

# Broad Learning System and its Structural Variations

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**Abstract:** After a very fast and efficient discriminative Broad Learning System (BLS) that takes advantage of flatted structure and incremental learning has been developed, this talk will discuss mathematical proof of the universal approximation property of BLS. In addition, the framework of several BLS variants with their mathematical modellings are given. The variations include cascade, recurrent, and broad-deep combination that cover existing deep-wide/broad-wide structures. From the experimental results, the BLS and its variations outperforms several exist learning algorithms on regression performance over function approximation, time series prediction, and face recognition databases.

## Short bio



Dr. Chen's research areas are in systems, cybernetics and computational intelligence. He is a Fellow of the IEEE, AAAS, and IAPR. He was the President of IEEE Systems, