients in every business i.e. B2B and B2C [1]. These colleagues are utilized to total basic assignments. The usage of chatbot collaborators comes about in diminished overhead costs, more effectively utilize of the time of support staff, and the capacity for businesses to supply client benefit exterior of normal trade hours.

Based on end-users, the worldwide chatbot market has been classified into Huge, Medium, and Little Undertakings. Huge Undertakings are anticipated to produce the most noteworthy market share, developing a CAGR of 24.1% amid the figure period. Based on the commerce demonstration, the worldwide chatbot market has been classified into Bots for Benefit, Bots for social media, Bots for Payments/Order Handling, Bot for Promoting, and Others [1].

For most of us, the extreme extravagance would be a collaborator who continuously listens in to client's call, expecting each requirement, and takes activity when essential. Personal advanced assistants such as Microsoft's Cortana, Google's Assistant, Alexa from Amazon, and Siri from Apple, are at the cutting edge of innovation in voice acknowledgment and machine learning.

It could be a well-known reality that innovation is advancing exceptionally quickly. As a result, the run of innovation increments day by day and comes about in low-cost computing. The innovations created such as Machine learning, Deep learning, Natural Language Processing (NLP), and big data analytics have given a modern speed-quicken fuel to Artificial Intelligence. As a result of which it is conceivable to execute conversational Interface Intellectuals. These Shrewdly (stacked with logical ML/DL models) conversational interfacing, which utilizes Machine Learning, Profound Learning as their spine. It is pointless for these Chatbots Applications continuously to be textual. This intelligence can be Voice and Visual based.

To supply superior customer benefits, increasingly businesses nowadays are joining chatbots into their processes. In particular, in businesses where high-volume client interaction is at the center of the e-business, such as managing an account, protections, and healthcare, chatbots have been total game-changers. They offer assistance sparing over 10 min on normal per client request, compared to the officials replying to the calls, with a tall victory rate per interaction.

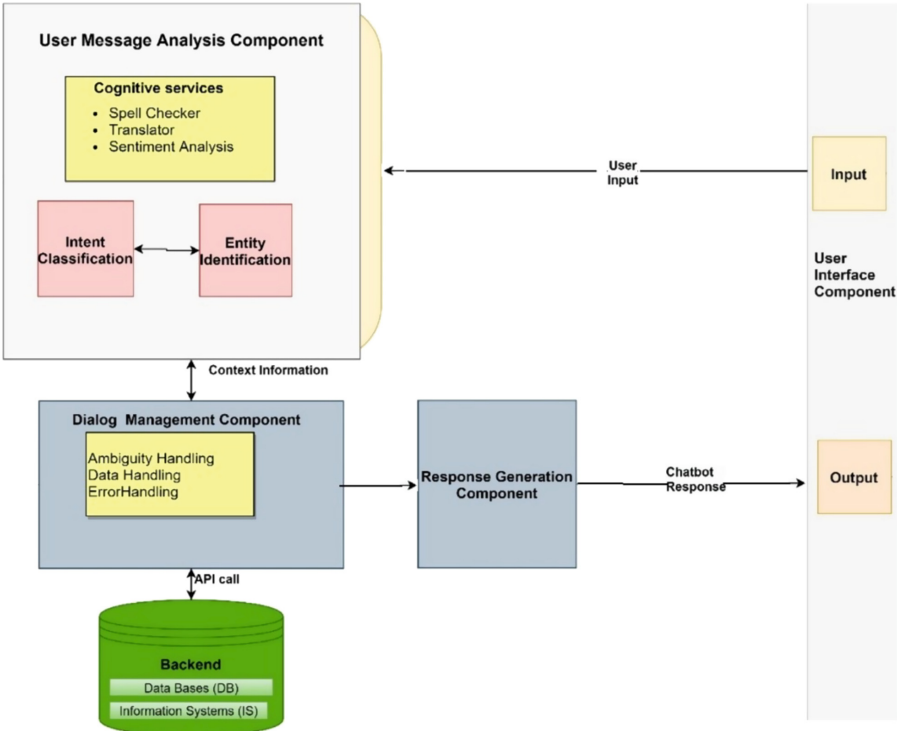


Fig. 1. A working schematic of the Chatbot Conversational System

Simple Definition of Chatbot. Speaking or talking, a chatbot (short form of “chatting robot”) may be a computer program that recreates human conversation, either using voice or content communication [2]. Actual working is shown in Fig. 1.

It includes Chatbots that work on keen domestic devices Chatbots that work using prevalent chat and informing stages like Facebook Messenger, and WhatsApp.

It can influence a client relationship by reacting to demands speedier whereas meeting expectations [2].

- Reducing client holding up time.
- Taking care of effective redirects for client inquiries.
- Providing specialists with leads.
- Resolving client support cases.

The complexity derived from technical properties and capabilities after so many years research which is shown in Table 1.

Table 1. Research Development based on Chatbots' Intents and Responses

Complexity		Request for Intent		Intent Response	
		Low	High	Low	High
Technical Properties	Appropriate NLP Component	Limited intent analysis capabilities	High intent analysis capabilities	High intent analysis capabilities	High intent analysis capabilities
	Appropriate Algorithm	The retrieval-based model that links user-selected query to pre-determined response	Generative-based model driven by ML & ANN	Generative-based model driven by ML & ANN	Generative-based model, driven by ML & ANN
	Appropriate dialogue system	Finite-based	Agent-based	Agent-based	Agent-based
	Appropriate database	Pre-programmed responses databases and no access to user profile	Multiple databases with access to real-time service interaction data and access to user profile	Multiple databases with full access to user profiles and real-time service interaction data	Multiple databases with full access to user profiles and real-time service interaction data
Capabilities	Initial service query	User inputs query in natural speech or text	User inputs query in natural speech or text	User inputs query in natural speech or text	Able to pro-actively prompt the user
	Communication	Structured approach that follows a supple set of pre-determined queries	Semi-structured approach that can handle complex and evolving conversations	Semi-structured approach that can handle complex and evolving conversations	Flexible interaction approach that can handle complex and evolving conversations
	Continuity of Interaction	Provides only individual one-time service interaction support	Provides only individual one-time service interaction support	Provides continued service interaction support	Pro-active continuous support including support for service Bundles
	Responses	General instructions, webpage links	Personalized instructions, webpage links	Highly personalized response within a limited context	Highly personalized response

2 Kinds of Chatbot Systems/Applications

2.1 Types of Communication Channel Wise

Nowadays, the chatbot scene is wide. Chatbots are not related as a single category but they drop along a more extensive range. The authors examined the articles whereafter classification by input or by informing channels [3].

