Research on the Development of Voice Assistants in the Era of Artificial Intelligence

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Abstract. Voice assistants have gradually occupied an important position in the products of many electronics companies. Artificial Intelligence voice assistants are able to interpret human speech and respond. Users can ask their assistant questions and manage other essential tasks such as email calendars through verbal commands. This paper analyzes the artificial intelligence voice assistant through the method of comparative analysis. The author studies the development situation of intelligent voice assistants, and compares the differences between Chinese and foreign voice assistants, and finally discusses the relationship between voice intelligent assistants and people's lives. The author found that users in different countries have different functional preferences for using voice assistants, but they can help people's work and life to a great extent. In other words, voice assistants play an important role in contemporary society. Therefore, people need to better understand the relationship between humans and machine

1 Introduction

In recent years, with the gradual development of science and technology, people have changed the lifestyle of finding information in the library when they have a problem. Now people can directly know the answer to the question by using a search engine or artificial intelligence voice assistants. For example, when people use iPhone mobile phones, they often use the siri function. Users only need to activate Siri's voice assistant function and use some simple voice commands to query information, make calls, send information, get directions and play music. It can be seen that siri, as an artificial voice assistant, has completed the work of personal assistant to a certain extent. The data that used to be calculated by the human brain has been superseded by machines, and artificial intelligence is a machine that can imitation human responses. In fact, artificial intelligence voice assistants are based on applications, which often using voice commands to answer users' questions and perform tasks. This interaction is mainly achieved through voice assistants and automatic speech recognition systems that output a set of words or sentences for text by recognizing and transforming the input speech fragments [1][2].

There are also many devices in people's daily life, such as Apple's Siri, Xiaomi's Xiao Ai classmate, home assistant, map navigation assistance and so on. Awakened by means of voice response voice assistant to be in a position to better help people's lives conveniently. People can make their lives better by utilizing the functions of voice assistants. Obviously, the relationship between artificial intelligence voice assistants and humans is getting closer and closer, and it has also led people to

reflect on whether voice assistants can replace humans and whether humans will have feelings for voice assistants. This article will explore the types of imitation voice assistants and their impact on people's lives through the research methods of literature review and comparative analysis, and further explains whether humans will develop emotions for artificial voice assistants. The author will first introduce the development and classification of voice assistants, compare the differences between Chinese and foreign voice assistants, and then describe the advantages and disadvantages of voice assistants. By studying the related performance and differences of voice assistant, it can help people better understand the relationship between artificial voice assistant and human.

2 Development of artificial intelligence voice assistant

2.1 Definition of artificial intelligence voice assistant

Artificial intelligence voice assistant is a type of speech semantic application technology which is mainly applied to speech recognition, semantic understanding, speech synthesis and other intelligent speech semantic application technology in electronic devices. Users no longer need to manually operate, and can use many operations simply by giving instructions to the voice assistant. The voice assistant understands the user's needs from the user's language instructions and completes the corresponding tasks for the user. By utilising the voice assistant, the user's experience of using electronic

