Speech recognition method based on artificial intelligence

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Abstract: After entering the 21st century, computers and networks play an increasingly important role in people's lives. He has already influenced people's lifestyles and habits. At present, with the continuous improvement of the level of informatization, artificial intelligence technology has matured, and the corresponding speech recognition has high accuracy and practicability, which can provide strong support for modern human-computer interaction. On mobile phones, automobiles and home appliances, voice recognition systems are now installed, which is convenient for people to operate, and voice recognition has become an ineviTable trend in the current electronic product market. Based on this, this paper starts with the overview of artificial intelligence, first analyzes the speech recognition method based on artificial intelligence, and then explores the development prospect of artificial intelligence speech recognition. It is hoped that it can provide some reference for the related research of artificial intelligence speech recognition.

1. Overview of artificial intelligence

In a strict sense, artificial intelligence belongs to a branch of computer. It mainly gives the theory and method of computer science, and intelligently recognizes text, image, sound and other information through logical algorithms. Since the birth of artificial intelligence, the field of its application has been continuously expanding. Moreover, with the help of computer systems, artificial intelligence has powerful information processing capabilities, can respond quickly in a short period of time, and is of great help to modern simulation and model building.

Artificial intelligence has an irreplaceable advantage in some respects. With the huge computing power, humans have developed a variety of artificial intelligence software, such as Deep Blue and Alpha Go, who can defeat the top players of human Go, which proves artificial intelligence. Its own advantages. Moreover, in the current practical application. Artificial intelligence plays an extremely important role in autonomous driving, expert systems, intelligent search engines and data mining. For this reason, humans have completed many scientific explorations with artificial intelligence. In addition, artificial intelligence plays an important role in the field of economics. It can promote the development of industrial networks and manage industrial production in a more modern way.

2. Artificial intelligence based speech recognition method

The artificial intelligence-based speech recognition system mainly uses the deep neural network as a model to simulate human perception of external information. Especially with the rapid development of Internet technology, the current artificial intelligence has penetrated into every aspect of people's lives. Therefore, the corresponding artificial intelligence speech recognition also has a large amount of original sound data, which can provide the perfect deep neural network for subsequent development. Support to meet diverse speech recognition needs.

2.1 Speech Picking and Feature Extraction

Speech recognition based on artificial intelligence first picks up the voice. At this time, the voice information is collected by the sound card of the computer system, and then the collected voice

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information is converted into digital information through a specific algorithm. Generally, in this process, preprocessing is performed according to the start and end of the speech information, and the entire recognition process is very rapid, and the transformation also has a mature algorithm. After the completion of the picking up of the voice information, the corresponding features are extracted, and the voice information has a specific recognition method. In the process of conversion, a specific mark is given according to the pronunciation, and then the subsequent feature extraction can be based on the corresponding mark. To effectively identify useful information. Of course, the whole process also includes the screening of voice information, which is mainly to influence the whole recognition process except the unrelated factors, which can effectively improve the accuracy of speech recognition. The pickup and feature extraction of speech is the key to speech recognition, and this process is also the core process of the input signal, so it is necessary to focus on the control. In the current specific application, a variety of methods have been adopted to enhance the accuracy of speech recognition, and the characteristics of speech have been meticulously classified. In this way, the accuracy of speech pickup can be significantly improved, while the features of speech are The judgment is more accurate.

