

# FM01

## Poster Session

09:00 – 11:00

Chair1 : Hie sik Kim ( Univ. of Seoul, Korea )

Room : base 2nd Floor-Zillertal

Chair2 : Tae-Kyu Kwon ( Chonbuk Nat'l Univ., Korea )

FM01-31

### VISUAL SERVO CONTROL OF A MOBILE MANIPULATOR USING NEURAL NETWORK ALGORITHM

Won Dong Joo, Min Gyu Park, Min Cheol Lee(Pusan Nat'l Univ., KOREA)

In this paper, we present autonomous mobile robot system, which has an image recognition module and perform tasks by itself with manipulator. Autonomous mobile robot can push each individual button on an elevator panel from a person's command. After the robot receives its command, it analyzes the image information of the elevator button that is acquired by CCD camera in an indoor environment with an elevator. In order to recognize the numbers on the button, the robot separates the number area in button and recognizes the segment through a neural network algorithm. We use the bar code form on the manipulator to find the position of the end of manipulator. The validity of the proposed method i...

FM01-32

### A New Landmark-Based Visual Servoing with Stereo Camera for Door Opening

Myoung-Soo Han, Soon Geul Lee(Kyunghee Univ., KOREA), Sung-Kee Park, Munsang Kim(KIST, KOREA)

In this paper we propose a new visual servoing method for door opening with mobile manipulator. We use an eye-to-hand system that stereo camera is mounted on mobile platform, and adopt the position-based method. The previous methods for door opening mostly used eye-in-hand system with mono camera and required predefined knowledge such as radius and position about door grip, which was mainly caused by using mono camera. This is also a severe constraint for pursuing general-purpose algorithm for door opening. For overcoming such drawback, we use stereo camera and suggest a new method that detect the door grip and estimate its pose from stereo depth information without predefined knowledge. AI...

FM01-33

### Real time tracking of multiple humans for mobile robot application

Joon Hyuk Choi, Byung Soo Park, Seok Lee(Seoul Nat'l Univ., KOREA), Sung-Kee Park, Munsang Kim(KIST, KOREA)

: This paper presents the method for detection and tracking of multiple humans robustly in mobile platform. The perception of human is performed in real time through the processing of images acquired from a moving stereo vision system. We performed multi-cue integration such as human shape, skin color and depth information to detect and track each human in moving background scene. Human shape is measured by edge-based template matching on distance transformed image. Improving robustness for human detection, we apply the human face skin color in HSV color space. And we could increase the accuracy and the robustness in both detection and tracking by applying random sampling stochastic estimati...

FM01-34

### Face Detection and Recognition with Multiple Appearance Models for Mobile Robot Application

Taigun Lee(Yonsei Univ., KOREA), Sung-Kee Park, Munsang Kim(KIST, KOREA)

For visual navigation, mobile robot can use a stereo camera which has large field of view. In this paper, we propose an algorithm to detect and recognize human face on the basis of such camera system. In this paper, a new coarse to fine detection algorithm is proposed. For coarse detection, nearly face-like areas are found in entire image using dual ellipse templates. And, detailed alignment of facial outline and features is performed on the basis of view-based multiple appearance model. Because it's hard to finely align with facial features in this case, we try to find most resembled face image area is selected from multiple face appearances using most distinguished facial features- two eye...

FM01-35

### Development of Merging Algorithm between 3-D Objects and Real Image for Augmented Reality

Dong-Joong Kang(Tongmyong Univ., KOREA)

A core technology for implementation of Augmented Reality is to develop a merging algorithm between interesting 3-D objects and real images. In this paper, we present a 3-D object recognition method to decide viewing direction toward the object from camera. This process is the starting point to merge with real image and 3-D objects. Perspective projection between a camera and 3-dimensional objects defines a plane in 3-D space that is from a line in an image and the focal point of the camera. If no errors with perfect 3-D models were introduced in during image feature extraction, then model lines in 3-D space projecting onto this line in the image would exactly lie in this plane. This observa...

FM01-36

### Graphic Simulator of Master/Slave Manipulator in Virtual Hot Cell

Sung Hyun Kim, Tae Gil Song, Jong Yul Lee, Ji Sup Yoon(KAERI, KOREA)

The crane and the master-slave manipulators (MSM) are widely used as a remote handling device in nuclear facilities such as the hot cell. The equipment to be installed in the hot cell should be optimally placed within the workspace of the wall-mounted slave manipulator for the maintenance operation. Also, the slave manipulator with the end effectors should be properly positioned and oriented for the dedicated maintenance operation. Hence, the workspace and the motion of the slave manipulator, as well as, the remote operation task should be analyzed before installing the manipulators and the hot cell equipment. For this purpose, the 3D graphic simulator, which simulates the remote operation o...