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products such as mobile phones is better. In recent years, voice interactive technology has become the key development direction of artificial intelligence technology. Since Apple launched Siri in 2011, various electronics companies have imitated Siri's voice assistant mode and added the voice assistant function to the company's products, such as Xiaomi's Xiaoai classmate, Google Assistant, Baidu Map voice. These companies are also promoting the implementation of voice interaction technology in people's lives. According to the survey data of China Telecom Terminal Research and Test Center, the user awareness rate of voice assistant is as high as 95.6%, and the use rate is 58.6% [3]. More than half of mobile phone users use voice assistance in their daily life. Obviously, artificial voice intelligent assistant is playing an increasingly important role.
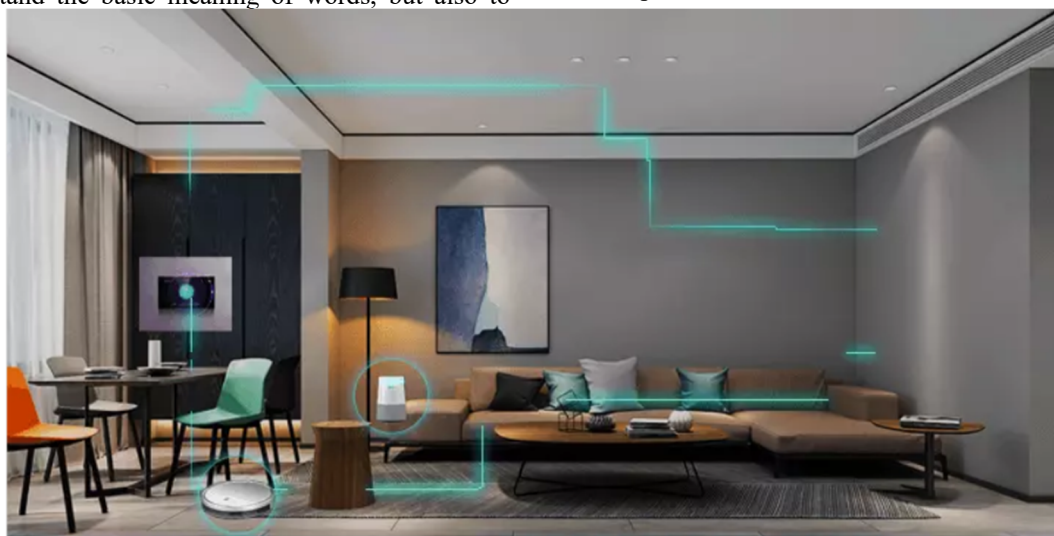
In the past 60 years, the technology of voice assistants has developed rapidly. From the combination of three robust acoustic models at the beginning, the accuracy rate of voice assistants has reached the level of human stenographers, reaching 95% accuracy. Users often use the speech-to-text feature, which allows people on the go to send messages and take shorthand. Amazon launched smart speakers, which connect apps on smart phones with furniture in daily life, opening up a broader space for voice interaction and occupying a larger market. The reason for the success of Amazon speaker is the fact that it can truly interact with dialogue, which is the most requested feature of today's social users [4]. Definitely, the understanding of natural language does not only require the voice assistant to understand the basic meaning of words, but also to

understand the deep meaning of sentences through in-depth research and learning, and to connect sentences with each other.

2.2 The development of intelligent voice assistants in China and foreign

2.2.1 China

In China, Internet companies have gradually formed a complete industrial chain of voice intelligent assistant products through intra-industry cooperation. Among them, Baidu, Alibaba and Tencent occupy a sizable market share. These companies also have many products for the application of intelligent voice technology. Companies for users in the daily life of the things need in-depth research, and make efforts to transform these products. In the field of home furnishing, these companies also have certain development. Baidu has launched Baidu IHome, and Alibaba has also launched Tmall series. In addition to these companies, there are many other Chinese companies that have developed products related to intelligent voice assistants[5]. For instance, Haier's voice assistant connects 10 types of smart home appliances under Haier's air conditioners, sweepers, ovens, and water heaters through voice interaction. Users only need to send commands to Haier's intelligent voice system, and Haier's smart home products can operate at any time[9]. Figure 1 shows that the central voice-controlled device can be used to accept commands and link other home devices.

Fig.1. Haier Smart Home Voice Control Device Demonstration[9]

In recent years, people cease to be satisfied with single intelligent voice technology. Intelligent companies gradually began to transform and develop towards technical services. Technology service providers represented by IFlytek began to promote new products. IFlytek advocates innovative and original product development. The current research and development direction are in the two directions of perceptual intelligence and cognitive intelligence. Many online application platforms have also used IFlytek, such as AutoNavi, Didi Chuxing and Ctrip. Recently, IFlytek has

continuously increased investment in R&D funds for innovation[6]. In the past five years, IFlytek's product revenue has tripled, which also proves that IFlytek's innovative products are increasingly in line with people's needs.

2.2.2 Foreign

In foreign countries, four major intelligent voice assistants of Amazon, Apple, Google and Microsoft occupy the main market. Among them, Amazon's Alexa and Google's

Google assistant is developing more rapidly. These voice assistants can support and accurately apply to the current mainstream demand functions, speech recognition, semantic analysis and so on.These four voice assistant companies are also constantly changing the core of their product concepts according to different user needs, striving to find suitable market groups and occupying leading positions in diverse markets[5].

