北京航空航天大學 BEIHANG UNIVERSITY

USC University of Southern California

报 告 人：美国南加州大学 C.-C. Jay Kuo 教授

报告时间：2019 年 12 月 25 日（星期三）上午 10:00

报告地点：北航新主楼第八会议室

报告题目：From Feedforward-Designed Convolutional Neural Networks (FF-CNNs) to Successive Subspace Learning (SSL)

报告摘要 Abstract: Given a convolutional neural network (CNN) architecture, its network parameters are typically determined by backpropagation (BP). The underlying mechanism remains to be a black-box after a large amount of theoretical investigation. In this talk, I will first describe a new interpretable feedforward (FF) design with the LeNet-5 as an example. The FF-designed CNN is a data-centric approach that derives network parameters based on training data statistics layer by layer in a one-pass feedforward manner. To build the convolutional layers, we develop a new signal transform, called the Saab (Subspace approximation with adjusted bias) transform. The bias in filter weights is chosen to annihilate nonlinearity of the activation function. To build the fully-connected (FC) layers, we adopt a label-guided linear least squared regression (LSR) method. To generalize the FF design idea furthermore, we present the notion of "successive subspace learning (SSL)" and present a couple of concrete methods for image and point cloud classification. Experimental results are given to demonstrate the competitive performance of the SSL-based systems. Similarities and differences between SSL and deep learning (DL) are compared.

报告人简介 Bio： Dr. C.-C. Jay Kuo received his Ph.D. degree from the Massachusetts Institute of Technology in 1987. He is now with the University of Southern California (USC) as Director of the Media Communications Laboratory and Distinguished Professor of Electrical Engineering and Computer Science. His research interests are in the areas of media processing, compression and understanding. Dr. Kuo was the Editor-in-Chief for the IEEE Trans. on Information Forensics and Security in 2012-2014. Dr. Kuo is a Fellow of AAAS, IEEE and SPIE. He has guided 150 students to their Ph.D. degrees and supervised 29 postdoctoral research fellows. Dr. Kuo is a co-author of 280 journal papers, 920 conference papers and 14 books. Dr. Kuo received the 2016 IEEE Computer Society Taylor L. Booth Education Award, the 2016 IEEE Circuits and Systems Society John Choma Education Award, the 2016 IS&T Raymond C. Bowman Award, the 2017 IEEE Leon K. Kirchmayer Graduate Teaching Award, the 2017 IEEE Signal Processing Society Education Award, and the 2019 IEEE Computer Society Edward J. McCluskey Technical Achievement Award.

邀请单位：北航计算机学院　　联系人：张永飞　82314108