The Virtual Experience System with Emotional State Measurementfor UX(User eXperience) Profiling

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Abstract. The aim of this paper was todevelop the UX profiling method applying quantitative measurement. The quantitative index of user profile used a valence by analyzing the physiological response. The proposed system of this paper consists oftwo module groups as the measurement control modules for user response monitoring and the 3D environment control modules for service scenario display. We applied this system to 'Public Health Service in the Park' service prototyping as anexample.The proposed system wasable to measure quantitative and a qualitative user response for UX profiling. This system can be useful inmakinggood UX service.

Keywords: UX prototyping, Emotion recognition, Virtual Experience System

1 Introduction

With the improvement of service business, providers are focusing on QoS(Quality of Service). High QoScan improve value of aservice [1].The UX(User eXperience) refers to direct and indirect experiences that happenin the course of a service. Therefore, a good UX makes and guarantees high QoS[2].For good UX design, user analysis isnecessary.User profiling method systematically analyzesthe user [3].This method has been used in qualitative tools such as the user interview and subjective questionnaire.From the engineeringpoint of view on user analysis, physiological signal analysis method canbe applied to the quantitative measurement of user response [4].

The aim of this research was to develop the UX profiling method applying quantitative measurement.The quantitative index of user profile used a valence by analyzing the physiological response.

2 Method

The proposed system of this paper consists oftwo module groups(Fig. 1). One was the measurement control module for user response monitoring(Fig. 2). This moduleanalyzesuser response. The responses were the autonomic nervous signal for

quantitative response, and the subjective answer for qualitative response.The quantitative response was defined and analyzed as nine emotions based on the Russell Model[5]. The analysis was done usingthe developed algorithm[6].KS-SQI (Korean Standard-Service Quality Index) was used as the qualitative UX profiling because it was one of service quality assessment methods.

Anothermodule was the 3D environment control module for service scenario display.The 3D environment control was controlled by the measurement control for time synchronizing and scenario sequence triggering.
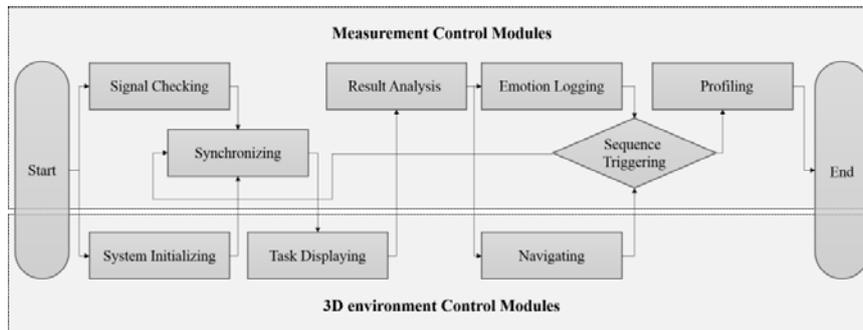

Fig.1. The System Structure and Flow. The system consistsof two module groups:the measurement control group and 3D environment control group.
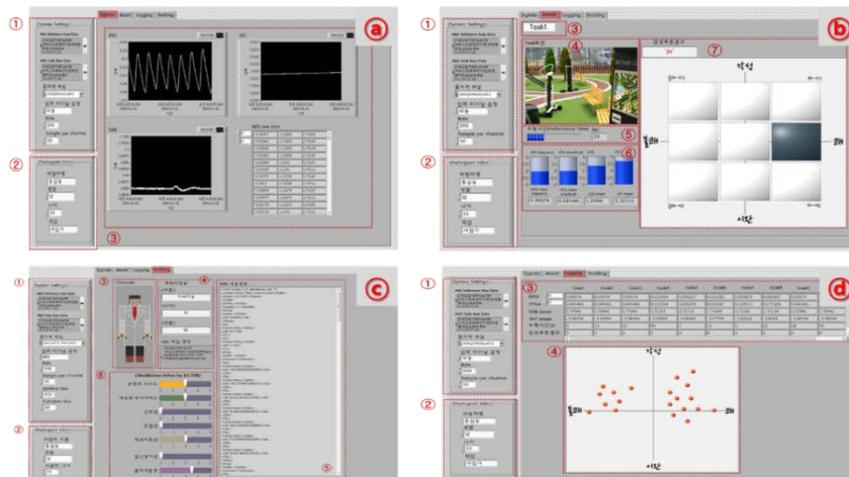

