

Research on Human Movement Recognition and Posture Analysis Based on CR Model

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Abstract

Human motion recognition is the focus of scientific research and technology at home and abroad at this stage. This paper mainly analyzes the future development trend of the industry based on the C-R model human motion recognition method on the basis of understanding the classification of human motion and posture.

Keywords

CR model; The human body; Action recognition; Posture analysis.

1. Classification of human movements and gestures

Human gesture recognition is the main research direction in the field of computer vision. Applying it to the construction of each line, we can not only get a new way of interaction, but also express the user's idea by combining body language. For example, in a crowded environment such as a factory or an airport, people can use gestures or movements to obtain more accurate information than human language^[1].

Human movement involves multiple areas, either the whole body or a particular part, such as the legs, hands, and head. Since these movements represent the characteristics of different people, the actual degree of complexity is also different, so the final research methods should be different. Nowadays, the recognition of human simple movements and gestures is the focus of scientific research and exploration in the industry, and it is the main content of CR model analysis. In essence, the recognition of human movements can be divided into two kinds, one is gesture recognition, the other is movement process recognition. Since the target of attitude recognition belongs to the static system, which is mainly used to identify and analyze the posture of all or part of the human body, in-depth discussion combined with the existing technology will surely provide more new opportunities for the development of the industry in the future. At the same time, because the recognition of the target is different, so generally can be divided into hand shape, body posture and head posture recognition. The recognition work in the process of movement refers to the dynamic recognition of human movement, such as footwork, gestures and so on^[2].

2. How to identify human movements based on CR model

According to the analysis of current human gesture recognition methods, the most common ones are mainly divided into three categories, as shown in Figure 1 below.