Relevant utilization of machine learning techniques and industrial perceptions to self-improve based on what clients are inquiring about and how they are inquiring about it. Speech-supported inputs through voice and chatbot utilizing voice acknowledgment answer user's questions or perform inventive tasks.

2.2 Types of Service Sector Wise

Recruitment – Planning gatherings, interaction with the recruiter, replies & queries regarding job assignments.

- Healthcare - Give status on healthcare staffing, convey pharmaceutical as well as security alarms, Communication between patients and others.
- Government – To resolve ground-level issues or any such services where humans are not able to answer individually.
- Domestic or home Gadgets – to control smart gadgets, control warming, oversee security, and control domestic machines, control wellness gadgets, set medication reminders.
- Transportation Services - Remotely bolt vehicles; recover data, Call ride share service.
- Individual Partner - Oversee installments, seek data, buy items or administrations, and react to questions.
- Marketing & Promoting - Make suggestions, offer dependability motivations, convey campaigns and offers, and convey significant content.

2.3 Categories of Chatbots

The following Fig. 2 shows the distinctive categories of chatbot systems based on AI and NLP. Every category has a basic measure, and a chatbot can have a place in more than one category parallelly. Chatbots can be classified broadly into four types, Knowledge space, Benefit Given, Objective, Input Processing, and Reaction Era method [1, 4]:

1) Information Based. This sort of chatbot is based upon the sum of knowledge that's accessible for the chatbot to get to or the content on which it is prepared. It is assist classified into two sub-categories:

- Open Domain chatbots, planned to reply to questions like “How is the climate in Aurangabad?” “What year was Mahatma Phule born?”
- Closed-Domain Agents works with knowledge of a single area of interest and are also known as domain-specific agents to provide answers for commonly limited situations, including such as leading guests through a museum and giving certain information types.

2) Services Offered. This form of chatbot addresses the interactions that how much interaction the user how much involved the interaction. Therefore, it is dependent upon the work at hand and a heartfelt exchange.

Three groups are further separated into it:

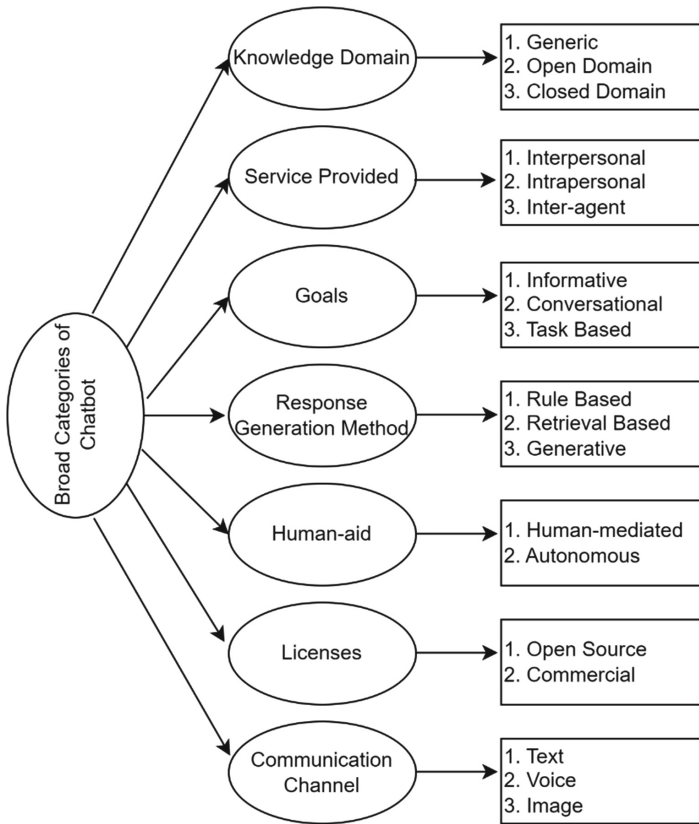


Fig. 2. Categories of Chatbot

- Interpersonal The chatbot helps the user with their everyday chores, but it doesn't interact with them. They are not acquainted with the user.
- Intrapersonal These are referred to as virtually real; they have a better awareness of the user and, with time, develop a sympathetic comprehension of the user. They exist in the confined space of the users.
- Inter-agent These are concerned with transferring information between chatbot frames. Since old chatbot applications lack a feature to initiate communication with other chatbot systems, this type can assist in doing so.

3) Goal. This kind of chatbot operates according to the exact objective that it was designed to fulfill. It can be broadly divided into three groups:

- Informative Open domain chatbots that process user inquiries and return results are comparable to informative chatbots in this regard. Google Search is the best and most prominent example.
- Conversational chatbots are the most difficult type of chatbot to develop since they need to be able to comprehend the context before continuing a dialogue.

- **Task-Oriented** These chatbots are typically business-oriented chatbots that are created to carry out a specific task relating to specific domains, such as customer support, product or service information, etc.

4) Technique for Response Generation and Input Processing. This kind of chatbot is working on the inputs being processed as well as the techniques applied to provide the appropriate answer. It is divided into three categories:

- **Based on laws** a set of predetermined guidelines for extracting features and producing responses accordingly.
- **Based on retrieval** The chatbot has a database of answers that it can draw from to provide answers to queries. Based on the questions, the user must choose an appropriate answer, and the chatbot will do as user says.
- **Generative in nature** It uses a range of machine learning and deep learning techniques to produce new responses based on a substantial quantity of historical data and transcripts of previous discussions.

In 2018, Nuruzzaman et al. [6] divided chatbot applications into the following categories.