Fig.2. Example of the Measurement Control Modules. The signal UI module(ⓐ) consisted of three parts suchas the system parameters of measurement(①), participant information(②), and signal display(③). The system parameters of measurement and participant information were maintained on other three modules. The resulting UI module(ⓑ) consisted of seven parts suchas the name of the task(③), display of the task(④), performance time(⑤), and result of emotion state(⑥,⑦). The logging UI module(ⓒ) consisted of four parts suchas the summaryabout all of the tasks (③) and results of emotion state about all of the tasks(④). The

profiling module(ⓓ) consisted of six partssuch as the picture of the persona(③), persona information(④), xml data(⑤) and result of KS-SQI index(⑥).

3 Results

We applied this system to 'Public Health Service in the Park' service prototyping as an example. This service was aimedto provide health management service including the exercise equipment and health measurement device.

3.1 Example: Public Health Service Prototyping

For health park experience, Unity3D was used to provide visual and auditory stimulations to users. Navigation of this stimulation was controlled by keyboard input. Display system used 3D TV with 3D glasses.A scenario of service consisted of planning, training, and health report.Example of this scenario was shown inFig.3. This service example using the system could measure the user's qualitative and quantitative response of each service task.
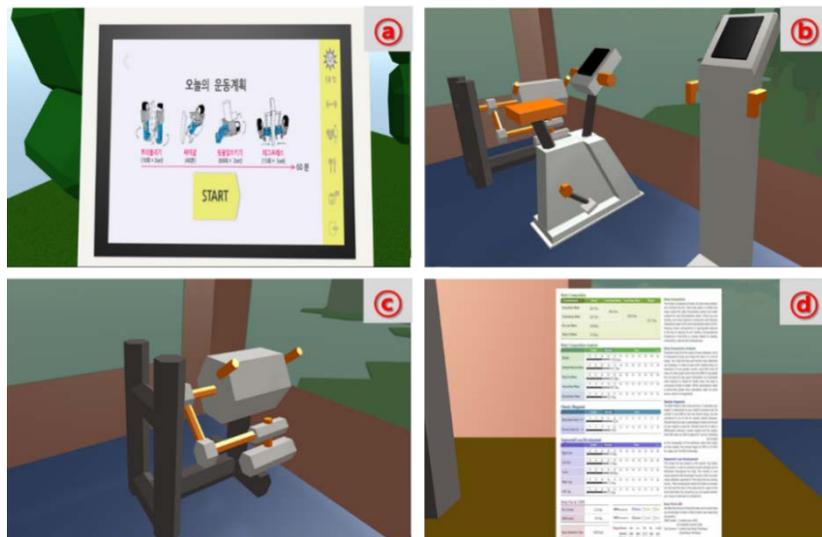

Fig.3. The Service Flow Examples. These examples was made using Unity3D. The exercise planning display (ⓐ). The task of exercising with equipment (ⓑ,ⓒ). The health report after the exercise (ⓓ).

4 Conclusion and Discussion

The proposed system was able to measure quantitative and qualitative user response for UX profiling. According to arelated study, UX profiling had been analyzed for qualitative response by subjective answer[7-8].However,this response was difficult to know user response in mind. Furthermore, the subjective answer simply disguisedor concealedthe real response.

This system was developed to consider the quantitative and qualitative responses. So, if adesigner usesthis system to make the UX, this can be a useful tool to make good UX service.

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