D-TP06 Computer Vision and Image Processing 2

13:00-15:00 **Chair : Rho Do Hwan (Chonbuk National Univ.)**
Room : 4231 **Co-Chair : Kweon In So (KAIST)**

13:00 – 13:20 **D-TP06-1**

A Study on the Camera Calibration Algorithm using Perspective Ratio of Difference Line Widths

Jeong Jun-Ik, Song Suck-Woo, Lee Ho-Soon and Rho Do-Hwan
(Chonbuk National Univ.)

At 3-D vision measuring, the camera calibration is necessary to calculate parameters accurately. Camera calibration was developed widely in two categories. One is that establishes reference points in space, and the other is that uses the grid type frame and statistical method. But, the former has difficult to setup reference points and the latter has low accuracy. In this paper we present an algorithm for camera calibration using perspective ratio of the grid type frame with different line widths. The advantage of this algorithm is that it can estimate position, pose and distance between camera and object...

13:20 – 13:40 **D-TP06-2**

A Study on the Distance Measurement Algorithm using Feature-Based Matching for Autonomous Navigation

Song Hyun-Sung, Lee Ho-Soon, Jeong Jun-Ik, Son Kyung-Hee and Rho Do-Hwan
(Chonbuk National Univ.)

It is necessary to distance measurement to detect about obstacles and front vehicles to autonomously navigate. In this paper, we propose an algorithm using stereo vision. It is as follows this algorithm's procedure. First, It has detected a front vehicle's common edges from left and right images by image processing. We select nember plate of a front vehicle as edges. Then, we estimate distance by triangle measurement method after stereomatching using corner points of the plate's edges as feature-based points. Experimental results show errors and values compand with experimental ones after set up distance between vehicles in advance.

13:40 – 14:00 **D-TP06-3**

A Volume Reconstruction Algorithm and a Coordinate Calibration of an X-ray Three Dimensional Imaging System

Roh Young Jun, Cho Hyung Suck, Jeon Hyoung Jo and Kim Hyeong Cheol
(KAIST)

Inspection and shape measurement of three-dimensional objects are widely needed in industries for quality monitoring and control. In this paper, we propose a three dimensional volume reconstruction method, which is an iterative method and as uniform and simulated algebraic reconstruction technique (USART). In this method, two or more x-ray images projected from different views are needed, and also the geometry of the imaging system need to be a priori identified well. That is to say, the relative locations between the x-ray source, imaging plane and the object should be determined exactly by calibration. To achieve this, we propose a series of coordinate calibration methods of the x-ray imaging system using grid pattern images. Some experimental results of these calibrations is presented and discussed in detail...

14:00 – 14:20 **D-TP06-4**

6 DOF Pose Estimation of Polyhedral Objects Based on Geometric Features in X-ray Images

Kim Jae Wan, Roh Young Jun, Cho Hyung S., Jeon Hyoung Jo and Kim Hyeong Cheol
(KAIST)

An x-ray vision can be a unique method to monitor and analyze the motion of mechanical parts in real time which are invisible from outside. Our problem is to identify the pose, i.e. the position and orientation of an object from x-ray projection images. It is assumed here that the x-ray imaging conditions that include the relative coordinates of the x-ray source and the image plane are predetermined and the object geometry is known. In this situation, an x-ray image of an object at a given pose can be estimated computationally by using a priori known x-ray projection image model. It is based on the assumption that a pose of an object can be determined uniquely to a given x-ray projection image. Thus, once we have the numerical model of x-ray imaging process, x-ray image of the known object at any pose could be estimated...

14:20 – 14:40 **D-TP06-5**

A Study on Center Detection and Motion Analysis of a Moving Object by Using Kohonen Networks and Time Delay Neural Networks

Kim Jong-Young, Hwang Jung-Ku and Jang Tae-Jeong
(Kangwon National University)

In this paper, moving objects tracking and dynamic characteristic analysis are studied. Kohonen's self-organizing neural network models are used for moving objects tracking and time delay neural networks are used for dynamic characteristic analysis. Instead of objects brightness, neuron projections by Kohonen Networks are used. The motion of target objects can be analyzed by using the differential neuron image between the two projections. The differential neuron image which is made by two consecutive neuron projections is used for center detection and moving objects tracking. The two differential neuron images which are made by three consecutive neuron projections are used for the moving trajectory estimation.

14:40 – 15:00 **D-TP06-6**

A Refinement Method for Structure from Stereo Motion

Park Sung-Kee, Kim Munsang and Kweon In So
(KIST)

For robot navigation and visual reconstruction, structure from motion (SFM) is an active issue in computer vision community and its properties are also becoming well understood. As a drawback in SFM, it is well known that the SFM methods, using small motion model such as optical flow and direct method, have inevitably motion ambiguity between translation and rotation, which is called bas-relief ambiguity. In this paper based on the robust direct method using stereo image sequence, we present a new method for improving those ambiguities. Basically, the direct method uses nearly all image pixels for estimating motion parameters and depths, and global optimization techniques are adopted for finding its solution...