THE CENTRE FOR PATTERN ANALYSIS AND MACHINE INTELLIGENCE IN ASSOCIATION WITH IEEE SYSTEMS, MAN & CYBERNETICS, COMPUTATIONAL INTELLIGENCE, AND CONTROL SYSTEMS CHAPTERS OF KW SECTION PRESENTS:

The Traffic Network Analysis Based on GPS Probe Data by a New Map Matching Algorithm and a Sensor Fusion Algorithm for Road Network Data Acquisition

Speaker: Professor Takayoshi Yokota, Professor, Department of Information and Electronics, Graduate School of Engineering, Tottori University, Japan

Date: Thursday September 26, 2013

Time: 3:00 pm – 4:00 pm

Place: University of Waterloo, E5-4106-4128 *Refreshments will be served*

Abstract:

Road networks can be modeled as two layers from the viewpoint of the frequency of use of roads by vehicles. This model was derived, tested and validated from the probe car data of 300 trucks operated by 21 freight companies in the Keihanshin area, Japan.

The two layers are called high-frequency network and low-frequency-network layers. Characteristics, such as the density of probe data, average driving time, and speed of both network layers, were estimated. The Cell (or grid map) based analysis used here can be extended to acquiring road network data itself, which means that road map can be acquired from stored probe data.

A new D.P. (Dynamic Programming) based map matching algorithm is developed for the probe data analysis. As probe data acquisition tools, smart phones are very useful. I will also describe how to acquire 3-D road network data by a sensor fusion algorithm using a GPS receiver, a gyro, and an accelerator which are embedded in smart phones.

Bio:

Takayoshi Yokota is a Full Professor in the Department of Information and Electronics, Graduate School of Engineering, Tottori University, Japan, since April 2012. From April 2009 to March 2012, he was a Professor of the Advanced Transport Logistics Lab (Hanshin Expressway) in the Department of Urban Management at the Graduate School of Engineering, Kyoto University, Japan. From April 1984 to 2009, he worked at Hitachi Research Laboratory, Hitachi Ltd, Japan, as a Researcher, a Chief Researcher and a Senior Manager, responsible for the R&D of intelligent transport systems such as real time traffic information systems, traffic control systems and navigation systems. He was born in Ibaraki Prefecture in 1956. He received his B.S., M.S., and Ph.D. from Tokyo Institute of Technology in 1979, 1981, and 1984. His current research interests include analysis, modeling, spatio-temporal information processing, and sensor fusion.