As a well-known company in the smart phone market, Apple's products are primarily aimed at its own product series. Siri is mainly applied in Apple's built-in, which is conducive to Apple's promotion to users with the help of Apple's series of products. This kind of intelligent voice assistant is more suitable for users who buy Apple's companion device. Microsoft's Cortana is more associated with the PC. Cortana lets users experience when their phone and computer work together. For people who use the voice assistant for office work, Cortana will help them have a better experience at work than Siri, which is more used in daily life.

Google, as the world's largest search engine, has a strong technical hand in Google assistant. Google Assistant is a virtual assistant software application designed by Google, primarily for mobile and home automation devices. Based on artificial intelligence, Google assistant can hold two-way conversations, unlike Google Now, the company's previous virtual assistant. Google assistant has the most powerful technical advantage over the previous two voice assistants, making it easier to search for information. Google assistant will analyze the user's preferences built on the user's search frequency and provide users with more valuable information. For example, a new "humming search" feature will develop by Google in 2020 will allow users to find songs simply by humming, whistling or singing.

Amazon holds the largest share of the facetious voice market. In 2014, it developed Alexa, a sarcastic voice recognition system, which leads all smart voice assistant companies to become the market leader. Amazon has combined the company's appliances with a voice assistant to make a feature-rich product. Amazon no longer keeps Alexa's voice technology private, but instead provides it to third-party platforms[5]. Through cooperation with other platforms, Alexa has mastered multiple skills in a short period of time, occupying an important position in intelligent voice assistance products.

2.3 Difference analysis of voice assistants in different countries

The Chinese company's products are more aimed at users' personal daily use, such as smart home and map navigation. And foreign intelligent voice assistant companies pay more attention to office use, such as the arrangement of some company meetings. In general, the voice assistants in each country are different, and there is no uniform evaluation standard. The user experience of using a voice assistant is also different. In Germany, most users rated voice assistants lower than in the UK, Italy and Spain. Reviews from these users also reflect the level of development of a country's voice assistants [7]. In contrast,

the usage rate of Chinese language assistants is relatively high, and users' evaluation of voice assistants is also relatively high. On the one hand, China has a relatively large base using mobile devices, and the number of users is also relatively large. On the other hand, Chinese companies attach great importance to the publicity of the use of voice assistant functions, which has promoted more people to use convenient software such as voice assistants.

3 Discussion

Voice assistants have begun to integrate into people's lives. It has a positive effect on the society as well as on the individual. For office, artificial intelligence voice assistant can help people work efficiently. For individuals, voice assistants can not only provide convenience in life. To a certain extent, it can make up for the lack of people's emotions. Some people are willing to chat with a voice assistant after they start using it, which also has a lot to do with the faster pace of life. While voice assistants are not as emotionally rich as people, voice assistants can be a qualified listener. It can also be seen that people have emotional dependence on voice assistants. In addition to people's reliance on voice assistants, the development of voice assistant technology also involves emotional issues. For example, the fact that Apple's voice assistant Siri married Amazon's voice assistant Alexa, although a marketing ploy, has also raised questions about whether voice assistants have feelings[8]. Although it is known that artificial intelligence voice assistants are generated by computer programming. But with the development and progress of science and technology, it will be a question worth thinking about whether artificial intelligence will appear human emotions autonomously.

4 Conclusion

In conclusion, with the gradual development of voice assistant, voice assistants are increasingly affecting people's lives. This paper analyzes the current status of the booming and broad development status of artificial intelligence voice assistant. This paper compares the voice assistant products of different companies in China and foreign countries. The author found that China pays more attention to voice assistant products related to life, while foreign customers prefer to use voice assistant products at work. With the development of technology, the relationship between artificial language assistants and humans will become closer and closer. The research method of this article is relatively limited. In the future research, the author will use more research methods such as questionnaires and interviews to better understand the views of artificial voice assistants in people's minds.

Acknowledgements

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