2.2 Analog sound training and recognition judgment

The speech recognition of artificial intelligence also includes the content of simulation training and speech recognition. The simulation training mainly uses the same clustering method to obtain the speech parameters, and in the process, the obtained parameters are saved as a template, and then the reference database The template inside is used to compare and identify the information, and the information with the highest similarity is used as the final output. There are many ways to achieve this process. Firstly, the speech feature is directly extracted and then saved as a template. The whole process can effectively extract the input speech information and training features. In this case, the vector sequence is needed to compare the storage. The template is finally determined by the minimum required character. Of course, although this method can respond quickly, due to the difference in information, the accuracy of matching when identifying the template signal is relatively low. Secondly, the state map is used to identify and store Chinese characters. This method can use standard training to arrange information. The advantage is that the information is converted by the maximum output probability. Moreover, in the process of digital information conversion, there will be specific values to seek the optimal recognition method. In this recognition method, the form of integral method is used, and the attitude model is used to effectively recognize Chinese characters, so its recognition Higher accuracy. The last method is to use dynamic time matching to perform speech recognition. In the application of this method, the digital information of speech conversion is first segmented, and the average of each feature sub-sequence is solved, and then the vector is obtained. template. This method has a higher processing accuracy, but the corresponding reaction time is longer due to the need for decomposition processing.

In the process of artificial intelligence speech recognition, after the speech information is converted into specific digital information, it is also necessary to perform recognition and judgment, so that it can be determined whether the speech recognition conforms to the reality. Generally speaking, the result of the whole recognition is input into the expert knowledge base, and the content is identified according to the background knowledge, the word formation rules and the grammatical semantics. The judgment of the result is also correspondingly corrected, and the speech recognition can be made by the recognition judgment. The intelligence is further improved.

2.3 Auxiliary function of artificial intelligence speech recognition

Speech recognition based on artificial intelligence also needs to use auxiliary functions to effectively improve the accuracy of recognition. The specific auxiliary functions are as follows:

(1) Noise filter. Noise filters are used to eliminate noise in voice messages because they can be accompanied by ambient noise when making voice commands, which can reduce the accuracy of the recognition. Therefore, a noise filter is added in the modern speech recognition system to eliminate the environmental noise and make the input of the speech information more complete and

independent, so that the accuracy of subsequent recognition can be effectively improved.

(2) Pre-emphasis. The strength of the speech signal may have different differences. In order to effectively improve the accuracy of the recognition, a pre-emphasis is also included in the speech recognition system. It emphasizes the voice information after noise reduction processing, which can facilitate subsequent voice information conversion and recognition. This is because voice information has a great relationship with people's pronunciation habits, and in order to express emotions, people will aggravate or reduce specific words. Although this is an important expression of language and culture, it also increases speech recognition to some extent. Difficulty. Therefore, the pre-emphasis can effectively balance the voice information, so that the input voice information is more gradual, so that the accuracy of the recognition can be effectively improved.

(3) Speech library. The artificial intelligence-based speech recognition needs to be completed with complex algorithms when processing speech information. At this time, it can be improved by means of the speech library, because specific instructions or pronunciations are often the most commonly used types, and these types are directly It is summarized in the speech library and can effectively simplify the process of recognition. When the speech recognition system receives the external speech signal, if it is similar or identical to a specific arrangement in the speech library, the result corresponding to the specific sequence in the speech library can be directly output, which can not only effectively improve the efficiency of speech recognition, but also identify Precision is also greatly guaranteed.

(4) Strengthen the learning system. The reinforcement learning system utilizes the principles of psychology to perfect the entire system of speech recognition in a positively motivated manner. For example, in a specific scenario, if the speech recognition system implements recognition, then a positive stimulus is obtained, each step of the process is marked, and the results are weighted. In this way, the deep neural network can be effectively improved, and the speech recognition of artificial intelligence is continuously strengthened in the development. This approach has its own advantages and disadvantages. The flaw is that reinforcement learning requires a lot of mistakes to make simple tasks complete quickly, but its advantage is that after sufficient value data input, reinforcement learning can get the optimal solution. At present, the artificial intelligence-based speech recognition system is building a deep learning network, which uses the powerful computing power of the computer to continuously improve the training, analyzes the output of specific problems from the data, and gives artificial labor in this way. Identifying a broader development space can significantly improve the accuracy of speech recognition, while also making the speech recognition system more intelligent.

