I-TA02 Sensoring and Sensor Fusion

08:30-10:30 **Chair : Rahmati Mohammad (Amir Kabir University of Technology)**
Room : C106 **Co-Chair : Kim Jung Ha (Kookmin Univ.)**

08:30 – 08:50 **I-TA02-1**

The Development of Collision Avoidance Algorithm for Unmanned Vehicle Using Ultrasonic Range Sensors

K. Bonggyu*, P.Younghoon*, K. Sanggyum*, and K. jungha**
(Kookmin Univ.)

The unmanned vehicle is composed of three parts : the front & side sensor system for keeping the lane and avoiding obstacles, the acceleration & brake control system for longitudinal motion control, and the steering control system for the lateral motion control. Each system helps the unmanned vehicle of which should take notice of its location and recognize obstacles around the place by itself and make a decision how much fast to proceed according to circumstances. During the operation, the control strategy that the vehicle can detect obstacles and avoid collision on the road involves with vehicle velocity very much. Therefore, We have to define a traction system which is powered by DC motor so that, unmanned vehicle can control its velocity accurately. In this study, we find mechanical and ...

08:50 – 09:10 **I-TA02-2**

On Design of Visual Servoing using an Uncalibrated Camera and a Calibrated Robot

Shigeru UCHIKADO & Masahiko MORITA,
Yasuhiro OSA,Tesuo MABUCHI, Kanya TANYA
(Tokyo Denki Univ.)

In this paper we deal with visual servoing that can control a robot arm with a camera using information of images only, without estimating 3D position and rotation of the robot arm. Here it is assumed that the robot arm is calibrated and the camera is uncalibrated. We use a pinhole camera model as the camera one. The essential notion can be show, that is, epipolar geometry, epipole, epipolar equation, and epipolar constrain. These play an important role in designing visual servoing. For easy understanding of the proposed method we first show a design in case of the calibrated camera. The design is constructed by 4 steps and the directional motion of the robot arm is fixed only to a constant direction. This means that an estimated epipole denotes the direction, to which the robot arm translates in 3D space, on the image plane.

09:10 – 09:30 **I-TA02-3**

Multi-Sensor Data Fusion Model that Uses a B-Spline Fuzzy Inference System

K.S.Lee, S.W.Shin, and D.S.Ahn
(Pukyong National Univ.)

The main object of this work is the development of an intelligent multi-sensor integration and fusion model that uses fuzzy inference system. Sensor data from different types of sensors are integrated and fused together based on the confidence which is not typically used in traditional data fusion methods. The information is fed as input to a fuzzy inference system(FIS). The output of the FIS is weights that are assigned to the different sensor data reflecting the confidence in the sensor's behavior and performance. We interpret a type of fuzzy inference system as an interpolator of B-spline hypersurfaces. B-spline basis functions of different orders are regarded as a class of membership functions. This paper presents a model that ...

09:30 – 09:50 **I-TA02-4**

Unsupervised segmentation of Multi-Source Remotely Sensed images using Binary Decision Trees and Canonical Transform

R.Sherkat, M.Rahmati, M. Sadeqi
(Amir Kabir University of Technology)

This paper proposes a new approach to unsupervised classification of remotely sensed images. Fusion of optic images (Landsat TM) and radar data (SAR) has been used to increase the accuracy of classification. Number of clusters is estimated using generalized Dunns measure. Performance of the proposed method is best observed comparing the classified images with classified aerial images.

09:50 – 10:10 **I-TA02-5**

Vehicle Platooning via Sensor Fusion of GPS Carrier Phase and Millimeter-Wave Radar

Myung Jin Woo and Jae Weon Choi

(Pusan National Univ.)

This paper is concerned with the vehicle platooning in the AHS (Automated Highway Systems). For this, a relative navigation system is developed for the vehicles operating as a platoon. The relative navigation system is based on two sensors including GPS and MMWR (Millimeter-Wave Radar) and the federated Kalman Iter processing measurements of them. The architecture of this system requires GPS measurements of a preceding vehicle via com- munication link. Even if GPS measurements are available, they contain errors which are unacceptably high in vehicle platooning. Therefore, GPS carrier phase is considered. Integer ambiguities of GPS carrier phase measurements are determined by using MMWR ...