I-FP02 Computer Vision-Mobile

13:00-15:00 **Chair : Kim Jung Ha (Kookmin Univ.)**
Room : C106 **Co-Chair : Masanori Sugisaka (Oita Univ.)**

13:00 – 13:20 **I-FP02-1**

Steering Control of Autonomous Vehicle by the Vision System

K. Sanggyum, M. Heechang, K. Changman, and K. jungha
(Kookmin Univ.)

The subject of this paper is vision system analysis of the autonomous vehicle. But, autonomous vehicle is one of the difficult topics from the point of view of several constrains on mobility, speed of vehicle and lack of environment information. Therefore, we are application of the vision system so that autonomous vehicle.Vision system of autonomous vehicle is likely to eyes of human. This paper can be divided into 2 parts. First, acceleration system and brake control system for longitudinal motion control. Second, vision system of real time lane detection is for lateral motion control. This part deals lane detection method and image processing method. Finally, this paper focus on the integration of tele-operating vehicle and autonomous...

13:20 – 13:40 **I-FP02-2**

Moving Stereo Vision-based Motion Plan by Recognizing the Obstacle Height for Intelligent Mobile Robot

Yeo-Hong Yoon, Kang-Hyun Jo, Hyun-Deok Kang, In-Hyuk Moon
(Univ. of Ulsan)

This paper describes the path planning of an autonomous mobile robot using one camera-based sequence image processing. As an assumption, all objects in front of the mobile robot are located on the same plane where robot moves. Using the moving camera grounded on the autonomous mobile robot, the robot extracts the angular points of obstacle objects, calculates the height using the assumption and discrepancy between two consecutive images. In the image processing, angular points of objects must correspond so that they deliver the size of objects. Thus, the robot passes through if the object has not the height, like the paper or the shadow projected. Otherwise, the robot passes aside if...

13:40 – 14:00 **I-FP02-3**

Fusion of Sonar and Laser Sensor for Mobile Robot Environment Recognition

Kyung-Hoon Kim, Hyung Suck Cho
(KAIST)

A sensor fusion scheme for mobile robot environment recognition that incorporates range data and contour data is proposed. Ultrasonic sensor provides coarse spatial description but guarantees open space (with no obstacle) within sonic cone with relatively high belief. Laser structured light system provides detailed contour description of environment but prone to light noise and is easily affected by surface reflectivity. Overall fusion process is composed of two stages: Noise elimination and belief updates. Dempster Shafer's evidential reasoning is applied at each stage. Open space estimation from sonar range measurements brings elimination of noisy lines from laser sensor. Comparing actual sonar data to the simulated sonar data enables...

14:00 – 14:20 **I-FP02-4**

Visual Control of Mobile Robots Using Multisensor Fusion System

Shohei Niwa and Yusuke Sezaki
(Shizuoka Institute of Science and Technology)

In this paper, a development of the sensor fusion algorithm for a visual control of mobile robot is presented.The output data from the visual sensor include a time-lag due to the image processing computation. The sampling rate of the visual sensor is considerably low so that it should be used with other sensors to control fast motion. The main purpose of this paper is to develop a method which constitutes a sensor fusion system to give the optimal state estimates.The proposed sensor fusion system combines the visual sensor and inertial sensor using a modified Kalman filter. A kind of multi-rate Kalman filter which treats the slow sampling rate ...

14:20 – 14:40 **I-FP02-5**

Intelligent Tuning of a PID Controller Using Immune Algorithm

Dong Hwa Kim(Hanbat National Univ.), Kaoru Hirota(Tokyo Inst.)

This paper suggests that the immune algorithm can effectively be used in tuning of a PID controller. The artificial immune network always has a new parallel decentralized processing mechanism for various situations, since antibodies communicate to each other among different species of antibodies/B-cells through the stimulation and suppression chains among antibodies that form a large-scaled network. In addition to that, the structure of the network is not fixed, but varies continuously. That is, the artificial immune network flexibly self-organizes according to dynamic changes of external environment (meta-dynamics function). However, up to the present time, models based on the conventional crisp approach have been used to describe dynamic model relationship between antibody and antigen. Therefore, there are some problems ...