

**Title:**

Smart Continuous Sensing and Monitoring

**Abstract:**

We utilize sensors to help us monitor events in the environment around us. In recent years, sensors become “small machines”, sometimes built with various devices or equipment (called *Things*) so that other than considering a sensor network, we have a more powerful machine network or *Internet of things* to manage. In the cases of intelligent transportation systems, smart homes, or weather prediction, homogeneous or heterogeneous sensory machines are deployed on things or deployed on their own to constantly sense the environment and we can use the collected readings to detect events or anomalies for further investigation. From the data analytics viewpoint, common issues in the sensory machine network or Internet of things include how to deal with tons of data (*BigData*) that are generated by sensors, how to save power consumption or transmission bandwidth in the network, and how to deal with data missing or forgery, to name a few. We aim to propose a framework to deal with sensory machine or IoT data to make a *smart* sensory machines network possible. We can use a limited amount of sensing and at the same time the sensing is effective enough to “understand” the environment without too much knowledge loss. Another important feature in our goal is to take the smart sensing action continuously. We consider the smart sensing in an online fashion so that we can analyze the data continuously to give output about environmental status at any time. To achieve that, the methodology must efficient enough so that we can continuously given reasonable result given massive data for each moment. We discuss the sensory machine network in various scales, with various sampling rate, and the sensory machines may be homogeneous or heterogeneous such that the data are with different value ranges or owning different physical meanings. Some case studies shall be focused to illustrate the effectiveness and efficiency of the proposed methodology.

**Short Bio:**

Hsing-Kuo Pao (Kenneth) received the bachelor degree in mathematics from National Taiwan University, and M.S. and Ph.D. degrees in computer science from New York University. From 2001 to 2003, he was a post-doctorate research fellow in the University of Delaware, and later he joined in Vita Genomics as a research scientist. In 2003, he joined the department of computer science and information engineering in National Taiwan University of Science and Technology, and now he is an associate professor. His current research interests include machine learning, IoT/M2M, and information security.