Goal-Based Chatbot. It is simply task-specific, and has a very short and necessary conversation with customers to accomplish a task. These chatbot systems are used by companies to help users with their questions.

Knowledge-based chatbot. These are using the knowledge available in the open internet or domain close to the query-related data. Open Domain Chatbots (Allen AI Science [7], Quiz Bowl [8]) are based on general topics and therefore only answer general questions.

Chatbot based on the response generated. The response model takes input and produces production in natural languages. Dialog manager combines all answer templates. To generate a response, the dialog manager uses three steps. In the first step response sets are generated using all response models, then in the second step Answers are given in order of priority. In the third step, if the answer is not preferred then the answer is based on the model selection policy. Different answers generative models are instance models, generative models, query-based models search engine models, and models. Figure 3 shows the summary of the chatbots working's scenario [5].

Additionally, chatbots can be categorized based on the request and response needs of the user as follows:

1. *Text-to-text bot (TTT).* This is a basic architecture where the user Word or sentence forms and chatbot responses alike use pattern matching or A general rules-based approach. A suitable example is ELIZA [2], which begins the global era of catboats. Nowadays there are various messaging apps such as Facebook Messenger, WhatsApp and Telegram that use Text To Text for two or more user interactions.
2. *Text-to-speech bots (TTS).* it makes the user more interactive and provides a useful purpose.

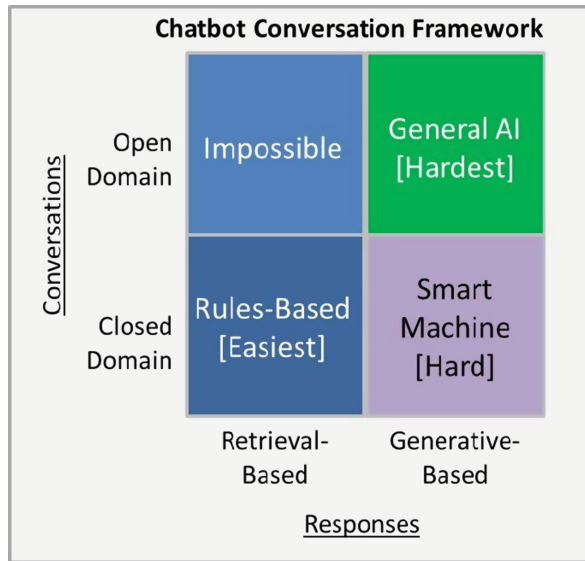


Fig. 3. Chatbot Conversation Framework

3. *Speech-to-text bot (STT)*. it generates text responses where the user interacts with speech Bots go through their voices and see the responses. It is suitable for various uses such as Meetings, hard of hearing people for social communication. SIRI [2] is one of the Chatbot STTs developed by Apple
4. *Speech-to-speech bot (STS)*. This is an emerging chatbot with human-like expertise. Currently, the education world is experimenting with voice-to-voice teaching assistants. More suitable for visually impaired people.

3 History: Development of Chatbot as a Human-Computer Conversational System

Chatbot applications or systems have captured a space in the market, old but primitive examples include ELIZA or HeX. Correlate user input with answers from over 40,000 knowledge records using AIML (Artificial Intelligence Markup Language) responsible for pattern matching. Brian McLaughlin [11] designed a chatbot called Claude that uses standard pattern matching to find the right answer. The Claude chatbot recognizes user input, uses the answers in the database to create an answer based on that input, and finally constructs the answer.

Since the early 1970s, educational agents have been developed within digital learning environments known as intelligent instructional systems. Conversation Educator uses artificial intelligence technology to enhance and personalize classroom automation. The knowledge of design and research is not only to make the most of technological advances but also to the development of engaging, useful, and valuable educational tools that understand emotional, cognitive, and social educational concerns.

However, This sort of chatbot requires thousands of rules to operate appropriately, it is difficult to bargain with linguistic and linguistic blunders in client reactions. Human-like chatbots need to use multi-turn response selection, using each response as feedback to select the correct and appropriate response for the overall context [12, 13]. A drawback of the pattern-matching approach is that the responses are automated, repetitive, and lack the originality and spontaneity of human responses [14]. On the other hand, response times are fast because there is no deeper syntactic or semantic checking of the input text [15]. The subsections below, it discussed the three most popular languages for implementing chatbots using a pattern-matching approach and compare their basic features.

ChatScript Released in 2011, ChatScript is an expert system for developing rule-based chatbots using a very compact open-source scripting language [16]. In addition to short-term memory, ChatScript also includes long-term memory using variables that store user-specific information, which can be used directly or in combination with conditioning to generate chatbot responses [14]. Some chatbots implemented using ChatScript are Suzette, Rosette, Chip Vivant, and Mistsuku [17]. Pattern Matching Language Discussion There are advantages and disadvantages to implementing chatbots using AIML, Rive-Script, or Chatscript [10].

Additionally, AIML is a rule-based matching sequence of word that can produce responses but it is very inefficient when dealing with large knowledge datasets. Although the content is easy to import, the main challenge is that developers have to manually enter large amounts of data to create a working chatbot [10]. RiveScript provides additional built-in functionality and more markup than AIML. Additionally, it applies inheritance principles in its themes, with weighted random responses and objects macros.

In AIM, every user input is converted to uppercase to minimize pattern-matching overhead [16, 17]. To deal with this shortcoming and prepare a response given to the same user input, ChatScript was case-sensitive. Also, the scripting language of ChatScript is complex as compared to RiveScript or AIML, parsing line-delimited languages. ChatScript can combine multiple lines in complex ways and provide answers that cannot be expressed in the same way in AIML or RiveScript. Machine learning methods Chatbots that use machine learning methods rather than pattern matching use natural language processing (NLP) to extract content from user input, removing the ability to learn from conversations.

