M-042

Design of High Realistic Tele-presence System for Co-presence of Human-user and Agent-avatar

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1 Introduction

In recent years,with the rapid development of network communication technology,the communication style is evolving everyday,and the concept of high realistic tele-presence communication are emerged.Such communication style enables people to gain a sense of they are in same real physical space when they communicate mutually between comparatively far physical distances.

This paper proposed a high realistic tele-presence communication system called HYBRIDi(Have Your Body Reach Into Digital-i).HYBRIDi solved the problem that people can not get the sense of being in same physical space around small area using present communication methods over Internet.

2 Present Communication Methods

A perfect high realistic tele-presence communication system should provide the sense of they are in same physical space with two users when they are communicating mutually through Internet.

When in same communication physical space, people can gain all five senses(vision,hearing,touch,smell,taste) of human-beings by looking,talking,hugging,smelling,kissing mutually, and can also gain the sense of synchronization(simultaneity and same space) by at same physical place in real time.

As a present communication method,letter can not provide any sense of high realistic tele-presence. Telephone only provides the sense of hearing.Video VoIP(Voice over Internet Protocol) provides both the senses of vision and hearing.

Recent years,3D SNS(Social Network Service) firstly get the possibility to provide users the sense of synchronization in virtual space through users' agent-avatar.

Nowadays,with the emergence of location aware service, it has already became possible to provide users sense of synchronization in different real physical space.

3 Proposed System

This section gives a brief introduction to HYBRIDi system which provides two users with a high realistic tele-presence experience when they are communicating with each other through Internet.

3.1 Evolution of Communication Methods

The proposed communication system HYBRIDi uses a medium to involve a human-user and an agent-avatar into a co-presence communication environment.By this approach it firstly provides possibility with users gaining the sense of synchronization in same real physical space around small area.

Part 3.2 will introduce the design of the medium.

3.2 The Design of A Medium

In the system, two terms: Human-user and Agent-avatar have been defined in a designed medium.

Human-user means an avatar whose motion on the system will be based on the user's motion detected by range sensor in real room which is seems to present location aware service using GPS.

Agent-avatar means an avatar whose motion on the system will be based on the user's input from keyboard as the present 3D SNS service.

The medium is the user interface of the system, it is a virtual space to simulate the real space, the mapping data in

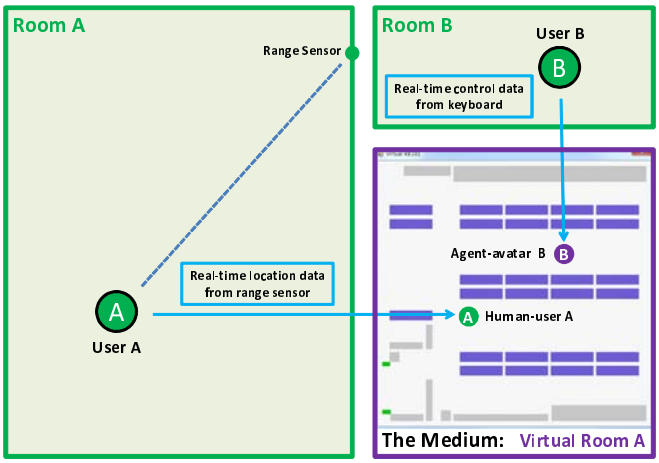

Figure 1. The design of the medium

real space will appear in the medium in proportional form. Through this approach, the medium can reflect the real-time location information of the user who logged as Human-user, the medium also can let the user control avatar walk around the virtual space by keyboard when logged as Agent-avatar. When the two types of avatars communicate mutually in the medium, they will get the sense of synchronization in same real physical space.

Figure 1 shows a example of the medium to bring two users into Room A, a real small physical space .

3.3 Network Communication Model

This part gives an introduction to communication model of the system.

The login process into the system uses Client/Server communication model as shown in Figure 2. During the login process, user will login in the system, download the mapping data of the room and get location information of another user in the medium through the server. Figure 2 shows the image of Client/Sever model for login process.

After successfully login in the system, as shown in Figure 3,communication model between two users will shift to P2P model.After login process, two users will only update their real-time location information data on the system.

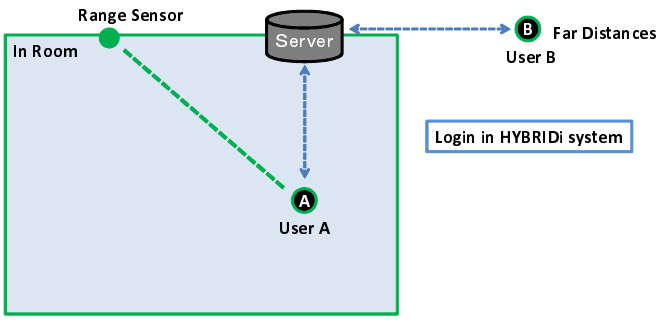

Figure 2. The login process using C/S model

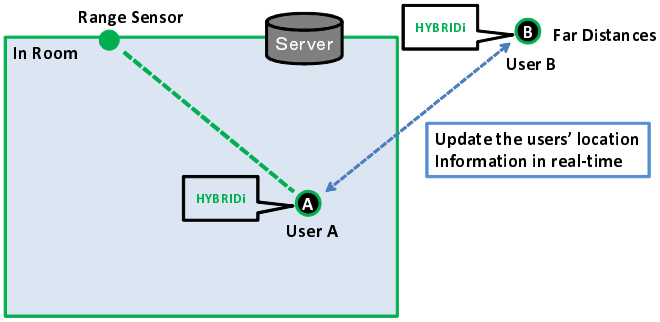

Figure 3. The communication process using P2P model

Elements of High Realistic Presence Communication							
Comparison	Five Senses					Synchronization	
	Vision	Hearing	Touch	Smell	Taste	Time	Space
Letter	×	×	—	—	—	×	×
Telephone	×	○	—	—	—	○	×
Video VoIP	○	○	—	—	—	○	×
3D SNS	○	○	—	—	—	○	◌
FB Places	○	○	—	—	—	○	◌
HYBRIDi	○	○	—	—	—	○	◌

◌ Synchronizaiton of virtual same space
◌ Synchronization of real different space
◌ Synchronization of real same space around small area
— No instances have been realized in history

Figure 4. Comparison of HYBRIDi and present communication methods

4 Comparison of HYBRIDi and Present Communication Methods

This section compares the degree of users' sense of high realistic tele-presence with present communication methods as shown in Figure 4.

The standard of evaluation is based on five senses of human-beings and the sense of synchronization of time and space . From Figure 4, we learn that HYBRIDi provides higher degree of high realistic tele-presence than all of other communication methods listed on the table by firstly enabling user to get the sense of synchronization in same real physical space around small area.

5 Conclusion and Future Work

The proposed system HYBRIDi enables two users get the sense of synchronization of same real physical space when communicate mutually between far distances.

The research will continue to find solutions for communication of multi-users on the HYBRIDi system and give evaluation to the system performance in the future.

References

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