

Order Learning and Its Applications to Computer Vision

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Abstract

In this talk, we first discuss order learning to determine the order graph of classes, representing ranks or priorities, and classify an object instance into one of the classes. To this end, we design a pairwise comparator to categorize the relationship between two instances into one of three cases: one instance is ‘greater than,’ ‘similar to,’ or ‘smaller than’ the other. Then, by comparing an input instance with reference instances and maximizing the consistency among the comparison results, the class of the input can be estimated reliably.

Second, we extend the theory of order learning by introducing several concepts, such as deep repulsive clustering (DRC), order-identity decomposition (ORID), moving window regression, and geometric order learning. Furthermore, we discuss how to apply order learning in the cases of weakly supervised and unsupervised settings. Experimental results on facial age estimation, aesthetic score regression, and historical color image classification show that the proposed algorithm can cluster ordered data effectively and yield excellent rank estimation performance.

Short Bio



Chang-Su Kim received the Ph.D. degree in electrical engineering from Seoul National University with a Distinguished Dissertation Award in 2000. From 2000 to 2001, he was a Visiting Scholar with the Signal and Image Processing Institute, University of Southern California, Los Angeles. From 2001 to 2003, he coordinated the 3D Data Compression Group in the National Research Laboratory for 3D Visual Information Processing in SNU. From 2003 to 2005, he was an assistant professor in the Department of Information Engineering, Chinese University of Hong Kong. In Sept. 2005, he joined the School of Electrical Engineering, Korea University, where he is a professor. His research topics include image processing, computer vision, and machine learning. He has published more than 330 journal and conference papers. In 2009, he received the IEEK/IEEE Joint Award for Young IT Engineer of the Year. In 2014, he received the Best Paper Award from the Journal of Visual Communication and Image Representation (JVCI). He was a member of the Multimedia Systems & Application Technical Committee (MSATC) of the IEEE Circuits and Systems Society. Also, he was an APSIPA Distinguished Lecturer for the term 2017-2018. He served as an Editorial Board Member of JVCI, an Associate Editor of IEEE Transactions on Image Processing, and an Associate Editor of IEEE Transactions on Multimedia. He is a Senior Area Editor of JVCI. Dr. Kim is an IEEE Fellow.