For example, a corpus of film scripts may be too broad or an IT helpline may be too specific [18]. These chatbots are usually implemented using artificial neural networks (ANN). In contrast, generative models synthesize responses, often using deep learning techniques. Natural Language Processing (NLP) Natural Language Processing (NLP) [19] is a field of artificial intelligence that studies how computer systems interpret and control natural language associated with text or speech. They consist of natural language understanding and natural language generation [20, 21], the latter introducing the responsibility of generating text, usually by artificial neural networks. Natural Language Understanding (NLU) Chatbots use natural language understanding (NLU) [22] to extract context from unstructured user input in human language and respond based on the intent of the current user [23].

The three main issues raised during the NLU process are the user's thinking mechanisms, interpretation, and general knowledge [24]. NLU supports intent classification

and feature extraction while considering contextual information. An intent classification model can be a classifier, such as a linear SVM algorithm, or a pre-trained model created by manually classifying collected user text messages into intents. Similarly, feature extraction models can pre-train initially. Once the model is trained, it can automatically classify new text messages from users as intents and extract entities [25]. Retrieval and generation-based chatbots use variety of algorithms of artificial neural networks. The system accepts user input, calculates vector representations, feeds them as neural network features and generates responses.

3.1 Creation of Chatbot System

Chatbots or virtual assistants help with basic business functions such as sales, support, and Marketing. They are available for any platform, so clients or users will find chatbots for Android, Facebook, Viber, etc. Mainly six steps are sufficient. This will help to create a simple but effective chatbot to provide conversational support to customers [26].

Define business goals – it needs to define what business function should be automatic [26]. Choose the right channel to connect with the people through the website, mobile applications, or such online platforms. Train the bot to respond correctly – the developer can use the full FAQ to train the chatbot. It depends on the business needs. This will help the chatbot to provide relevant answers to the customers or visitors. Voice-enabled a personality face added bot can enhance the chatbot's personality by giving more realistic effect. Create a balanced approach - most chatbots may not be as effective as per customers' need Developer can define what specific stage the customer is in possibilities to connect with actual intent. Test, start, and repeat - After defining and preparing the chatbot system. It is recommended to measure the robot's performance and repeat as needed from time to time.

Developers have choices to design and develop a chatbot system as per the following:

Utilize a chatbot platform. Chatbot platforms are gifts for businesses that need to effectively construct chatbots for sparing FAQs time. Here are the criteria for selecting a platform. Ease of Use - The ready-to-use robotic platform consists of pre-made templates, making it easy to use. Build bots based on the customer's needs and deploy them across multiple channels. No coding support required - no coding required, the client can effortlessly and straightforwardly construct chatbots with negligible improvement exertion and time, and superior client engagement. Analytics - bot examination makes a different degree of client fulfillment and what was effective and the rummage around for the chatbot reaction fizzled. By measuring these measurements, the client or designer can recognize the keys implies inquiring the clients to ask and prepare the chatbot appropriately [27].

Build from scratch [27]. If the business needs are unique or numerous, it is advisable to build a bot entirely from scratch is complicated but it is good because once the dataset is prepared it will just need to enhance the quality of the dataset properly. In this case, off-the-shelf robotic platforms are probably not able to delete the specific solution for any business needs, Developers should follow guidelines: identify the business or client's needs and create a chatbot for the website API. Use the right platform to implement bots

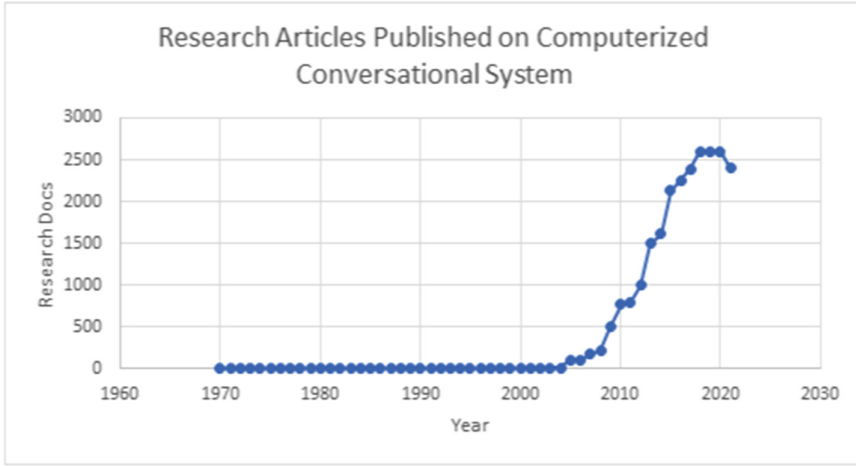


Fig. 4. Research Articles Published for Chatbot

and live chat as a complete toolkit for the team to understand customers' exact demands. Chatbots act as catalysts to improve performance when deployed in different business functions and industries. Here discussed a few use cases for how customers can get the most out of conversations. Business Insider reports expressed that 75% of customers around the world utilize chatbots for client benefit. Client benefit is a portion of it. Basic commerce capacities where chatbots have a critical effect. With AI chatbots, companies can spare Client benefit costs and key efficiency measurements to make strides in client benefits. Businesses are adopting Chatbot technology offers fast customer engagement. IT help desk - Chatbots can help to increase the productivity and motivation of the customer support team's efficiency. In-App Support – Having a bot handle common in-app issues can increase user engagement. This allows businesses to send notifications to keep customers informed banking chatbot system.

4 CAAS: Literature Survey via Systematic Way

A comprehensive and systematic methodological review of the literature on this topic was performed using following approach. Following steps consists of simple review actions. Initially, relevant keywords, synonyms & search strings are identified to search for relevant articles in this area, afterword relevant journal, proceedings databases are identified. We then collected research articles on chatbots from selected databases. These activities focus on gathering information on the topic [28, 30, 35, 37]. The next step is article selection and analysis of recalled articles, classifying articles into sub-categories based on aspects of chatbots: understanding of chatbot technology in the financial industry, experience with chatbots, experience and intent expression, chatbot safety and chatbot development [28, 31, 32] (Fig. 4).

