MOVIE-BASED VR THERAPY SYSTEM FOR TREATMENT OF ANTHROPOPHOBIA

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Abstract- **The fear of public speaking is a kind of social phobia. The patients having the fear of public-speaking show some symptoms like shame and timidity in the daily personal relationship. They are afraid that the other person would be puzzled, feel insulted, and they also fear that they should be underestimated for their mistakes. For the treatment of the fear of public speaking, the cognitive-behavioral therapy is generally used. The cognitive-behavioral therapy is the method that makes the patients gradually experience some situations inducing the fears and overcome those at last. But if the real situations inducing fears cause dangerous symptoms or the patients have difficulty in imagining the situations, the effect of this method is notably reduced. And making the situations inducing the fears to patients requires a vast amount of effort and time. In this study, we developed the public-speaking simulator and the virtual environment for the treatment of the fear of public speaking. The head-mounted display, the head-tracker and the 3-dimensional sound system were used for immersing in the virtual environment. The virtual environment of this system is suggested in a seminar room where 6 virtual audiences are seated. The virtual audiences were made with real movies and inserted into the virtual environment. The patient speaks in front of these virtual audiences and the therapist can make virtual audience members respond with some motions. Moreover, clinical tests have been made to verify the effectiveness of the treatment.**

Keywords - **Anthrophobia, Public speaking, cognitive-behavioral, VR therapy, Movie-Based**

I. INTRODUCTION

The fear of public speaking is a kind of social phobias. The patients having the fear of public speaking show some symptoms like shame and timidity in the daily personal relationship. They are afraid that the other person would be puzzled, feel insulted, and they also fear that they should be underestimated for their mistakes [1][2]. For the treatment of the fear of public speaking, the cognitive-behavioral therapy has been generally used. The cognitive-behavioral therapy is the method that makes the patients gradually experience some situations inducing the fears and overcome those at last. Recently, the virtual reality technology has been introduced as an alternative method for providing phobic situations [3][4][5].

In this study, we developed the public speaking simulator and the virtual environment for the treatment of the fear of public speaking. Because the existing virtual environment, which is totally constructed by models, is less realistic than real movies or images, It cannot provoke the patients to feel the phobia [6]. For the more immersive environment, a head-mounted display and 3 dimensional sound generation system were used. The virtual audiences were made with real movies and the background of the entire virtual environment was fitted to the background of the virtual audiences.

With this system, the 3 patients were exposed to this virtual environment.

II. METHODOLOGY

During virtual reality therapy, the patient wears HMD (head-mounted display) and experiences the phobic situation. The virtual audiences in the virtual environment interact with the patient, and the therapist can control the motions of the virtual audiences.

1) *Hardware*: The virtual reality therapy system was composed of a PC (Pentium III class) with a video adaptor enabling Direct3D acceleration, an HMD, a head tracker and 3-dimensional sound generation system (Fig. 1).

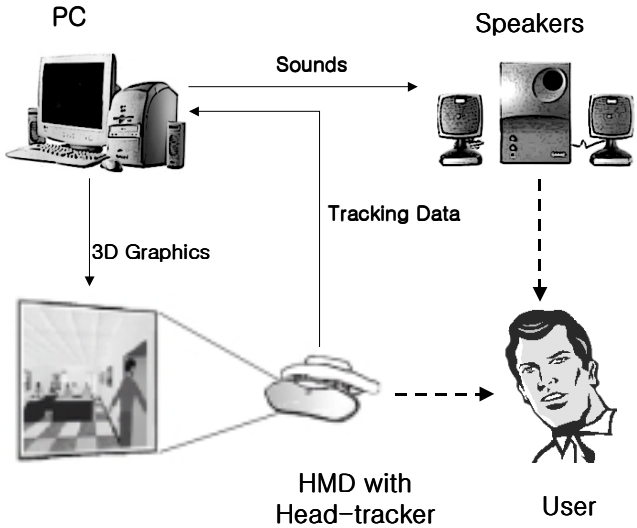

Fig. 1. The virtual reality speech simulator

2) *Virtual Environment:* The main program of this simulator was developed in *Visual C++ 6.0* and *DirectX 7.0a SDK*. 3-dimensional modeling tools (*3D Studio MAX*

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Abstract

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and *Rhinoceros*) were used for making virtual objects. In the virtual environment, the six virtual audiences are sitting down on the chairs around the desk in the seminar room (Fig. 2). The audiences in the virtual environment were made from real movies. The virtual audience has some motions and voices, and the therapist can control the their motions, sounds, and voices. The detail motions of virtual audiences are presented in Table 1.

