



Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

The Application of Augmented Reality Technology in Teaching Education

Fan Kang¹ and Cunchen Tang²

International School of Software, Wuhan University, Wuhan, China

ABSTRACT

This paper presents the application of augmented reality technology in education, combining with the current situation of applying virtual reality education, analyzes the problems existing in the virtual reality application in education, puts forward some suggestions, and finally prospects the developing trend of the technology of virtual reality now.

Keywords: virtual reality technology; education; application suggestion

INTRODUCTION

Augmented reality (AR) is a newly developed computer application and interaction technology. Unlike virtual reality (VR), where the user is completely immersed in a virtual environment, an augmented reality system is augmenting the real world scene. The computer-generated 3D graphics or 2D text is merged with the real view to help users to learn and perceive more information which cannot be seen in the real world [1]. Augmented reality has been widely applied in many domains, such as medical visualization, military training, manufacturing, maintenance and repair. They all involve superposing computer generated virtual model on real scenes, which must be done in real-time.

3D real-time tracking is therefore a critical technique of most AR applications. The augmented virtual objects must remain aligned with the observed 3D positions and orientations of the real object accurately, even when users move their viewpoint quickly. Marker-based tracking for AR environments prepared by calibrating the environment, adding landmarks, controlling lighting and limiting the operating range to facilitate tracking has been highly successful. The most popular one is the ARToolkit library of Kato and Billinghurst.

This paper describes augmented reality registration algorithm applied for real-time motion tracking in outdoor and indoor environment. Randomized tree method is utilized to recognize key points extracted from the input image to those key frames as a classification problem. Extended Kalman filter is also applied for jitter correction. A video see-through mobile augmented reality system is built for the on-site digital reconstruction of Yuanmingyuan Garden. Experimental results demonstrate that this algorithm is real-time, robust and effective in outdoor and indoor environments. However, our algorithm still has some limitations, which we plan to improve in the future. First, the stability of our system will drop quickly, when the actual illumination condition is quite different from the light conditions on the training stage. The reason is that an object which can be reliably detected mainly depends on the training images that are synthesized. Once trained, the performance can no longer be improved. Second, when the camera moves to some distant locations, the appearance of the selected features may be drastically different. This will lead to a sharp drop in the number of the inners. In the future work, our first aim is to update the randomized trees at run-time, adapting them to the actual lighting conditions. At last, during training stage we will simulate all new image views by a fully affine normalization method, which can cover the six parameters of an affine transform.

THE APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN EDUCATION

Virtual reality is applied to education which is a leap in the development of education technology. It is a kind of for the learners through their interaction with information environment to get new knowledge, skills, learning styles. Its main applications are[2]: virtual laboratory, virtual classroom, virtual library, virtual campus, virtual studio, virtual remote education.

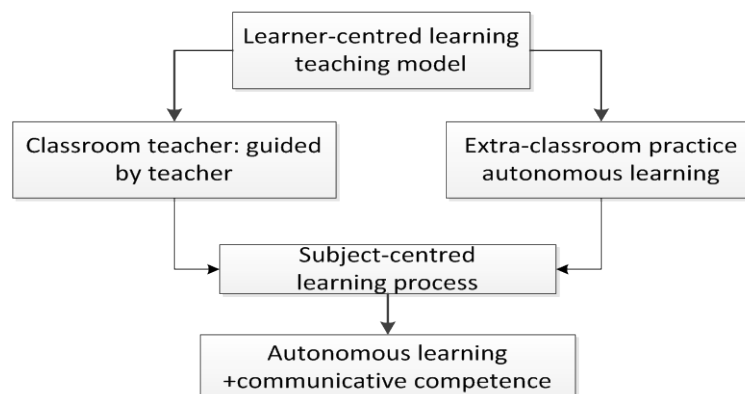


Fig.1: autonomous learning teaching model based on augmented reality

Virtual reality technology is to simulate real and vivid things and the environment, and provide a variety of natural interaction ways and means of session, can stimulate students' learning actively, and help to stimulate people's thinking in images and research thinking, so as to deepen the concept and the construction of new ideas and creative. Therefore, the use of virtual reality for education can dramatically improves the teaching effect. At the same time, the original teachings are often subject to the conditions of laboratory equipment, teaching funds, or there are some in general teaching environment can't appear things and phenomena. The introduction of virtual reality technology, we can based on the limited equipment investment, relying more on software and wisdom, targeted to carry out all kinds of simulation and virtual teaching. In addition, in the field of education Web site, virtual teacher, venue and other emerging form of education will also inevitably appeared in the network, and they are close to the real and higher than the real advantage, occupies a place in the field of education in the future. As a result, virtual reality technology in the field of education and training has a vast application value.

THE STATUS QUO ANALYSIS OF VIRTUAL REALITY TECHNOLOGY APPLIED IN EDUCATION

The domestic many colleges and universities have established the national laboratory, in virtual reality aspects research work. Of which Beijing university of aeronautics and astronautics has established a national ministry of education key laboratory of virtual reality technology, ZheJiang university, also has a computer aided design and graphics (CAD/CG) state key laboratory, other colleges and universities such as Tsinghua University, Xi'an Jiaotong University for virtual reality sense of reality and the three-dimensional reality technology are also carried out extensive research, makes the fruits in the research of the basic theory of virtual reality in China.

