Chatting Module Design in Online Virtual Campus System

Xingquan Cai, Cheng Yang

College of Information Engineering, North China University of Technology, Beijing, 100144, China
Xingquancai@126.com

Abstract. In this paper, we present a new method to design and realize chatting module in online virtual campus system. Our virtual campus system is based VRML (Virtual Reality Modelling Language) and JavaScript, and has two parts, including server and client. We divide the system into several different modules, including user interface, models database, information database, navigation graph, chatting module and server module. In order to meet all the demands of students and professors, we offer three chatting modes, including public chatting, regional chatting, and private chatting. In this way, the students and professors can use different modes to achieve different functions. Certainly, we also design the chat panel for students and professors. We have implemented our method and our system is running smoothly.

Keywords: online virtual campus; chatting module; regional chatting mode; private chatting mode

1 Introduction

In recent years, with the rapid development of virtual reality technology, so many kinds of virtual reality applications began to go into our lives, like vehicle driving simulator for new driver, 4D movies in cinema, virtual tourism system, digital earth, digital city, Augmented Reality shows in product launch, etc. Virtual campus also is the hot topic in virtual reality area, and more and more scientists begin to research how to design virtual campus system efficiently.

Virtual campus system, especial the web-based system can show the digital university campus and broadcast the information in campus. In online virtual campus system, the university students and professors can roam in the campus free and unrestrained. And they also can achieve the campus information from the departments and exchange their thoughts about courses, lives, and hobbies with each others face to face. So in this paper, we present one method to design chatting module in online virtual campus system.

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In order to meet all the demands of students and professors, we offer three chatting modes, including public chatting, regional chatting, and private chatting. In this way, the students and professors can use different modes to achieve different functions. Certainly, we also design the chat panel for students and professors. We have implemented our method and our system is running smoothly.

In this paper, after exploring the related work of virtual campus, we provide the modules in our online virtual campus system. Then we give the chatting module design method of our online virtual campus system. And we also show the results using our method. Finally, we draw the conclusion and give the future work.

2 Related Work

Virtual campus has always been a challenging research in computer graphics. Up to now, many projects have been proposed, which can be classified into three types, including 2D method, 2.5D method and 3D method.

Usually, 2D method is panorama method, and belonging to IBR (Image-Based Rendering) method. In 2D method system, we should make a lot of photos at the characteristic positions in our real campus, and the photos are around the characteristic points in 360 degree. We just use the billboard technology to render the photos seamlessly when we select the characteristic places. Many universities have used this method to show their campus, like Shanghai Jiao Tong University, Shandong Economic University, etc. In this way, we can design the virtual campus quickly, but we can not walkthrough in the virtual campus.

2.5D method is 45 degree oblique method. 45 degree oblique method is the most important technology in game design, and is often used in RPG Games. In this system, the Artist Designer designs the pictures and models in the fixed camera angel. So we just look the campus in the same camera angle. This method also is simple, but this system is lack of details of the campus.

3D method is the most favorite method, because this system is full of details and we can walkthrough in the campus. Usually, we should make a lot of models of the buildings, road, trees, stones, etc. Then we need to program the system and render the campus. There are many methods and many software used to design the virtual campus, such as OpenGL Performer, Geo Union software, X3D [1], Vega Primer [2,3], VR-Platform [4], etc. Nanyang Technological University in Singapore used OpenGL Performer to render their campus. Peking University in China selected Geo Union software. Beijing Institute of Fashion Technology in China used X3D to show their campus on internet. They just render the models of buildings, road, etc, on internet, but no live campus information.

We want to design 3D online virtual campus system. In our virtual campus, the university students and professors can roam in the campus free and unrestrained. And they also can achieve the campus information from the departments and exchange their thoughts about courses, lives, and hobbies with each others face to face. So in this paper, we present one method to design chatting module in online virtual campus system.
3 Modules in Online Virtual Campus System

According to the requests of the virtual campus application, we divide the system into several different modules, including user interface, models database, information database, navigation graph, chatting module and server module. Every module has its special functions.

User interface provide one panel with many command buttons and containers used to interactive with the virtual campus system. Usually, user interface can display the virtual world that shows the 3D content.

Models database can provide all the models of buildings, trees, road in campus with different level of detail. In order to enhance the realistic of the real environment of campus, we reference the theory of LOD (Level Of Detail), construct a few sets of different precision model, and depend on the distance of the users and models to select different models. In this way, we can visit the campus with different detail.

Information database contains the information about departments and other entities of the university. The manager of the department and the system can modify the information. In this way, the university students can achieve the information so fast.

Navigation graph contains the location information about the general layout of the campus. We can switch by click the command button on the navigation graph panel. The guest user might not be easy to be lost in our virtual campus system.

Server module manages and broadcasts all the information in virtual campus system. All the 3D models are stored in the server workstation. Every player should pass the server check before logging in the system.

Chatting module is the most important module in our system, because the students and professors participate in virtual campus. By chatting, they exchange their thoughts, idea, plan, etc. Only more and more students logging in virtual campus, our virtual campus could play an important role in campus education.

4 Design Chatting Module in Online Virtual Campus System

Our online virtual campus provides a communication platform for university students and professors. Especially, the chatting module provides the convenient and fast chat panel. In this way, all the users can roam in virtual campus free and unrestrained.