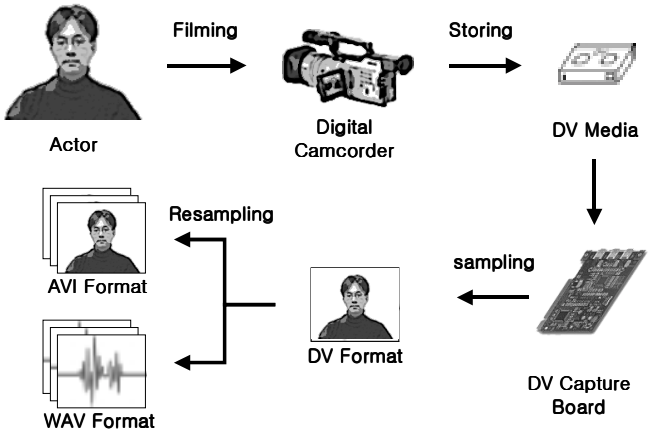


Fig. 2. Making virtual audience

Motion Name	Audience 1	Audience 2	Audience 3	Audience 4	Audience 5	Audience 6
Listening	Listening	Listening	Listening	Listening	Listening	Listening
Clapping 1	Clapping	Clapping	Clapping	Clapping	Clapping	Clapping
Clapping 2	Clapping	Bored	Clapping	Unconcern	Clapping	Unconcern
Chatting 1	Chatting	Chatting	Chatting	Chatting	Chatting	Chatting
Chatting 2	Chatting	Chatting	Listening	Unconcern	Chatting	Chatting
Unconcern 1	Chatting	Chatting	Irrelevant act	Sleep	Unconcern	Unconcern
Unconcern 2	Bored	Listening	Listening	Bored	Bored	Bored
Unconcern 3	Stretching	Listening	Stretching	Listening	Bored	Listening
Sleepiness 1	Bored	Sleep	Listening	Sleep	Bored	Sleep
Sleepiness 2	Yawning	Listening	Bored	Bored	Yawning	Irrelevant act

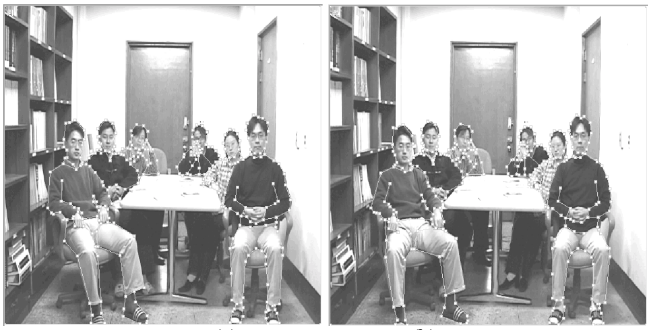
Table 1. The motions of the virtual audiences

The movies in DV File format were filmed by the digital camcorder when the actors performed the determined motions in table 1, and this DV movie files were converted to the non-compressed AVI files with 44.1 KHz Joint Stereo Sound. The frame rate of this movie files was 30 frames per second (Fig. 2).

If the last frame of the first movie is Fig. 3-(a) and the first frame of the second movie is Fig. 3-(b), for example, the jerk occurs between these movies. The morphing, especially the 2D free-form deformation (2D FFD), was used as the material to connect these movies naturally [7][8][9]. Fig. 4 shows the morphing task between two movies. Using several control points and control meshes, the morphing between Fig. 4-(a) and Fig. 4-(b) was operated. At last, the geometric models and textures of the background were constructed and fitted the completed movies.

(a) (b)

Fig. 3. The jerk between two continuous movies



(a) (b)

Fig. 4. Tasks for morphing between two other movies

III. RESULTS

Fig. 5 and Fig. 6 shows the entire virtual environment completed. The movies are naturally inserted in the background of the virtual environment.

Fig.5. The entire virtual environment

Fig. 6. The virtual audiences

Using this system, the three patients with anthropophobia experienced the phobic situations for about 30 minutes. Also, they expressed their physical symptoms during exposure to the virtual environment (table 2).

Subject	Exposure Time	Comments and Symptoms
Subject 1	23 minutes	The audiences were very realistic. Strong heartbeat and sweats. Feel strained.
Subject 2	30 minutes	The audiences were very realistic. Strong heartbeat and strained voices. Get dizzy.
Subject 3	27 minutes	Realistic, but table and tree disturb immersion. The audiences ridicule me. Feel strained.

Table 2. The results of clinical tests

IV. Discussion

The system, constructed by this research, can generate the immersive phobic situations to the patient with phobia. The virtual environment of this system is more realistic than the full-model based virtual environment. But there are some disadvantages. Above of all, making, editing and morphing tasks of the movies take much time. Also, the therapist cannot control each virtual audience, and immersion and interaction can be decrease. But, separating the movies for each audience in the filming process can easily solve this problem.

V. Conclusion

In this study, we developed the public speaking simulator and the virtual environment for the treatment of the fear of public speaking. For the more immersive environment, a head-mounted display and 3 dimensional sound generation system were used. The virtual audiences were made with real movies and the background of the entire virtual environment was fitted to the background of the virtual audiences.

With this system, the therapy was planned with the treatment protocol including the virtual reality therapy sessions. Before the therapy, the 3 patients were exposed to this virtual environment. All of patients expressed their physical symptoms during exposure to the virtual environment. Using this system for the treatment of anthropophobia, accordingly, the effectiveness of the treatment can be increased.

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