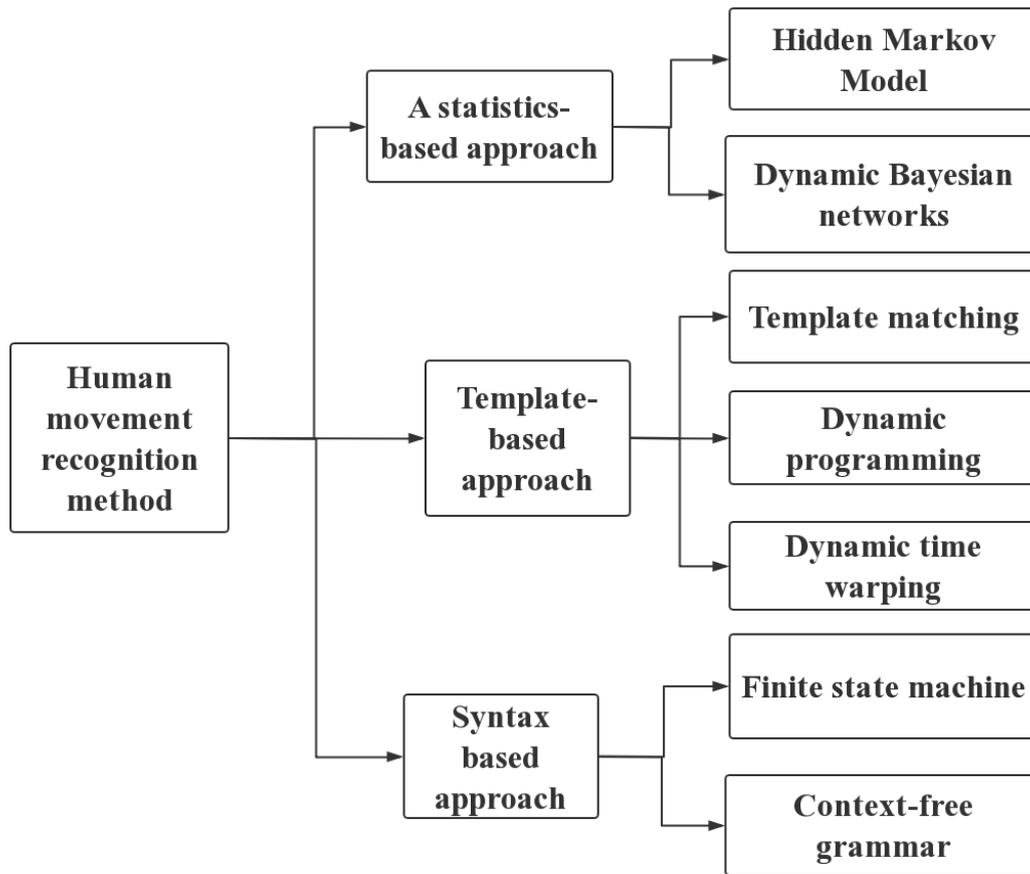


Fig. 1 Method diagram of human action recognition

2.1. Statistical Methods

As one of the most effective choices nowadays, this kind of method is often applied as follows: First, Hidden Markov Model. As one of the most common market applications and promotion, it is implemented from the two aspects of state and observation. It belongs to a random model based on transition probability and transmission probability. The specific probability of the state in the system is only related to the state at the previous moment, and has no connection with other historical conditions. On the one hand, we should get the sequence of feature vectors and take part in the training with the learning algorithm. On the other hand, we should recognize the feature vectors with the model. Second, dynamic Bayesian networks. As a new statistical model emerging in the market in recent years, it can grasp the probability dependence relationship between variables and follow the law of time change, which has a strong explanatory and expansibility in practice. Because this model can recognize a variety of dynamic objects, it is also the core of future industry exploration^[3].

2.2. Template Method

This kind of method is divided into the following kinds: First, template matching method. Although it is simple to use for gesture recognition, and the computational complexity is low, but it is highly sensitive to noise and time change; Second, the dynamic construction regularity method. Although this method can effectively deal with the ambiguity of human movement posture in the time range, and can also visually present the time axis of the training template, from the perspective of overall application, the difficulty of operation will increase with the increase of the number of training samples.

2.3. Grammatical methods

This kind of method is the main direction of using natural language to describe human movements and postures in the future. Now many researchers have proposed new scientific research schemes based on this content. It should be noted that it is difficult to describe the human movements and postures in the image sequence, and our understanding of the concepts such as behavior and time is not unified at present, so it is still very difficult to correctly describe the scene content based on CR model. Therefore, the current domestic and foreign research projects can only use this method for a simple description, can not be used to describe too complex human posture^[4-6].

3. Future development trend

Understanding the development and changes of artificial intelligence in China in recent years, we can see that there are many scientific research projects aiming at human motion recognition and posture analysis, and with the improvement of practical technology level, some achievements have been made, which is of great importance to future urban construction and economic development. Analyzing the trend of integration of artificial intelligence and various industries in recent years, it is very important to strengthen the exploration of human gesture recognition. The following are the main directions of future research: First, the category is limited. At present, the recognition of human movement and posture is mostly simple content, such as standard posture, walking, running and so on, while the recognition target is only a single individual. In order to identify the interaction between multiple targets under complex conditions, is the core of industry research; Second, feature selection. The feature vector is chosen as an important basis for model research and analysis, and the actual content directly determines the method and performance of the selected recognition. If too many eigenvectors are selected, the generated dimension will continue to rise, which will inevitably increase the operation difficulty of the computer system and CR model. On the contrary, if the number of selected features is too small, it is difficult to get a higher recognition probability as soon as possible. Therefore, in practice exploration, it is necessary to make clear how to obtain the appropriate eigenvector, so as to obtain a higher recognition rate; Third, learning limitations. Although some achievements have been made in the identification research with machine learning tools, it is still in the primary stage of development now. It is difficult to achieve the desired effect in terms of the restriction on motion model or the influence on scientific research results. At the same time, the machine learning method needs extensive training. In other words, only after each movement and posture has been trained for several times can it be correctly recognized. Therefore, when selecting such a model for recognition, it is necessary to know some specific sets of movements in advance, so as to ensure the orderly operation of the subsequent system^[7-9].

4. Conclusion

To sum up, human movement is artificial intelligence in essence. Therefore, in the new era, facing the increasingly competitive market environment, in order to adapt to this new change more quickly, the country should integrate its own scientific and technological level and intensify the exploration of artificial intelligence. In particular, the recognition and analysis of human movements and postures based on CR model can not only provide basic support for the development of virtual reality, intelligent monitoring and other fields, but also further improve the social and economic level.

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