The Visual Guide to over 800 species of the Cyber Sea-Shell Museum on the Web using an Animation Technology

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Abstract

Computers and communication technologies have been brought tremendous change to various aspects of an ever-fast changing world at present. Particularly, the use of internet and cyberspace is widespread in every corner of our life.

We developed a cyber shell museum using an animation technology. It was developed for educational purposes, and accessible through the world wide web of internet. Cyber shell museum is consisted of five compartment including rare shells, marvelous shells, shell of the world, the shell of Korea and its story of shells. The database contains the pictures and related information of the shell and it implies not only animation display but also text information. The files of database were classified depending on the species, genus, family, order, and class and division of the shell. Picture of shells is displayed and user may reach the image and virtual view information by clicking through the object displayed. This provides multiple techniques to user may manipulate, visualize and interact with image on the web. And every such transformation as translation, rotation, and scaling can be applied in the picture interactively for the convenient and effective viewing.

1. Introduction

As information industry has been developed modern times, the demand for user-oriented information has increased more than text-oriented one. Human being prefer visual technique method to written text, for the visual recognition has been developed in recent years. Especially, he or she are trying to make every efforts to communicate more easily with information users with visual configuration, using computer and through them.[1]

In former times computers provided only linguistic and two dimensional pictures and to and to use mouse and keyboard only to control cyber world. But, it didn't provide enough for information users to believe the world as he or she saw it in cyber world. Displaying information on internet gives users both time-saving and economic benefits. To provide museum and other useful information in the internet or through internet will give much more educational effects. One of new methods which constructed museum on internet ,especially visualization, is new one which is generating interaction between computer and human. This visual method is creative art in expressing graphic and factual image, depicting on screen and giving the feeling of real thing vividly. Of course in mobilizing human imagination through three dimensional space it is useful too. There are a lot of problems to solve in order to construct factual image on internet. First, the biggest problems of all, is the lacking of reality and control of the image for users. Furthermore, there is a problem in terms of internet transmission velocity. In order to transform a real thing into object in cyber space through computer, the art which deals with factual method with three dimensional space is required. That is, the emphasis on visualization make us artifical feeling without understanding traits of real objects. On the contrary, the constructing on factual movement cause this disharmony, confusion between fact and visual situation. The visualization using the JAVA can solve these problems at once. The animation generating from it can express real things freely and make the control of image on screen smoothly according to intention of producer. We can display animation on screen, stop, enlarge, contract, and control animation speed freely. Thus we can construct user-oriented system. This artical explains visualization technique at Chapter 2 and making of animation model for visualization at Chapter 3. We discuss the system building of museum at Chapter 4 with

2. Visualization

Although the visual system of information has been discussed on internet, it is not much advanced yet. Recently, the technology for providing three dimensional image on internet has been regarded as an important field. Indeed, VRML that makes three dimensional graphic image, requires VRML Plug-in set-up and is difficult to express a real image. Also, users should take a special training to operate the system. Moreover, the translating rate becomes much slower with a big file [3][5]

Currently, information through the internet is provided by means of the first dimensional image or text. Although there are several ways to transfer a variety of information, it is rare to be shown as three dimensional translation on the web. Such a three dimensional presentation is normally carried out in the space through Java Applets program. In fact, the JAVA language may be the best tool for expressing a three dimensional image on the internet.[6] However, there are still some problems such as ways to add real images to the internet graphic or the object in the three dimensional space. The three dimensional graphic tool or image-extracting procedure may be available to visualize the object. However, three dimensional images can be created on the internet by producing an optical illusion through a succeeding two dimensional image. Indeed a system using a realistic image is a better way rather than simple graphic manufacturing for the creation of an effective visualization [2][3]. Also, the visual demonstration is a direct process and produces the best impression on the internet. This might be a good foundation to transfer an exact information on object and the best procedure to give users a confidence. Now when the speed for transferring information by the internet become faster, the processes through the visualization will be an essential way for the future.