3. Artificial intelligence speech recognition development prospects

Due to the rapid development of computer technology, artificial intelligence has grown up in a short period of time, and artificial intelligence-based speech recognition has also spread rapidly, which has affected all aspects of people's lives. Especially in modern electronic products, the experience of human-computer interaction is very important, and speech recognition becomes an indispensable part. Through speech recognition, the signal input process can be effectively simplified, people's hands can be liberated, and a better experience can be obtained in human-computer interaction. Therefore, speech recognition is still being explored and improved in the current application. Combined with the current actual situation, in the future development, the direction of artificial intelligence speech recognition is mainly reflected in the following aspects:

(1) Diversified and personalized services. At present, the artificial intelligence-based speech recognition technology has matured initially. In the subsequent development, it is mainly to improve its accuracy, and it will be committed to providing diversified and personalized services. Only in this way can the market be better occupied. Voice recognition based on artificial intelligence should improve the corresponding voice service mode. It is best to build a mature industry chain. When people input voice commands, they can be executed through the network. This involves signal feedback and subsequent command execution. Among them, there are many technical difficulties,

and they still need constant exploration and improvement.

(2) Perception and cognitive ability of speech recognition. The development of artificial intelligence speech will continue to expand the connotation in the follow-up, so it will also increase the cognitive and cognitive level of technology, no longer stay in the simple command recognition, which will make people's expression easier, and can effectively enhance The service capability of artificial intelligence speech recognition. At present, the related technologies of speech recognition have been introduced in the fields of real estate, e-commerce, automobile, insurance, finance and education, but the overall application is relatively basic, so in the future development, it will inevitably start from the increase of connotation and continuously improve the speech. The identified service capabilities allow the user's emotions and commands to be better perceived by the computer system, so that subsequent executions are more humane.

Artificial intelligence speech recognition currently has an extremely wide market. It is a high-end embodiment of artificial intelligence. Therefore, major network companies have joined the development of speech recognition systems to make all kinds of software more perfect and mature. In order to effectively promote the development of artificial intelligence related technologies, government departments at all levels have also issued corresponding policies, which further accelerate the development of speech recognition. It is also based on this large environment that artificial intelligence will penetrate into more fields in the future development. For example, current mobile phones are striving to include intelligent speech recognition in the home smart voice ecosystem, which enables voice recognition to provide better services.

4. Conclusion

Speech recognition based on artificial intelligence has a wide range of applications at present, which effectively changes the traditional command input mode, which can make the operation of electronic products more humanized. Moreover, speech recognition can be applied to various fields such as education and finance, which can greatly facilitate people's lives. Therefore, in a short period of time, artificial intelligence speech recognition has developed rapidly, and it has matured at present, and a corresponding system has been formed. Based on this, this paper focuses on the analysis of artificial intelligence speech recognition methods, from the three aspects of speech pickup and feature extraction, analog sound training and recognition judgment and artificial intelligence speech recognition, and combined with the current reality. The situation analyzes the future development of artificial intelligence speech recognition, and hopes to provide a certain direction for the related research of artificial intelligence speech.

References

[1] Li Shengnan. Research on the analysis framework of classroom teaching behavior based on artificial intelligence technology [D]. Beijing University of Posts and Telecommunications, 2019.

[2] Mu Baoliang. Speech Recognition Method Based on Deep Learning[J]. Information and Computer (Theoretical Edition), 2018(22): 154-155.

[3] Xiong Xiaoqian. Research on speech recognition method, device and system based on artificial intelligence[J].Science and Technology Information, 2018,16(03):17-18.

[4] Bi Mengxi. Research on anti-noise robust speech recognition based on deep convolutional neural network [D]. Shanghai Jiaotong University, 2017.

[5] Zhang Xueyuan. Research on related technology of service robot interactive platform based on artificial psychology [D]. Beijing University of Science and Technology, 2007.

[6] Zhu Honghui. Research on some key technologies of knowledge-driven anthropomorphic intelligent control system [D]. Wuhan University of Technology, 2006.