09:00-11:00
Room : C302

Chair : Ishimatsu Takakazu (Nagasaki Univ.)
Co-Chair : Chan Tony (Nanyang Technological Univ.)

09:00 – 09:20   **I-FA08-1**

Measurement and Scale Effects of Digitized Virtual Human Head

Edmond C. Prakash, Reginald C. Jegathese and Tony K. Y. Chan
(Nanyang Technological Univ. (NTU))

Measurement of complex surfaces without touching is desirable in several fields. This arises mainly for measurement of complex surfaces including those surfaces that deform during touch. Our research presented in this paper describes the use of a 3D digitizer for scanning 3D objects. The use of such a device, in addition to proper calibration, requires proper scaling in all three dimensions. We propose measurement techniques to measure various aspects of the surface circumference, area and volume. We also present experiments from using a 3D Minolta digitizer for measuring 3D human heads.

09:20 – 09:40   **I-FA08-2**

H2 Control of Wheel Chair Robot with Inverse Pendulum Control

Yoshihiko Takahashi and Otsushiro Tsubouchi
(Kanagawa Institute of Technology)

Wheel chair bound persons need assistance since there are many steps or curbs or other obstacles blocking their path in the roadways and walkways. Although a step may be small, it may be very difficult for such a person to climb over it. Therefore, we are proposing a power assist wheel chair robot that enables a wheel chair bound person to climb over steps up to about 10 centimeters in height without assistance from others. By using the proposed wheel chair robot, a user can maintain inverse pendulum control after raising its front wheels. Then, a user can move forward to the step maintaining the inverse pendulum control, and can climb over the step using motor force of a rear wheel shaft........

09:40 – 10:00   **I-FA08-3**

Rehabilitation System of Hand Manipulation Using Virtual Reality

Yoshio Fukuda, Takakazu Ishimatsu, Toshio Higashi, Tetsuo Nagao, Takashi.Takeda (Nagasaki Nagasaki Institute of Applied Science)

Recently computer graphic technology has achieved remarkable development. Applications of this technology to various fields are expected. In this study, one application of computer graphics to the medical field is shown. We developed a rehabilitation system of hand manipulation using virtual reality aiming to offer enjoyable rehabilitation training to physically handicapped people with upper limb disabilities. This rehabilitation system generates training environments for upper limbs, such as moving balls in virtual space of computer. And by using data glove as a sophisticated input device, a user can manipulate objects in virtual space by his hand. By using this rehabilitation system, a user can have rehabilitation training under various conditions without feeling tedious.

10:00 – 10:20   **I-FA08-4**

Motored wheel chair for upper limb disabled

Motohiro Tanaka, Yusuke Shimogama,Yuichiro Yokogawa, Takakazu Ishimatsu(Nagasaki Univ.), Kang Chul Ung(Cheju Univ.),Tsumoru Ochiai (Ube college)

We propose an electric wheelchair that is suitable for the upper-limbs disabled with sufficient operability and low expenses. Features of this wheelchair, 1) By installing a simple mechanical module, existing electric wheelchairs can be readily converted to a special version for the upper-limbs disabled. 2) The electric wheelchair can be freely operated by motion of a head. 3) A vision system to assure safety operation by the disabled is introduced.

10:20 – 10:40   **I-FA08-5**

Non-contact sensor to detect movement of dementia patient

Rei Satoh, Seigo Ariki, Takakazu Ishimatsu, Nobuoh Matsuzaka(Nagasaki Univ.), Kang Chul Ung(Cheju Univ.)

In this paper we explain about systems developed to forecast the standing up of the dementia patients. Basic idea of our approach is to measure the respiration and body movements in the bed. Based on the data measured, forecasting of standing up action from the bed is possible to some extent. First system proposed uses an image processing technique. Data obtained about the respiration and movements are used to forecast the standing up of the patients. The second system uses ultrasonic sensors, which emits and receives ultrasonic signals. Two techniques of the ultrasonic sensors are considered. One technique is to emit ultrasonic burst signals and to detect the instance when…

10:40 – 11:00   **I-FA08-6**

Sub-Optimal Route Planning by Immuno-Agents

Michiyasu Shiozaki, Hideji Fujikawa, Koichiro Shida, Ben T. Nohara
(Musashi Institute of Tech.)

In Vehicle Information and Communication System (VICS), which is an active field of Intelligent Transport System (ITS), information of traffic congestion is sent to each vehicle at real time. However, a centralized navigation system is not realistic to guide millions of vehicles in a megalopolis. Autonomous distributed systems should be more flexible and scalable, and also have a chance to focus on each vehicle's demand. This paper proposes a sub-optimal route planning mechanism of vehicles in urban areas using the non-network type immune system. Simulation is carried out using a cellular automaton model. This system announces a sub-optimal route to drivers in real time using VICS.