The visual processes can be adapted for a variety of fields. For instance, in Cyber Clam Museum, the visual processes were used to design a screen with a realistic image and create a system that makes possible show at 360° . Therefore, in the system, users can observe the detailed clam's structure and save the image.

This system is helpful to publish information on the clam in a text. Finally as we can see in Fig. 2.1 shown an animation containing a realistic image created by the visual technique, the visualization of information affords better realism to users.

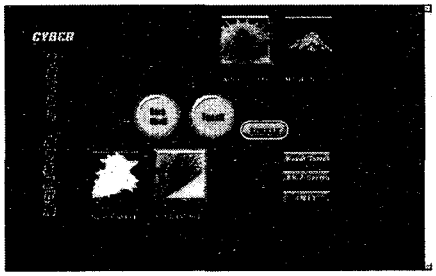

Fig 2-1 Cyber Shell Museum

3. Animation Model for Visualization

In a theoretical point, it is natural to make an imaginary actuality equivalent to real condition by using of imagination. On the other hand, an imaginary actuality may become a new art mode in a point of artistic view. As artists create a world through a painting, a musical score, a stage or a stone, the world of imaginary actuality will be artificially realized in the computer. If users plunge into the imaginary actuality and interact with a variety of items in the world, they must obtain a better pleasure. Now we first suggest a model for the interaction between users and system for the animation of imaginary actuality. How can we define a relationship between users and system for the animation of imaginary actuality? And what is the basic relationship?. A model that we are to suggest in the present paper is based on the model provided by J. Latta et al. [4]. Our model mainly consists of inter-phases connecting human with imaginary environment. The final goal of our animation system of imaginary reality is that when users replace a real situation with imaginary one, any difference between two situations cannot be realized by users. Furthermore, our system shall enable users to feel the better color sense or contours.

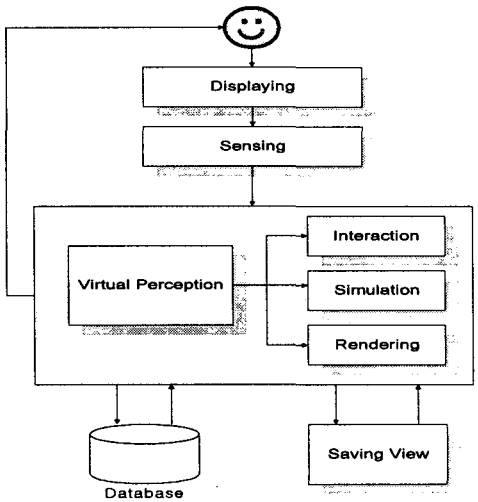

Fig 3-1 Virtual Reality Animation Model

As shown in figure 3-1, users can look real things through a monitor on displaying module. Sensing module in our system is to sense human's action or gesture. This module includes a variety of sensors and digital camera equipped with input and output devices. Information received through above two modules is processed on Virtual Perception module and extracted according to user's idea. This module connects the physical module with the logical sensor and a limitation that can be interacted with imaginary world is determined according to user's goal. All these works are determined on Interactive module.

Interactions with pre-determined environment are actually performed in the Simulation module. Of course, the basic processes can be operated without establishment of Interactive by users. Rendering module takes a part to draw the changed imaginary world. This module can reduce or magnify a real object and make a rotation to all sides in the monitor. The DB for the imaginary reality contains an image and a text of all objects in the imaginary world. This also includes geometrical, physical and behavioral characteristics on the intellectual action. Saving View can save and output the part that a user aim to.

4. Design and Implementation of the Cyber Shell Museum

4-1. Design of the Cyber Shell Museum

As shown in Figure 2-1, the overall configuration contains the shell of the world (Figure 4-1), the shell of Korea (Figure 4-2), the marvelous shells (Figure 4-3), the story of shells (Figure 4-4), the rare shells (Figure 4-5), the visual search (Figure 4-6), and the textual search (Figure 4-7). Structural components were designed in seven parts of species, names, live, range, occurrence, sizes, and contents. The search consists of the textual search and the visual search, the visual search is possible without knowing names

of shells.