4.1 Step 1

Information Gathering Search string and database ID. Author tried to use of five electronic databases to identify relevant articles on text-based chatbots related to finance, education, healthcare, e-commerce, and general industries. These are Science Direct, SpringerLink, Google Scholar, IEEEExplore and MDPI. Articles were collected from 2018–2021 and are limited to peer-reviewed full-text journal articles and/or English-language articles in major international conference proceedings. These databases offer an excellent selection of peer-reviewed articles in many fields. In addition, the keywords were collected by breaking down the search question into “chatbot” and “finance, education, health, e-commerce and general, sector”. Topics that may be relevant to finance, education, healthcare, e-commerce industry surveys can be captured using text-based chatbots [33, 34].

4.2 Step 2

Item Selection After identifying the search keywords, the initial search retrieved a total of 183 articles using the above techniques: 26 via ACM, 46 via IEEEExplore, 23 via Science Direct, 49 via SpringerLink/Elsevier and 39 via Scopus Indexed/UGC Approval. Here the articles retrieved from publication periods between 2018 and 2021 in order to keep the number of articles for analysis. The titles and abstracts of 183 articles were selected according to the eligibility criteria for inclusion in the review. Subsequently, the full text of articles deemed eligible were further assessed for inclusion. At this point we have selected 32 items for inclusion in the collection [35, 36];

Inclusion criteria (IC)

- IC1: Articles cover finance, education, healthcare, general industries, banking, insurance, and e-commerce.
- IC2: The document focuses on text, audio, and video chatbots.
- IC3: The research must be published in a recognized international journal or in the proceedings of an international conference with a potential research journal.
- IC4: The research must be written in English and published between 2018 and 2021.
- IC5: The journal in which the article is published must be indexed by Scopus or Web of Science.

Exclusion criteria (EC)

- EC1: Publications that have not been peer-reviewed or that correspond to summaries of entire books, editorials, or letters.

4.3 Data Synthesis

In this section, based on the final dataset of 32 articles from the literature review, text-based chatbots in the following main categories of finance, education, healthcare, e-commerce, and general fields are described to enhance the talking point, As follows: 1) Understanding chatbot technology in finance, education, healthcare, e-commerce and in general, 2) Interaction with chatbots, 3) Chatbots - development. The data on the results following the literature review have been synthesized where the overall results on the subject discussed.

5 Reviews on Chatbot as a Service (CAAS)

After reading the selected articles, we focused reviewing on the following sectors where the implementation of CAAS has shown impact and results.

5.1 CAAS (Chatbot as a Service) in Education Sector

The purpose of this study was to examine the current availability of the Internet or web-based educational chatbots as well as to check the platform and its performance. Web-based chatbots have been available for decades, but a big step forward comes when chatbots move into the instant messaging environment. Beyond text messaging, instant messaging applications can include additional features such as voice and video messaging, calling, gaming, e-commerce, media sharing, animated GIFs, stickers, and advertising. Or a chatbot.

This study was the first to review educational chatbots on a web-based platform and explored them based on topic, conversational language, and development platform. Whereas per findings that the majority of chatbots use English as their language of communication. It also found that nearly half of chatbots lack discussion techniques or simulated human conversation, instead of using button-based browsing and automated replies with additional information on websites outside the chatbot's interface. was shown from Based on subject analysis, chatbots mainly deal with language learning, business topics, or multiple subject areas. From a developer's perspective, the Chatbot service has been identified as the most used platform among build tools.

Unfortunately, many of these chatbots give the impression of being short-lived. As such, it remains difficult for teachers to offer advice on specific chatbots that students may consider. Teachers may think given the exponential growth of chatbots; one can ask how intelligent they are. According to review for the web-based chatbot, the user's request could not be fulfilled. So, the next step for chatbots is recent advances in natural language processing and machine learning. they are constant. It learns and improves from user conversations and generates responses based on a collection of known conversations stored in a database. If the chatbot is built to handle large amounts of data, this is probably the right time to pose a question. Use them as teaching assistants? Regarding implementation goals, the author identified four of teacher's main Goals: 1) Improving Skills, 2) Diversity in Education, 3) student interests; 4) educational institutions. These four goals cover more than 70% of analyzed publications. Most researchers focus only

on the Narrow Side of Chatbot Evaluation Successful learning, ease of use, acceptance of technology. This discrepancies in implementation goals and appropriate assessment Approaches are known from other educational technologies learning analytics dashboard [38].

Another structured approach to aligning implementation goals and the evaluation procedure is very important to be able to evaluate this correctly. Chatbot Effectiveness [39], suggesting a structured A four-step evaluation process starting with The Wizard of Experiments and subsequent technical validation, laboratory research, and field studies. This evaluation procedure is systematically linked Hypotheses from chatbot results to help evaluate chatbots for implementation goals. “Adjusting Chatbot Ratings Therefore, it is important to “set implementation goals”. Issues that need to be addressed in future research agenda. Regarding the educational role, the results showed the educational role of chatbots can be summarized as learning, help and guidance.

The role of learning is support learning or educational activities such as B. Acquisition of knowledge. or Auxiliary role is support for learner simplification Everyday life. Specify the opening hours of the library. or the mentor’s role is the personal support of the student development, e.g., self-learning. of from a pedagogical point of view, all three roles are essential for learners, Therefore, it should be embedded in a chatbot. These educational roles It aligns well with the four implementation goals outlined in review. Improving student skills and motivation is powerful, but in the context of learning, the efficiency of teaching goes hand in hand support. The mentoring role is instead equally relevant to everyone Identified goals for implementing a chatbot. in the review. Therefore, chatbots primarily designed to serve.

Improve skills and motivate students by supporting learning, educational activities,

Making education more efficient through delivery relevant administrative and logistical information for learners; Coaching students support multiple effects.

In relation to teacher’s mentoring role, it can be identified three main tasks for system. Categories of chatbot mentoring methods:

- scaffolding,
- recommend
- inform.