But in domestic applications in the field of education, basic not fully immersive virtual reality system, mostly concentrated in the OPENGL and VRML to develop some of the applications of size not too big, application platform is given priority to with the PC[3].As a result, China's colleges and universities in the field of virtual to real, most of them stay in technology research, virtual reality technology has not been in the promotion and popularization of true education.

PROBLEM ANALYSIS

We can see that, despite the broad prospects for development of virtual reality, but as an emerging science, there are many factors to limit its wide application in the field of education, these factors are mainly as follows:

(1) The experimental effect remains to be strengthened.From the effect of the implementation of virtual reality, its credibility is poorer, refers to the credibility of the virtual environment created by the poor.Credibility is not high. The specific reason in the following aspects: ①the representation of the geometry on virtual world,lack of realistic physics, behavior model; ②the virtual world in terms of perception, the synthesis research more visual, hearing, touch (sleep) less attention, lack of authenticity and real-time; ③in the interactions with the virtual world, not enough natural alternation, such as voice recognition effect of artificial intelligence is far from satisfactory.

(2) The establishment of the hardware environment. The problems mainly two aspects: the first is the relevant equipment are widespread use inconvenient, the effect not beautiful, and so on and so forth, it is hard to meet the

demand of the virtual reality system; The second hardware variety remains to be further extended. At the same time of improving existing equipment, should speed up the development of new equipment. At the same time, the needle on different areas to develop special hardware equipment can meet the application requirements.

(3) The implementation cost. Application of virtual reality system related equipment price is more expensive, and the equipment limitations. Like to purchase a 3 d mouse to tens of thousands, the construction investment of more than millions of CAVE system; A low display up to tens of thousands in general.

SOME SUGGESTIONS

(1) Follow the principle of demand traction, technology promotion. Under the education demand, focus on the core technology, such as dynamic environment modeling technology, real 3D graphics generation and display technology, the development of new interactive equipment, the intelligence pronunciation virtual reality modeling, etc. Only the most critical and most need to solve the technical problems to conquer, the development of virtual reality technology to a new level.

(2) Pay attention to the actual situation. In the process of using the virtual experiment teaching, and can't completely replace the real experiment. Virtual experiment is virtual experiment which lack sense of "real", as the reading on the Internet and with real books, always feel real books more true. Therefore, in the concrete implementation, should be the actual situation. Purposefully arrange some experimental operation in the real environment, so that more can deepen students impression of experiment, improve the effect of the experiment.

Focus on overseas development, make full use of policy support. We should attach great importance to the research of virtual technology, but we can't behind closed doors to do research, should focus on virtual technology abroad and the development of theory, and through various channels to communicate with foreign, such as visiting, visit, etc. In addition, can also establish a "virtual team" [3]. In a virtual team, its members scattered in space, mainly through the electronic information communication technology (email, video conference, etc.). Moreover, the development of new communication technologies, such as Internet, accelerated the trend. At present, virtual team has already been applied in many fields, such as R&D organization, customer service, scientific research, etc. as shown in fig 2

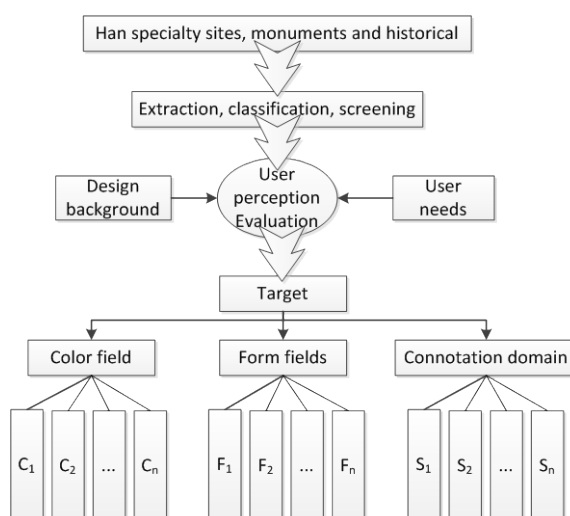


Fig 2 virtual team

At the same time, as an emerging science, virtual technology needs a good environment for development. Luckily, the virtual reality technology has been the national medium and long-term science and technology development plan outline (2006-2020) "column for the former along the technology, as one of the three major themes of the information technology, it will no doubt for the development of virtual technology to provide more space and better environment for development[4].

CONCLUSION

The associated with virtual reality system of science and technology become more and more mature, a variety of new research and application fields will constantly continue to expand, it is an inevitable trend. Virtual reality technology will be the star after the multimedia, computer network, in the field of education with most application of

technologies, it will make the 21st century education and training to be qualitative and change. Through these ways, our algorithm will be more stable to detectable range and will be much more robust to illumination changes.

REFERENCES

- [1] GuoTiantai. *Journal of ningbo university*, **2006**, 25 (1).
- [2] Ye Su, Wang Haopeng. *Computer teaching and education informationization*, **2008**, 22 (2).
- [3] Chen Rongquan Deng Jingsong. *Journal of corporate economic*, **2004287** (7).
- [4]Pietro Murano,DinoMackey. [J].*Interacting with Com- puters*,**2007**,(19): 305-313.