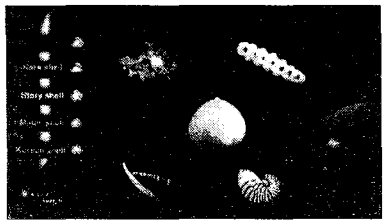

Fig 4-1 World Shell

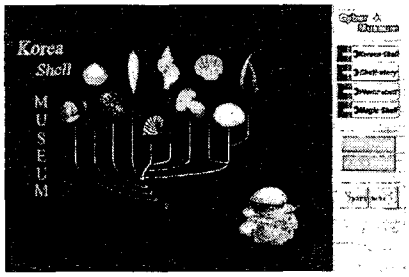

Fig 4-2 Korea Shell

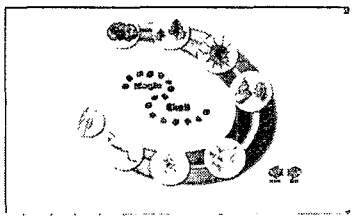

Fig 4-3 Marvelous Shell

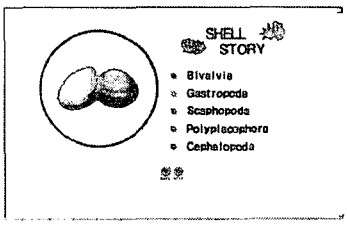

Fig 4-4 Story Shell

Fig 4-5 Rare Shell

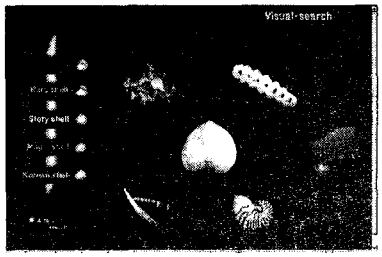

Fig 4-6 Visual Search

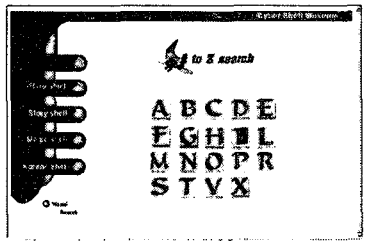

Fig 4-7 Textual Search

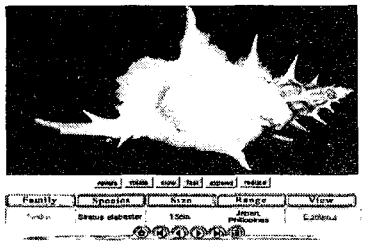

Fig 4-8 Animation

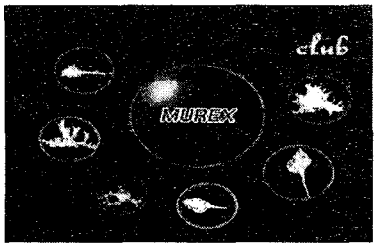

Fig 4-9 Club Structure

4-2. Algorithm

The animation algorithm consists of a display processor, a zoom processor, and a speed processor and all processors run by calling a run processor. The animation is done by creating a file from the image to be animated taken by a camera and by utilizing a Java program that is saved in the memory address of a image. In the run processor, a thread runs first to determine a rotation/stop and left/right rotation situation and then the animation is performed sequentially if the satisfaction is made. The reverse operation is performed in

the case that the inx is reducing. Then, the speed processor and display processor are called.

```
Run Processor()
  while(runner != null)  // thread start
    if(rotate == 0)       // rotation · , stop
      if (shift == 0)       // left, right
        inx++;
        if(inx >= aniCount-1) inx=0;
      else
        inx--;
        if(inx  <  0) inx=aniCount-1;
      Speed();
      currentImg = img[inx];   // change image
      Display();
```

