

# I-SA08

## Virtual Reality

09:00-11:00  
Room : C302

Chair : Park Jong Hyan (Han Yang Univ.)  
Co-Chair : Ishikawa Seiji (Kyushu Institute of Technology)

09:00 – 09:20

I-SA08-1

### **A Virtual Bike Simulator System for Balance Rehabilitation Training using Virtual Reality**

Jong Yun Kim, Chul Gue Song and Nam Gyun Kim  
(Chonbuk National Univ.)

This paper describes a development of rehabilitation training system for the postural balance control. A new rehabilitation training system, designated as a virtual cycling system, was developed to improve postural balance control by combining virtual reality technology with an unfixed bicycle. In this experiment, 20 normal adults were tested to investigate the influencing parameters of postural balance control. In order to evaluate the usefulness and the training effects of the system, several parameters including path deviation, cycling velocity, cycling time, center of pressure, and head movement were evaluated and analyzed quantitatively. Also, to improve the effect of balance training, the visual feedback information related to the subject's weight shift was ...

09:40 – 10:00

I-SA08-3

### **Development of A Wearable Input Device Recognizing Human Hand and Finger Motions as A New Mobile Input Device**

Dae H. Won\*, Ho G. Lee\*, Jin Y. Kim\*, (KITECH)  
Jong H. Park\*\*(Hanyang Univ.)

Recently, the researches on the mobile computing technologies for palm computers, PDA's and wearable computers became very active. In the development of mobile devices, one of the key technologies is the human interface. So, this paper suggests a new input device for PDA's and wearable computers so-called key-glove. The design methods of key-glove are discussed in this paper and we manufactured the key-glove which recognizes that character is typed in though the hand's movements analysis and is designed as an input device for wearable computers and virtual environment. Also, we are executes a performance test for alphanumeric data entry, command entry and X-Y pointer input. In the results, we are confirmed in its ...

10:20 – 10:40

I-SA08-5

### **A study on the virtual indoor Scene navigation**

Yeong-Seok Kim, Cheung-Woon Jho, Kyung Hyun Yoon  
(Chung-Ang Univ.)

This paper presents a simple modeling system that constructs 3D models from an indoor cylindrical environment map using all of the available geometry of the interior structure such as vertical and horizontal lines and parallel and perpendicular planes. The indoor scene abstract model is created through this system and the navigation through the process of 3D reconstruction. This system first automatically detects the vanishing points in a cylindrical environment map from parallel lines and planes, and determines the indoor scene topology previously defined using this information. The determined topology enables the user intervention UI simply construct a 3D model by using the photogrammetry. The modeling system can be ...

09:20 – 09:40

I-SA08-2

### **Producing a Virtual Object with Realistic Motion for a Mixed Reality Space**

Daisuke Hirohashi, Joo Kooi Tan, Hyoung Seop Kim,  
Seiji Ishikawa (Kyushu Institute of Technology)

A technique is described for producing a virtual object with realistic motion. A 3-D human motion model is obtained by applying a developed motion capturing technique to a real human in motion. Factorization method is a technique for recovering 3-D shape of a rigid object from a single video image stream without using camera parameters. The technique is extended for recovering 3-D human motions. The proposed system is composed of three fixed cameras which take video images of a human motion. Three obtained image sequences are analyzed to yield measurement matrices at individual sampling times, and they are merged into a single measurement matrix to which the factorization is applied and the 3-D human motion is recovered ...

10:00 – 10:20

I-SA08-4

### **Learning of Skilled Typist's Finger Positioning for New Input Device Scheme**

Jin-Young Kim\*, Ho-Gil Lee\*, Sung-Ho Hwang\*( KITECH)  
Hyouk-Ryeol Choi\*\*( Sungkyunkwan Univ.)

Skilled typists can type characters or wrds without looking at keyboard, relying on the finger's relative position. If the relative positions of the fingers can be identified, a virtual keyboard may be accomplished by applying the concept of "DataGlove" or "FingerRing". The virtual keyboard may be efficient as a new mobile input device supporting QWERTY keyboard layout. For the purpose of investigating skilled typing pattern, in this paper the touch-positions of the fingers are measured with a touchscreen while four skilled typists type a long sentence. From these measurements it can be observed that the groups of touch-positions are classified into alphabet characters. Though there are some overlapped groups we can find constant distances capable of being discriminated ...

10:40 – 11:00

I-SA08-6

### **Putting Your Best Face Forward: Development of a Database for Digitized Human Facial Expression Animation**

Lee Ning Sung, Alia Reid Zhang Yu, Edmond C. Prakash, Tony K. Y. Chan and Edmund M-K. Lai(Nanyang Technological Univ.)

3-Dimensional (3D) digitization of the human is a technology that is still relatively new. There are present uses such as radiotherapy, identification systems and commercial uses and potential future applications. In this paper, we analyzed and experimented to determine the easiest and most efficient method, which would give us the most accurate results. We also constructed a database of realistic expressions and high quality human heads. We scanned people's heads and facial expressions in 3D using a Minolta Vivid 700 scanner, then edited the models obtained on a Silicon Graphics workstation. Research was done into the present and potential uses of the 3D digitized models of the human head and we develop ideas for ...