

Experimental Application of Multi-threshold Color Image Segmentation Algorithm in Smart Classroom

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Abstract: At this stage of technology application and innovation development process, image processing technology has gradually become the basis of artificial intelligence technology application. Especially in the effective application of multi-threshold color image segmentation algorithm, it can be analyzed and integrated from many different dimensions, which can really help to build a smart classroom. Based on this, this paper is from the multi-threshold color image segmentation algorithm, multi-threshold color image segmentation algorithm in the intelligent classroom application method analysis, two perspectives to carry out more in-depth research and analysis, in order to drive China's relevant education and comprehensive quality ability to improve the overall.

Keywords: Multi-threshold; Color image; Segmentation algorithm; Smart classroom

1. Introduction

Nowadays, the development and progress of society has enhanced the importance of artificial intelligence science at a certain level, and image processing technology has gradually become a more important part of the development of modern society and has entered the vision of more and more people. The comprehensive promotion of image processing and analysis course is also helpful for modern students to learn and understand more knowledge content research and analysis, its content is mainly the integration of computer graphics, computer vision and pattern recognition and other knowledge content, in the intelligent classroom teaching activities, but also can greatly level to cultivate students' comprehensive ability and practical ability. Therefore, the development of high-quality students with excellent professional skills is an important task at this stage of education.

2. Multi-threshold Color Image Segmentation Algorithm

2.1 Inter-class Variance

The main emphasis of multi-threshold color image segmentation is to find more than two optimal thresholds to segment each of the three components. The use of inter-class variance algorithms should also be actively enhanced in order to comply with the basic trends of modern society in a real sense. Once the thresholds are quantified within a certain range, it is possible to strengthen the accurate acquisition of each group of values and intervals in the process of image decomposition, so that the unreasonable phenomena that existed in the previous grayscale classes can be improved at a great level ^[1].

2.2 Entropy Thresholding Segmentation

The entropy thresholding algorithm, which is an automatic thresholding technique without supervision, ensures the validity of the centralized distribution of each separated region in the process of maximizing the entropy value of the segmented histogram ^[2]. In the application process of single-threshold segmentation, when noise causes certain interference with the image quality, the ideal effect is also difficult to be effectively reflected, which is why it is necessary to repeatedly and continuously obtain each group of values, which in turn can well achieve the ultimate purpose of multi-threshold color image segmentation, as well as the basic needs. At the same time, the entropy algorithm has a direct and obvious impact on the simulation experiment of multi-threshold image segmentation of classroom real-time images. In the process of improving the image quality and display effect, it is also necessary to further strengthen the classroom attendance assessment and analysis with the help of real-time images, so as to obtain more accurate and detailed data information content.

3. Analysis of the Application Method of Multi-threshold Color Image Segmentation Algorithm in Smart Classroom

3.1 Harmony Search

Harmonic search in the actual intelligent classroom teaching, can be very good multi-threshold color image segmentation algorithm embodied. The harmonic search algorithm is a kind of intelligent optimization algorithm, and in practical use, it refers to the principle of music performance. The basic harmonic search algorithm idea is also precisely presented in several different steps. The generation of groups of tones of the same size as the harmony memory is managed and controlled within the range of tones available, ensuring the uniqueness of each group of tones. If the harmony is obtained from the harmony memory, it needs to be fine-tuned to provide a better basis for the advantages and value of the image segmentation algorithm. If the quality of the new harmony is stronger than the worst harmony in the harmony memory, the worst harmony in the harmony library can be replaced by the new harmony, and a new harmony memory can be obtained. In contrast, the harmony memory is not changed. In addition, the image threshold segmentation should be further enhanced to provide a better basis for the effective control of the algorithm and to help. The effective use of the image thresholding algorithm for harmonic search is to determine the final objective function by selecting the mean difference of grayscale between image classes, thus ensuring the scientific nature of the segmentation threshold ^[3]. This can also provide more comprehensive guidance and help for the scientific manifestation of the threshold segmentation algorithm. Especially for the recognition and analysis of images in different environments, it can also provide a better basis for the accurate control of each group of values.

3.2 Graphical User Interface

The graphical user interface consists mainly of objects such as menus, windows, dialog boxes, etc. This is also to better facilitate the work of human-computer interaction. The programming of graphical user interfaces also enables the implementation of various image segmentation algorithms such as global threshold segmentation, variable threshold segmentation, and threshold segmentation with acoustic search. Among them, image thresholding interface design is one of the more common and important components. If one wants to truly ensure the scientific nature of experimental demonstrations and student operations in smart classroom teaching activities, the relevant staff needs to get the image histogram in the process of designing the software by selecting the image button to obtain the image under the prerequisite conditions. The effective use of different image threshold segmentation algorithms also allows the output of images on different software systems. The diversity of segmentation algorithms in the software can provide a more complete base support for the subsequent embodiment of the advantages as well as the value of smart classroom education, which in turn can achieve different classroom teaching purposes and create a good teaching atmosphere. The use of the user interface is mainly to adjust the segmentation algorithm parameters, change the size of the filter window in the threshold segmentation, change the number of multi-threshold segmentation thresholds, change the number of chunks of adaptive threshold segmentation and other phenomena. Students with can also understand the impact of various segmentation algorithms and parameters on the segmentation effect, thus enhancing their own learning ability ^[4]. The graphical user interface runs as an important part of the GUI. The understanding of the original image, histogram, etc. needs to be enhanced by clicking on the selected image, so that it is also possible to understand more intuitively the specific effects of the displayed image segmentation. Immediately afterwards, with the help of modern information technology tools and algorithms, the same image is processed more systematically and scientifically, effectively preserving the original image, the original image histogram and the processed image in the image button

3.3 Teaching Applications

Image processing and analysis are very powerful theoretical and practical aspects of smart classroom teaching, enhancing the overall quality and innovation of students. For this reason, the concept of accelerating the creation of smart classrooms has gradually become a very important part of education in the field of higher education. At the present stage, university teachers are constantly exploring intelligent and efficient teaching methods in their lecture management, mainly to ensure that the smart classroom can truly realize the authenticity and finality of the human education mode. In addition, the current stage of smart classroom creation in China, at a certain level is the teacher as the main body, and then transform the specific mode of student cooperative learning, so that it can also well provide more comprehensive guidance as well as help for artificial intelligence and information technology means in the development of modern science and technology means, their own application value embodiment ^[5]. Therefore, more high-quality classroom teaching content and methods can well provide a broader application prospect and practical significance for the long-term and stable development of China's education, as well as teaching activities.

4. Conclusion

To sum up, in the specific image processing and intelligent classroom teaching activities, the managers of relevant departments should also strengthen the innovation and integration of educational contents from different dimensions, so as to truly improve the unreasonable phenomenon of multi-threshold color image segmentation algorithm in the intelligent classroom and meet the basic development needs of modern society. In this paper, we focus on the three perspectives of harmonic search, image user interface, and teaching application to conduct a more in-depth study and discussion, and also to maximize the development of innovative thinking and ability of students in the new era.

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