The display processor is one that displays a image sequentially on the screen after getting the information of the size and position of a image to be displayed by calling a zoom processor. The xpos represents a x-axis position, ypos is a y-axis position. Img Width is the width of an image, imgHeight is the height of an image, and drawImage is a Java function that draws an image.

```
Display Processor()
  Zoom();   // Calling zoom processor
  g.drawImage (backgroundImg, 0, 0, imgWidth,  imgHeight, this);
  g.drawImage(currentImg, xpos, ypos, imgWidth, imgHeight, this);
```

The zoom processor is one that controls the size of an object. Here, the current Image is the image to be displayed, the zoom parameter controls the image with the step of 1/10, and xpos and yos are a x-axis and a y-axis positions of an image to be displayed, respectively.

```
Zoom Processor()
  int imgWidth  = currentImg.getWidth(this) + (zoom * 60);
  int imgHeight = currentImg.getHeight(this) + (zoom * 40);
  xpos = -1 * (zoom * 30);
  ypos = -1 * (zoom * 20);
```

The speed processor is one that makes the speed of an image to be animated as optimum as possible.

```
Speed Processor()
  try
    Thread.sleep(pauseTime);
    catch(InterruptedException e) ;
```

4-3. Implementation of the Cyber Shell Museum

The Cyber Shell Museum is implemented using HTML, Java Script and Java based on the Web. Technologies employed in this paper can provide better reality than still images of existing museums through visual effects that allows zoom, rotation as well as still views as shown in Figure 4-8. The implementation has performed as follows: First, digital camera digitizes real shells with 360 rotational views or using animation technologies on developer's purpose. Second, real parts of shells are extracted and their sizes are adjusted to employ using the Photoshop. Third, animation programs were developed to provide interactions with users considering zoom-in, zoom-out, 360 degree rotation. Finally, background of shells were determined and Java programs were developed to get system worked as animation.

For the shells of the world, about 1,000 species of shells are selected and they are classified into 5 kinds (Gastropods, Bivalves, Tusk shells, Chitons, Cephalopids) and more detailed classification has been done respectively. For example, in case of Gastropods, shells are classified into nine kinds of Ear, Cap, Pear, Corkscrew, Top, Spindle, Club, Barrel, and Egg using the appearance of shells. The Bivalves is classified into 7 categories, i.e. Discus, Fan, triangular, Boat, Paddle, Heart, Irregular. If the CLUB of Gastropods is clicked using mouse, selected kinds of shells are displayed in the left side of the screen as shown in Figure 4-8. An user can select one of them to see related information (Figure 4-9) and the front view of the selected shell through animated pictures. With various functions such as still picture, zoom-in, zoom-out, 360 degree rotation, the use can enjoy nice virtual reality. For the shells of Korea, shells are classified into 10 categories and selected shells are displayed continuously with time interval. The world of Marvelous-shells contains 20 kinds of marvelous shells in the world and gives a uses curiosity due to the fancy looking shells.

The Story-shells was implemented in order for students to get knowledge about shells. For example, it provides pictorial and textual information for easy understanding about what Gastropods is, terminologies for spire, aperture, apex, growth line, and etc. The Rare-shells contains five categories about rare shells in the world. A user can search shells by using images when the user doesn't know shells' name or appearance. If the user knows shell's name, the textual search can be used with shell's names and characteristics.

5. Conclusion

This paper showed the similar system three dimension, using shell museum on cyber space technique and animation. So far we have utilized simple image, and the graphic visual objectives on internet. Besides these, we could give more detailed information that of going to museum in person using the factual image. The visualization of utilizing Java makes the internet users who are familiar with complicated and difficult information understand easier. Furthermore, the users control the necessary information which is available directly. What is called a kind of users-oriented system. The weak-points of this system realized rather slow when we use telephone line. But we can solve the problem naturally by improving internet transmission velocity promptly and the processing speed of computer. This paper, different from the visual image of graphic, gives not only users using the internet much interests but also, the educational value. This cyber shell museum provide new conceptual internet information and share materials which are display on web beyond space limitation. So far, we construct based on the materials for shell over 800 species worldwide with animation. Furthermore, in the nearer future we will handle over 2,500 species of shell with animation.

6. Reference

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