In order to meet all the demands of students and professors, we offer three chatting modes, including public chatting, regional chatting, and private chatting. In this way, the students and professors can use different modes to achieve different functions. Certainly, we also design the chat panel for students and professors.

4.1 Chatting Panel

The chatting panel not only shows the messages, but also offers the control buttons. The chatting panel could display the messages from the virtual campus in time. There are a lot of control buttons on the chatting panel, including edit boxes, text boxes, sending message button, search message button, etc. If there are many messages, the
text box will appear on the slide, so that students and professors will view the rest of the historical record information. They also can search their interested messages through search message text box and search message button.

We also have a chatting modes select box. Students and professors can select the chatting modes according to their favorites.

### 4.2 Chatting Mode

Public chatting mode is an important chatting mode, and broadcasts the messages in public way. The public chatting mode can let students join the chatting in the same scene. Every user can view others chatting information through the chatting panel, and check their own chatting messages, so that they can watch the content they are interested. We use the NetSyncer node of VRML to monitor the status information of each user, and set up the event of edit box for chatting panel to get the message response of user chatting; and transmit the chat mode sign and chat content to the system of chat, then depend on the sign of public chat to deal with something, there only normal the chat content (detect the illegal or impolite phrase); finally the chat panel show the user name and chat content.

### 4.3 Regional Chatting Mode

The regional chatting mode limits the person rang of chatting. This mode divides the same scene into many different sub-scenes, and the users can view the chatting information in the same sub-scene, but these users see nothing in the different sub-scene. The same user in the different sub-scene, who can see the different information, thus the user can clearly understand the current scene topics.

The regional chatting mode also uses the NetSyncer node of VRML to monitor the status information of each user as well as public chatting mode. This mode deals with messages through the event of chatting. It is difference that sending the message which including the sign of chat mode, the sign of sub-scene and chat-content, so the chatting system use the dissimilar way to deal with. Because this chatting mode refers to more than one scene, but the sigh of each sub-scene is different. Before the chatting content processing, we need to get the position of all online users, compare with the range of sub-scene to distinguish the users, then judge the users whether in the same scene or not. In other words, these messages should not visible or visible to these users, lastly the chatting panel shows the messages with standardization.

### 4.4 Private Chatting Mode

The private chatting mode is the communication between two individuals. Conveniently, the chatting information can be seen only by the two individuals. However, other person can not view the information. In this way, the two individuals can build a synchronous connection, and this can help the people to increase the chance of chatting.
The private chatting mode also uses the NetSyncer node of VRML to monitor the status information of each user as well as public chatting mode and regional chatting mode. The NetSyncer node also deals with messages through the event of chatting. It is different that besides getting the sign of chatting and chatting content, it need to get the unique identification of the user who is clicked, and use the only identification to judge whether this user identification existence. If this user existence, it needs to build synchronous channels by the chatting system. This can show the information in time. Because the nickname of user is unique in this system, it means that does not allow users to repetitive, so it use’s the users nickname as the user's unique identifier.

5 Results

We have implemented our algorithm. We use JDK, Tomcat, and MySQL to program the server of our website, while we use VRML and JavaScript to program the client. The rendering system has a real viewport size of 1024×768.

Our online virtual campus has several different modules, including user interface, models database, information database, navigation graph, chatting module and server module. And our system is running smoothly, just as Fig. 1 shows the main user interface of our virtual campus. We also design the chatting module in our system, and add the chatting panel in our online virtual campus. Just as Fig. 1 shows, there are several function buttons on the chatting panel. We can chat with others convenient and fast.

![Fig. 1. Main interface of our online virtual campus and chatting panel in our virtual campus system.](image)

We have designed three chatting modes, including public chatting, regional chatting, and private chatting. Fig. 2 gives three person are chatting in public chatting mode, and they can view all the chatting messages. Fig. 2 also shows the person in regional chatting mode. Because they are roaming in regional chatting mode and in different place, center garden and teaching building, they can not view the message from each other. Fig. 3 shows that two female students are chatting in private chatting mode and one male is roaming near their place. Because the two female are chatting in private chatting mode, the male can not view their chatting messages. In this way,
everyone in our online virtual campus can exchange his idea, thought, and plan with others free and unrestrained.

Fig. 2. Roaming in our virtual campus system in public chatting mode and roaming in our virtual campus system in public chatting mode.

Fig. 3. Two female students are chatting in private chatting mode and one male is roaming.

6 Conclusions and Future Work

In this paper, we present a new method to design and realize chatting module in online virtual campus system. Our virtual campus system is based VRML (Virtual Reality Modelling Language) and JavaScript, and has two parts, including server and client. We divide the system into several different modules, including user interface, models database, information database, navigation graph, chatting module and server module. Every module has its special functions. In order to meet all the demands of students and professors, we offer three chatting modes, including public chatting, regional chatting, and private chatting. In this way, the students and professors can use different modes to achieve different functions. Certainly, we also design the chat panel for students and professors. We have implemented our method and our system is running smoothly.
Although we have realized our chatting module and our online virtual campus system, the models in our system are not in detail. If we use the models in detail, the models data in our system is so big, so the system might be running a little slow. This is the bottleneck of our system, so we need to resolve it in future.

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