



Cheng-Lin Liu is a Professor at the National Laboratory of Pattern Recognition (NLPR), Institute of Automation of Chinese Academy of Sciences, Beijing, China, and is now the director of the laboratory. He received the B.S. degree in electronic engineering from Wuhan University, Wuhan, China, the M.E. degree in electronic engineering from Beijing Polytechnic University, Beijing, China, the Ph.D. degree in pattern recognition and intelligent control from the Chinese Academy of Sciences, Beijing, China, in 1989, 1992 and 1995, respectively. He was a postdoctoral fellow at Korea Advanced Institute of Science and Technology (KAIST) and later at Tokyo University of Agriculture and Technology from March 1996 to March 1999. From 1999 to 2004, he was a research staff member and later a senior researcher at the Central Research Laboratory, Hitachi, Ltd., Tokyo, Japan. His research interests include pattern recognition, image processing, neural networks, machine learning, and especially the applications to character recognition and document analysis. He has published over 200 technical papers at prestigious international journals and conferences. He won the IAPR/ICDAR Young Investigator Award of 2005. He is an associate editor-in-chief of Pattern Recognition Journal, an associate editor of Image and Vision and Computing, International Journal on Document Analysis and Recognition, and Cognitive Computation. He is a Fellow of the IAPR and the IEEE.

Title: Deep Prototype Learning for Robust Pattern Recognition

Existing pattern classification studies mostly concern the generalized classification accuracy, but ignore the rejection and robustness in open world. In recent years, deep learning methods achieved huge successes in pattern recognition, but the popular deep neural networks show inferior generalization when training with small sample and robustness to noise and outlier. In the talk, I first explain the robustness of pattern recognition, and introduce some methods for improving the robustness from the viewpoint of rejection. The rejection methods fall in two categories: ambiguity rejection and outlier rejection, which are based on different models and learning methods. I will give the formulations of two rejection modes and introduce some methods. Last, I will introduce a newly proposed deep learning method for robust pattern classification: deep convolutional prototype learning (CPL). The CPL uses a prototype classifier for classification, which is inherently robust to outlier. And combining with feature learning by convolutional neural network (CNN), the CPL yields high classification accuracy. Through regularization based on maximum likelihood (ML), the generalization performance on small sample and robustness can be further improved. The CPL model also shows potential in domain adaptation, online learning, novel class discovery, and so on.