

Research on Intelligent Chat Robot

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Abstract

Intelligent chat robot has created a variety of new methods of customer participation and enterprise development. Unlike humans, artificial intelligence enables chat robots to work around the clock. With the help of this feature, enterprises can greatly reduce their response time and simplified tasks, and at the same time, it can help enterprises perform the same tasks many times in a cost-effective way. In the future, intelligent chat robots will be famous for providing instant customer service and enhancing brand value.

Keywords

Intelligent Recognition; Chat Robot; Artificial Intelligence.

1. Preface

Nowadays, enterprises are faced with many difficulties, such as difficulty in recruiting talents, high recruitment cost, slow growth of employees, fierce market competition, high labor cost, low labor efficiency, high staff turnover rate and low enterprise profit. How to reduce operating costs, improve employee stability rate, improve corporate profits, so that the long-term development of enterprises, it has become an urgent problem for enterprises to solve.

In the national two sessions in 2019, Premier Li listed "deepening the research and development and application of artificial intelligence technology in 2019" in the government work report, and listed artificial intelligence three times in the three-year government work report from 2017 to 2019, which shows the government's concern and attention to artificial intelligence technology. In this industry background and policy background, intelligent chat voice robot, born.

Globally, AI has the potential to provide meaningful communication facilities between users and service providers. Users usually interact with chat robots through the platform through the communication channel connected to the network. Intelligent chat robot has created a variety of new methods of customer participation and enterprise development. Unlike humans, artificial intelligence enables chat robots to work around the clock. With the help of this feature, enterprises can greatly reduce their response time and simplified tasks, and at the same time, it can help enterprises perform the same tasks many times in a cost-effective way. There is no doubt that the intelligent chat robot provides many advantages, just like the intelligent chat robot can be on standby 24 hours a day, and as a dedicated resource to provide customers with the services they really need. Intelligent chat robot is famous for providing instant customer service and enhancing brand value.

2. Research Status at Home and Abroad

Compared with the field of artificial intelligence, the work on intelligent robot chat has been carried out for a long time. The purpose is to attract users to continue chatting with them. This is usually a means to control the chat, to control the content and progress of the conversation. However, as the preliminary research is limited to computer capability and knowledge base, all

artificial intelligence experiments are relatively small in scale. Therefore, designers will limit the content of the conversation to a specific expert system field to reduce the difficulty.

However, with the development of information technology in 1995, the rapid enhancement of the computing power of search engine companies such as Baidu and Google, as well as the rapid development of the Internet industry and the rapid popularization of mobile terminals in 2005, under the joint action of intelligent robot chat or intelligent query system, it has been pushed to the peak, and the research progress is also worthy of attention.

Due to the early research on AI chat robots and Q & A systems, a series of mature chat systems have been developed for users, such as apple Siri, Microsoft Cortana, Facebook Messenger, Google assistant, etc.

These interdisciplinary AI robots use the company's technology accumulation in big data, natural semantic analysis, machine learning and deep neural network to complete and shape their own real and interesting corpus. Through continuous training, they can understand the semantic and contextual information in dialog data. In addition to answering common human-computer interaction questions, they can also realize natural intelligent interaction, bringing convenience and fun to users.

Compared with foreign countries, there is a big gap in the investment scope and research level in the field of intelligent chat in China, and the research results are not significant. However, there are still a series of universities with remarkable achievements in this field, including Tsinghua University, Institute of computing, University of Hong Kong, Chinese University of Hong Kong and Harbin Institute of technology. Among them, the research of universities in this field mainly focuses on the development of NLP tools, such as hit tools (Chinese vocabulary analysis, syntax analysis and grammar analysis) of Harbin Institute of technology and CQAs Chinese question answering system of Taiwan National Defense University (focusing on the processing and relationship of named entities).

3. Project Content

3.1. Original Design Intention

Based on the social needs and the application value of the products, the intelligent chat robot is designed and developed to solve the defects of similar products.

3.2. Specific Steps of Function Design

Intelligent chat robot can chat with people naturally and happily after speech recognition is successful. Intelligent chat robot mainly includes recognition (face recognition, speech recognition), training, context integration, intelligent control, Multi-sensor information fusion.

3.2.1. Recognition Stage (Face Recognition, Speech Recognition)

Face recognition samples face features, extracts its unique features and converts them into digital codes, and further forms these codes into feature templates. When people interact with the recognition system for identity authentication, the recognition system compares its features with the feature templates in the database to determine whether they match, and then decides to accept or reject the instructions of the person. Speech recognition means that robots can transform speech signals into corresponding texts or commands through the process of recognition and understanding. In the recognition stage, the feature vector of the input speech is compared with each template in the template library in sequence, and the one with the highest similarity is output as the recognition result. When the robot hears the speech, it first processes the original speech, partially eliminating the influence of noise and different speakers, so that the processed signal can better reflect the essential characteristics of the speech.

3.2.2. Training Phase

In the training stage, the user will say every word in the vocabulary once in turn, and will characteristic vectorSave it as a template in the template library.

