MONDAY 11 FEBRUARY

DATA AND INFORMATION FUSION SYMPOSIUM

SESSION 6: APPLICATION OF DATA AND INFORMATION FUSION

On-Board Camera 3D-Motion Analysis

Uchimura Keiichi, Kumamoto University, JAPAN, Hu Zhencheng, Kumamoto University, JAPAN

Estimation of on-board camera's 3D motion has been a very important technique for autonomous robot navigation and other vision-based detecting and measuring tasks. Because of the non-linearity and continuously changing background, on-board camera's 3D-motion analysis is very complex and always employs optical flows, line matching of road lane-marks or tracking the horizon. It has to pay a huge calculation cost and is very sensitive to noise. A new estimation method with the introduction of camera's Focus of Expansion (FOE) is presented in this paper. Using the motion features of on-board camera and FOE, camera's 3D-motion parameters can theoretically be determined in our method by using only three matching pairs, which make it fast and more efficient for real-time applications comparing with the traditional methods. Experiments on simulation images and image sequences of real road scenes showed the effectiveness and precision of proposed approach.

High Density Model of Content Distribution Network

Cameron Craig, Low Steve, Wei David CALTECH, USA

It is well known that optimal server placement is NP-hard. We present an approximate model of content distribution network for the case when both clients and servers are dense, and propose a simple server allocation and placement algorithm based on high-rate quantization theory. The key idea is to regard the location of a request as a random variable with probability density that is proportional to the demand at that location, and the problem of server placement as source coding, i.e., to optimally map a source value (request location) to a codeword (server location) to minimize distortion (network cost). This view leads to a joint server allocation and placement algorithm that has a time-complexity that is linear in the number of users.

Method of Calculating Classifier Correlation for Decision Fusion

Goebel Kai, Yan Weizhong, Cheetham William, GE Corporate Research & Development, USA

This paper deals with the concept of correlation in multi-classifier fusion tasks. The need to encapsulate the degree of correlation stems from the notion that the least amount of correlation among the classifiers is desired in fusion tasks. We define a measure that captures the correlation for n classifiers for binary output. In addition, we propose correlation calculation for classifiers with continuous output. We then suggest their use in classifier selection, simulation, and within the fusion task. Using an application from fault detection for uninhabited autonomous vehicles we show how the concepts can be applied.