However, if a comparison taken between current chatbot mentoring has been reported in the literature is that summarizing the teacher’s day-to-day mentoring role, chatbots are not on the same level. To take on a mentoring role for teachers [40], chatbots must meet several conditions of the following activities in the mentoring role. to 1) Scaffolding, chatbots should directly assist learning new skills and most importantly getting beginners into the activity. 2) Recommend should be supported by chatbot utilize information, tools, or other materials for specific learning tasks situation. For 3), It needs to promote chatbots. Support according to student goals and achievements Develop metacognitive skills such as self-regulation. According to Discrepancies in Mentoring by Teachers and Chatbots Here a different opinion The research topic is “exploring the possibilities of chatbots”. to supervise students.” As for adaptations, there were only two releases Identified people discussing adaptations of chatbots that show Similarity by applying them

within the test. in relation to educational technology that offers streamlined customization Learners need a high level of experience. Based on the results, it seems that research on chatbots is still in early stage [41] or [42] argue that chatbots Personal information of learners must be taken into account in order to meet the following: Customization definition request. Personal information should be retrieved and stored somehow, at least temporarily learning model. Information for learners such as knowledge and knowledge interest, indications seem to be under-explored [43] points to further information about learners can be used to make the chatbot more adaptable: personal goals, personal obligations, personal background, personal characteristics and learning context. Author ranked ‘research in this area’ as a third challenge, so it may call as “exploring and utilizing”. It also challenges the adaptability of chatbots. “Through systematic analysis of publications, Author have identified and structured domains. Here, educational roles in four domain categories. chatbot learning, chatbot support, chatbot mentor, and another research. These results are application cluster (AC) for educational chatbots, previously [44] studies were included. Characterizing the activity of chatbots, [45] characterized chatbots by domain. This establishes a relationship between these two types of applications Cluster (AC) and structure them accordingly. Here the structure additionally, it includes chatbot mentoring and other research “Service Oriented Chatbots” and “Educational chatbots” [44]. Also, there is a strong tendency to inform students. It can also be already mentioned by [46].

In last of this first review, An important limitation worth mentioning here is the exclusion of alternative keywords for the search queries, it exclusively uses chatbots to avoid incompatible search results [41, 44]. Although found that chatbots share properties with teaching agents, dialog systems and bots gave more easiness for learning. It has carefully considered the compromises between potential eliminations related work and the expansion of the research program, including Related work but not necessarily related. The second limit can be lies in the coding process of category formation and application, which can be unable to establish due to novelty of discovery [40, 44].

5.2 CAAS (Chatbot as a Service) in Health Sector

In this section, author diagnosed empirical research at the consumer experience. Additionally, when reviewed that about the evaluation confirmed that health chatbots had been utilized in a couple of domain names. The maximum common domain names had been preventive care and chance conversation public health surveillance with the aid of using health officers Telehealth, place of business health and safety and care of the elderly [62, 63].

Characteristics of the COVID-19 associated chatbots. To well symbolize chatbots, the authors had to well verify their definition and significance in healthcare. The current literature describes chatbots as digital dealers that permit customers to have interaction with an AI-based computer program These digital dealers paintings thru receiving requests and returning responses. Technical capabilities which include speech synthesis from text, facts visualization, conversational capacity, customization were all important additions to chatbot packages Chatbots may be released from a smartphone-primarily based totally application (apps) which include LINE, WhatsApp and Telegram social

media structures which include Facebook and Twitter or the developer or provider providers' websites Likewise, chatbots may be standalone apps which include the one proposed with the aid of using Battineni [64].

In addition, those novel technology can presently accomplish the subsequent tasks:

Health chatbots solution questions. Initially, health chatbots had been configured to right away solution numerous questions associated with COVID-19 Once the consumer asks a query to a chatbot, a logical reaction is furnished, exploiting its back-cess records or know-how base. To construct these records, builders make use of Artificial Intelligence Markup Language (AIML). AIML works with the aid of using spotting keywords, patterns, and "Question-Answer pairs" [65].

Health chatbots ask questions. In order to nice help customers, a few chatbots will ask the involved individual to solution questions on themselves. In a few cases, chatbots ask customers approximately their demographic facts, medical history, house records, and COVID-19 associated signs and symptoms for people with signs and symptoms, additional data may be asked which include the final medical institution visits and diagnoses results. Those questions had been important to screen customers and decide their COVID-19 symptom and contamination severity status [66].

Health chatbots create health statistics and records of use. Chatbots can keep day by day logs in their customers' health conditions and construct statistics in their health records and usage Storing and keeping those day-by-day logs can assist in correctly monitoring consumer health status, signs and symptoms, and bodily hobby patterns. For example, a proposed mobile utility with chatbots had the cap potential of recording consumer facts associated with bodily hobby and nutrition for the reason of interoperability that become critical to combine facts from chatbots' customers with health facility health- care systems [64, 66].

Health chatbots fill bureaucracy and generate reviews. In an attempt to help customers, chatbots can fill bureaucracy and generate scenario reviews that encompass numerous facts and metadata which include consumer non-public records, and consumer responses with recorded timestamps and period of conversations. For example, the chatbot utility in was able to generate an access by skip for the personnel who had been evaluated as now no longer inflamed nor suspected to be inflamed with COVID-19. This screening manner is less difficult and extra green than conventional screening personnel at the workplace access points. It additionally furnished health officers with entire and real-time facts for making knowledgeable decisions to manipulate suspected cases [63, 67, 68].

Health chatbots take easy moves. Lastly, evaluation located that chatbots can take moves primarily based totally on the users' responses for example, after assigning a severity score for a consumer who's experiencing signs and symptoms, a chatbot may want to decide the following important moves to nice help. These customized moves can also additionally include providing custom designed recommendation and guidelines approximately COVID-19, or robotically connecting the consumer to a health expert if them enter symptom score surpassed a selected pre-designed threshold in an

emergency, a few chatbots can offer extra information about the consumer's location, signs and symptoms and contamination severity rating to the users' docs or close by health facilities in a well-timed manner [62, 63, 67].

Applications of health chatbots

The following literature evaluation diagnosed following health chatbot packages [69].

Firstly, the maximum common reason become disseminating health records and know-how. Health chatbots had been prepared with numerous health academic substances and records approximately COVID-19 signs and symptoms, medication, precautionary measures (e.g., cleansing hands, sporting face masks, etc.). These academic materials and records had been presented in extraordinary codecs like texts or scientific catalogue, audio or lively clips, and maps.

