Improvement of Medical Clinical Teaching by VR Medical Surgical Helmet

Dilong Zhang*

Chongqing College of Electronic Engineering, Chongqing 401331, China

10765666@QQ.com

*Corresponding Author

Abstract: Utilize a VR medical surgery science teaching helmet, including a camera, for real-time acquisition of images. And a transmitting device, configured to transmit the real-time collected image to the processing module. And a processing module, configured to splicing the real-time collected images into a complete panoramic picture. The processing module performs real-time encoding of the complete panoramic picture to generate a panoramic preview video. A VR helmet body for viewing the panoramic video. By using a VR medical surgical science teaching helmet, the whole process of doctor's operation can be stereoscopically photographed. Students can observe the whole process of doctor's operation through the helmet, instead of the traditional teaching demonstration of words and PPT, and make the video more intuitive. Under the new media environment, it is necessary to make use of new technology to build a long-term education mechanism of "all-round and all-round" education for medical students in the socialist core values education, so as to enhance the pertinence and effectiveness of education, to cultivate high-quality medical talents with both ability and morality.

1. Introduction

As a special profession, doctors need professional medical skills, and the mastery of these skills requires a continuous learning process [1]. In the past two years, the surgical teaching system has become an important rural project for clinical teaching, academic exchanges or remote guidance [2]. The video recorded by surgery is also a valuable learning material, and an important evidence for future medical accidents. However, the current surgical teaching system can not make students immerse themselves in the situation, and it is not intuitive enough [3].

2. Specific implementation methods

The following describes the implementation of the VR medical teaching helmet by a specific specific example, and those skilled in the art can easily understand other advantages and effects of the VR medical teaching helmet from the contents disclosed in the present specification [4-6]. VR medical teaching helmet can also be implemented or applied in different specific ways. Details in this manual can also be modified or changed based on different viewpoints and applications without deviating from the spirit of VR medical teaching helmet [7]. It should be noted that, without conflict, the following embodiments and features in the embodiments may be combined with each other.

The VR Medical Teaching Helmet provides a VR medical surgical science teaching helmet, including:

Camera for real-time capture of images.

And a transmitting device, configured to transmit the real-time collected image to the processing module.

And a processing module, configured to splicing the real-time collected images into a complete panoramic picture [8].

The processing module performs real-time encoding of the complete panoramic picture to generate a panoramic preview video.

The VR helmet body is used for viewing the panoramic video.

The processing module constructs a virtual training scene according to the panoramic video [9].

The processing module is also used to record the strength of the operator's hand and the explanation of the operator's corresponding operation process [10].

The processing module includes a basic data storage unit, a virtual model for storing all medical devices used in the operation process, and corresponding device function information.

The practitioner uses the corresponding medical device model to complete the training in the virtual training scene according to the explanation of the operation process and the hand strength [11]. In particular, during the surgical training of the practitioner, the strength of the surgical instrument model is also displayed, and the strength is compared with the recorded strength [12]. The practitioner adjusts according to the displayed strength and the recorded strength so that the displayed strength is close to the recorded strength.

Optionally, the hand force is acquired by a surgical instrument with force feedback.

The camera includes a regular polyhedral support, and an image sensor is disposed on each face of the regular polyhedral support [13].

In an embodiment, the image sensor is disposed at a center of each face of the regular polyhedral bracket.

In an embodiment, the image sensors have the same field of view and the angle of view of each image sensor is greater than the angle between two adjacent image sensor axes [14].

In one embodiment, the optical axis of the image sensor on each face of the regular polyhedron coincides with the line connecting the face of the image sensor to the center of the regular polyhedron.

In an embodiment, the panoramic camera splices the captured images into a complete panoramic picture in real time, including:

Get multiple images for mosaic panoramic images.

The images are expanded into longitude and latitude images respectively.

The mosaic regions between several longitude and latitude images are extracted respectively, and the mosaic regions are obtained [15]. The mosaic regions are projected onto the unit ball.

Extracting the cylindrical area corresponding to the area to be spliced on the unit sphere, respectively calculating the optical flow field between the left and right images of the area to be spliced.

According to the optical flow field between the left and right images of the area to be spliced, the images of each splicing area are respectively fused until the images of all the spliced areas are fused, and the seamless spliced panoramic image is obtained [16-18].

The separately expanding the plurality of images into the latitude and longitude images specifically includes:

Gets a model that expands the captured image to a latitude and longitude image.

According to the model, the plurality of images are respectively expanded to obtain a plurality of latitude and longitude images respectively corresponding to the plurality of images [19].

In one embodiment, the VR helmet body includes a first ophthalmic lens, a second ophthalmic lens, and an adjustment module for adjusting a separation distance between the first ophthalmic lens and the second ophthalmic lens [20].

The adjustment module adjusts the distance between the first lens and the second lens by the following ways:

The eye image information of the user is acquired by an image acquisition device.

According to the eye image information, the distance between the two pupils of the user is calculated.

According to the distance between the two pupils of the user, the pupil distance information of the user is obtained.

According to the eye information, if it is determined that the eye information does not satisfy the visual condition of the VR glasses, the adjustment mode is determined according to the eye information, including:

If it is determined that the intermuscular distance information does not satisfy the interpapillary distance configuration information in the visual condition, determining, according to the interplay distance information and the interpolated distance configuration information, that the adjustment mode is a interpapillary distance adjustment mode.

Adjusting the VR glasses according to the adjustment mode, including:

1) Adjusting a position of the first ophthalmic lens and the second ophthalmic lens of the VR glasses according to the user's distance information.

2) Comparing the distance between the user and the current distance of the VR glasses according to the user's distance information.

If the pupil distance of the user is greater than the current pupil distance of the VR glasses, the first motor and the second motor are controlled. The first eyeglasses corresponding to the first motor and the second eyeglasses corresponding to the second motor are synchronously moved away from the central reference point to match the pupil distance of the VR eyeglasses with the pupil distance of the user.

If the pupil distance of the user is less than the current pupil distance of the VR glasses, the first motor and the second motor are controlled. The first ophthalmic lens corresponding to the first motor and the second ophthalmic lens corresponding to the second motor are synchronously moved in a direction close to the central reference point to make the distance between the VR glasses and the user the distance between the two matches.

In this embodiment, the eye information of the VR glasses user is acquired by collecting, and if the eye information of the user is determined not to satisfy the visual condition of the VR glasses. According to the user's eye information, the adjustment mode is determined, and the VR glasses are automatically adjusted in different adjustment modes, so that the visual condition of the VR glasses can be matched with the user's eye information. It realizes the automatic collection of user's eye information, and automatically adjusts the visual conditions of VR glasses according to user's eye information, which improves the visual effect of VR glasses and improves the visual experience of medical students.

The practice of socialist core values education is related to the fundamental issue of "who to train people" and "what kind of people to train". Under the new media environment, we should make use of new technology to build a long-term education mechanism of "all-round and all-round" education for medical students in the socialist core values education, so as to enhance the pertinence and effectiveness of education. Cultivate high-quality medical talents with both ability and political integrity! General Secretary Xi Jinping emphasized that "the evangelist must first understand the channel and the channel. The helmet can intuitively let the students feel the case of a living patient who has been treated! Let the medical students feel the lofty and greatness of the doctor profession!

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