3.2.3. Context Integration Stage

Context integration means that the system needs to continuously integrate physical context and language context in the training process to generate a more sensible reply. The most common example of language environment is that in long conversations, people will record what they have said and the information they have exchanged with each other. The most common method is to embed the conversation into a vector, which may also need to integrate other types of context data, such as date, time, location or user information.

3.2.4. Intelligent Control Stage

Intelligent control is a process in which intelligent machines achieve their goals autonomously. Robots can learn autonomously and make decisions autonomously according to the instructions they get.

3.2.5. Multi-sensor Information Fusion Stage

Multi-sensor information fusion is an information processing process that uses computer technology to automatically analyze and synthesize information and data from multiple sensors or multiple sources under certain criteria to complete the required decision-making and estimation. Finally, we can communicate with users and execute relevant instructions.

4. Challenges and Prospects

With the breakthrough of artificial intelligence technology and the improvement of health big data, chat robot, as a resource to communicate emotions with people, will partially alleviate the shortage of human resources, and gradually become an important part of intelligent, information and digital chat construction, increasing the accessibility of services. However, at present, most dialogue systems are in the stage of program development, testing and evaluation, and the problems of technology, application effect and ethics in the application process still need to be solved urgently.

4.1. Technical Aspects

The most common problem of chat robots in the field of information technology is the inaccuracy of speech recognition, which is caused by noise interference, input syntax errors, different input speeds, nonstandard accent, dialect, multilingual recognition and so on. This is an urgent problem to be solved, which will also lead to an increase in the use cost. It is suggested that in the future design of chat bots, according to the different characteristics of users, different operating systems of chat bots should be designed to enrich the corpus, so as to improve the breadth and depth of conversation, improve the context awareness of chat content, design different voice or text intervention content, improve the user experience and further expand the applicable group.

4.2. Ethical Aspects

Some chat robots with low anthropomorphism still respond mechanically to people's empathy, and a single repeated answer can't really achieve emotional comfort and spiritual companionship. In the process of interaction, the unreality of artificial emotion and the authenticity of human emotion are easily out of balance, and human emotion feedback to computer is more abundant, which leads to one-way relationship in emotional dimension. In addition, like other artificial intelligence products currently in use, the security of personal privacy information, the security of data transmission and storage, the responsibility determination of nursing accidents when using chat robots, and the supervision of artificial

intelligence algorithms need to be regulated by laws and regulations. It is suggested that the multi-level judgment structure of ethics and the ethical framework of human-computer interaction should be established when developing robot system, and emotion analysis technology should be introduced into the dialogue system to improve the diversity and fidelity of intelligent interaction technology applied in virtual reality.

5. Implementation Method and Process

The literature review process of this paper combines three stages of effective literature review process and literature retrieval process, as shown in Figure 1. In addition, the scientific research of intelligent machines is interdisciplinary. The research in the field of digital marketing may lead to some basic questions, which may be answered in the fields of consumer psychology, marketing analysis, economics, computer science or machine behavior. This paper hopes to objectively capture all the key substantive research progress of chat robots in digital marketing through as many comprehensive and representative databases as possible.

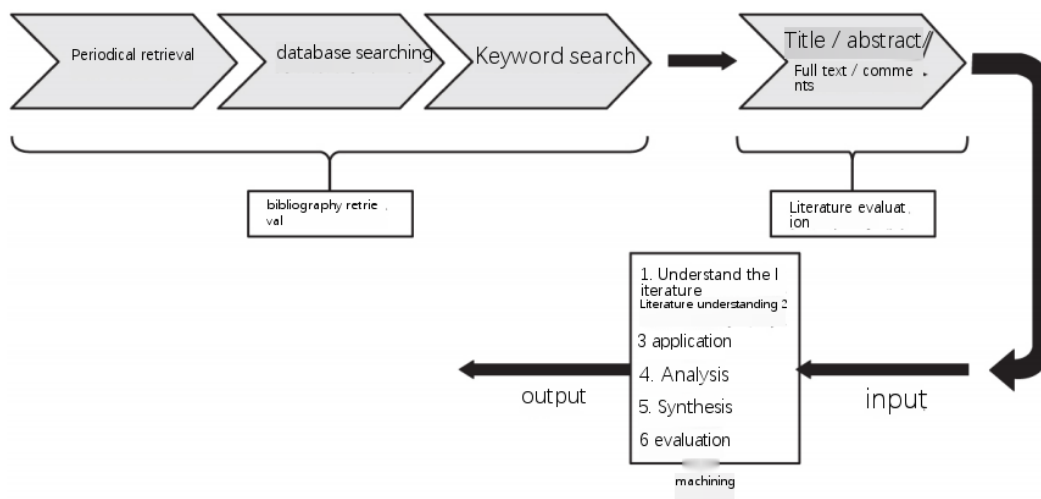


Fig 1. Literature review process

6. Conclusion

There is no doubt that intelligent chat robot provides many advantages, such as intelligent chat robot can stand by all the time and serve as a special resource to provide customers with the services they really need. This paper mainly sorts out the related knowledge of intelligent robot, expounds the core of intelligent robot realization, and analyzes its development and existing problems. It lays a solid foundation for the future research of intelligent robots.

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