Secondly, health chatbots had been applied as self-triage and private chance evaluation gear in the course of the COVID-19 pandemic. For example, a chatbot advanced in America become used for self-screening primarily based totally on measures advised with the aid of using WHO and neighbourhood health officers earlier than in the long run recommending or concluding the want for in- affected person care. In every other instance, the chatbot in become used for personnel' self-screening that allows patient to verify the risk of COVID-19 contamination earlier than coming into their workplaces. Additionally, health chatbots display close by medical services (e.g., drive-thru checking out facilities) and listing emergency or hotline numbers for in addition non-public chance evaluation.

Thirdly, health chatbots had been advanced to give response health signs and symptoms and intellectual wellness traits associated with the pandemic. For example, a utility with a chatbot become advanced to advise health elements such as nutrition, bodily hobby, etc. in the course of mandated self-isolation periods.

At the social machine level, a few health chatbots have become clearly inactive because of the dearth of hobby from the network. In addition, there has been a mismatch among how customers perceived those technology in contrast to the actual talents furnished with the aid of using health chatbots. Users' terrible perceptions approximately the chatbot integrity, benevolence, capacity to offer correct records, and capacity to keep their privateness can also additionally avert their recognition to use health chatbots.

Furthermore, human beings without a get admission to era or the Internet might not advantage from this technology, main to lacking records encompassing the entire populace and lowering the accuracy of coming across and predicting inflamed cases [70].

At the technical machine level, fact-checking of records whilst concurrently being deployed is difficult for a chatbot as lots of records is up to date on a day-by-day basis. A chatbot capacity to manner and supply accurate and up-to-date records from time to time calls for the intervention of multidisciplinary teams [64, 71]. Additionally, cutting-edge chatbots might not be developmentally prepared to correctly help with sensitive subjects which include intellectual health. For instance, using Empathetic Natural Language Generation isn't but considered to be sophisticated – as such, health chatbots might not be appropriate for managing human beings with apprehensive break- down or mind of suicide. These extreme troubles are not unusual place in the course of pandemics, and a

chatbot lack of ability to offer appropriate recommendation can also additionally depart the consumer at excessive chance of self-damage or different disordered thinking. Our review found that using healthcare chatbots presents a number of system-level social and technological challenges [71].

In summary, we found that on the social platform level, healthcare chatbots are barely active due to lack of community interest. Additionally, there is a disconnect between user perceptions of these technologies and the actual functionality provided by medical chatbots. Negative user perceptions of integrity, friendliness, ability to provide accurate information, and ability to protect their privacy can hinder their adoption of healthy chatbots.

5.3 CAAS (Chatbot as a Service) in Finance Sector

In further chatbots in finance, by explicitly highlighting the main determinants of the conversational and technical problems addressed to date, and with a view to their inclusion in an indexed database in order to contribute to the existing literature and to help with finance. an in-depth look at chatbots [51].

In addition to providing a solid and up-to-date review, it also aimed to provide a one-stop repository for finance and researchers interested in the use of chatbots, as well as provide insight into future research direction revealed that the implementation of chatbots in banking and finance, can improve the quality of service to users, productivity and the proportion of satisfied users, as well as reducing the human workload report that the implementation of chatbots can help customers living in remote areas to receive adapted services and bring modernity, efficiency and intimacy. Examine a variety of factors that influence risk, including type of service and its pricing plan, infrastructure, quality level, and number of users before chatbot implementation [47]. Also Author read and reported that chatbot services for legacy products have a positive impact on banks' bottom line show that health insurers, supported by a strong knowledge base, seek new technological opportunities to improve innovative products [48, 50]. Additionally, important influencing factors have been identified that can serve as guidelines for future chatbot implementations [48, 49].

In summary, the articles included in this study focused mainly on the conversational aspects of chatbot use in the financial sector. Value of a Chatbot System in Market. During the study found the benefits of implementing chatbots in finance and banking such as improved decision making, customer service, productivity, efficiency, resource management, etc.

5.4 CAAS (Chatbot as a Service) in E-Commerce Sector

E-commerce sector boosted by the COVID-19 pandemic forced to accelerate digital transformation, bring traditional offline services online to exist in the world, 65% of retail businesses use artificial intelligence, E-commerce using chatbots [2, 51]. The factors that determine consumer acceptance are studied [52–54] forecast and production Management [55], Image Annotation Accuracy Using Machine Learning (ML) [31, 55, 56] and “conversational agents”, also called “chatbots” [57]. Chatbots can provide a personalized shopping experience across physical and online channels [11, 57] and

promote consumer well-being. But the biggest challenge remains the complexity is that the effectiveness of human language and chatbots conversation.

Chatbots can be considered necessary, relevant Many interface elements for shopping e-commerce Exploratory tasks, such as giving advice and search large catalogs, completing virtual Fitting Room Features, and Delivery Customers services.

When designing and adopting, chatbots In the consumer journey, [58] Lights that retailers may already want to choose from design a chatbot platform or design their own; From a technical point of view, a conversational proxy is designed to mimic natural language; however, the analysis Skills still need to be learned from consumer data and social media (for example, instant messengers like Facebook Messenger) and voice-based artificial intelligence (using speech recognition) Like Siri and Alexa, the most used Platforms.

Gender differences were also observed in commercial consumers. e-commerce, demonstrating the increased use of chatbots by women. There are four main events:

More complete, authentic, and professional diploma Retail chatbots need store object datasets that must be more broadly educated and reliable: Since there are no large out-of-the-box public datasets, [59] or manual data collection from clothing brand websites and Facebook messages and comments. Others such as [60] proposed to transfer the knowledge of the richest region.

Application of chatbots in specific e-commerce Multimedia conversations, etc. (for example, text, sound, and image): [58] also shows a lack of innovative technology in the luxury industry.

Let the chatbot ask the user for their preferences and [60] proposed a multimodal chatbot to Gather the user's visual and textual clothing needs. Future work may include chatbot recovery and Better recommending users' short-term and long-term preferences for commercial products. 3) Chatbot integration with other trading apps at the different stages of the consumer journey: Because chatbots can provide personal information and Make consumers aware of their journey [61], studies examining this integration, such as Try almost the last recommended item, show Potential. Another opportunity is the integration Use of augmented reality (AR) - like virtual fit Indoor applications (VFR). ECommerce Comparison Applications that use chatbots and applications that use augmented reality but they don't recommend combining the two Serve commercially.

In Summary, this misconception can lead to the belief that a chatbot should respond in the same way as another person. eCommerce chatbots continuously flourish to enchant their clients with unparalleled involvement. Building a chatbot for e-commerce can take your deals to another level. With an e-commerce chatbot, it is possible to construct compatibility together with the customers and eventually support loyalty. Using one of the built-in frameworks, it is fair a couple of clicks are absent from the beginning to engage the clients, giving them valuable information, and interesting deals.

5.5 CAAS (Chatbot as a Service) as a General Chatbot

For users who do not understand the basics of programming and come from a specific non-technical background. Need a chatbot without any deep technical knowledge, the best option is to choose a chatbot that provides the available service online [72, 73]. With the dramatic increase in the use of chatbots in business and enterprise applications,

and many large enterprises came up with this solution. Some of them listed are Popular services from trusted IT giants.

- Google's conversation stream (DialogFlow) [75]
- Wit.ai from Facebook [75]
- Microsoft LUIS [74]
- IBM's Watson [76]

DialogFlow (formerly Api.ai, Speacktoit) is a human-computer interaction technology developer based on natural language dialogue under Google. The company is known for creating Assistant (developed by Speacktoit), a virtual companion for Android, iOS, and Windows Phone smartphones that can perform tasks and answer user questions in natural language. Speacktoit also creates a natural language processing engine that includes conversational context such as conversation history, location, and user preferences.

Wit.ai is an open-source chatbot framework with advanced natural language processing or NLP capabilities. Wit.ai is owned by Facebook and is a popular choice for NLP-enabled Facebook Messenger bots. Use Wit.ai to create smart chatbots for social channels, mobile apps, websites, and IoT devices.

Microsoft LUIS Language Understanding Information Services (LUIS) is a domain-specific AI engine developed by Microsoft. This enables natural language and knowledge processing using intent models and predefined domain entities. Find the sentence intent and run LUIS NLP on Big Data. In conversation, he aims to define, "Explain user goals" (intents) and extract actionable insights from data (entities).

According to natural language models, active learning is often used. The template starts with a list of common users' intent, such as "book a flight" or "contact helpdesk". Example sentences distributed by the user are called utterances. Once the intention is established, a statement is made.

The statement is then marked with the basic data that LUIS expects the user to extract from the statement. After forming, A prototype is formed and drafted, and complaints are ready to be received and processed.

IBM Watson is a rules-based AI chatbot created by IBM's DeepQA extend. it's for Information recovery and question-answering framework combining normal dialect handling and machine learning layered approach. Watson employs an assortment of components, such as title, date, geographic area or other substances distinguish and allot property values to produced reactions. At that point, the machine learning framework learns How to combine the values of these properties into the ultimate score for each reply. Based on this positioning, it positions everybody's conceivable answers and chooses one as the finest reply. Watson's underlying cognitive computing innovation has boundless employment.

Evaluate chatbots using statistics. Metrics are quantifiable metrics used to evaluate business processes. In the context of chatbots, benchmarks are metrics for evaluating the performance of bots. Several criteria can help design an effective chatbot, some of which are discussed below [77].

Table 2. Metrics Evaluation

Metrics	Dialogflow	Wit.ai	LUIS	Watson
Blue Test	Yes	Yes	Yes	Yes
Scalability	Passed	Passed	Passed	Passed
Inter-operability	High	Medium	Medium	Low
Speed	Hight	Medium	Low	Medium

- **Blue Score:** The Prime method, Bilingual Evaluation Study Score (BLUE) is a method that compares the generated word sequence to a reference order.

The BLEU score was proposed by Kishore Papineni in 2002 and was originally only used for translation tasks. The benefits of BLOU scores are:

- Easy to calculate and inexpensive
- Language independent
- Highly correlated with people’s ratings

The BLUE score works by adding the corresponding n-gram user text to the n-gram reference text. The higher the BLUE score, the smarter the chatbot.

- **Scalability:** If the number of chatbots is large, it is said to be more scalable. users and add-ons. A good chatbot can work in any environment [79].
- **Interoperability:** Interoperability is the ability of systems to exchange and use information. An interoperable chatbot should support multiple channels and allow users to quickly switch between channels [79].
- **Speed:** When it comes to speed, measuring a chatbot’s response rate plays an important role. A good chatbot should be able to provide answers quickly [80] (Table 2).

In Summary, these chatbots have a fixed set of rules, pattern-based matches, and a really basic machine-learning strategy has risen. Current chatbots ask questions about the user’s topic and clarify or advise in a limited way. Chatbot simply collects information from the knowledge base and provides answers. Based on previous answers, A chatbot must be able to ask questions with human intent. When properly trained, chatbots can understand people’s natural languages and respond appropriately to any situation.

6 Overall Conclusion

In this survey article, several chosen 32 articles have been covered within the literature survey, concentrating fundamentally on Chatbot plan strategies within the period specified. A survey of selected studies that affected chatbot design has been discussed, and the contribution of each study has been identified. From the above study, due to

the extent of strategies and approaches utilized to construct a Chatbot, it can be said that the development and headway of Chatbot design are expanding at an unsurprising pace. In addition, in the selected studies, chatbots designed for dialogue systems are, in general, limited to unique applications. By developing more robust knowledge bases, general-purpose chatbots need improvements.

This study also examined the chatbot research papers that have applied the aforementioned technologies and classified them into various categories.

There are two main points in this area of research: how well chatbots can understand user messages and how well chatbots can provide context-correct answers. Let's think about the time when the chatbot is very advanced; users will not be able to recognize what they are talking about chatbot. People will get used to chatting with chatbots and it will become as natural as chatting with other people.

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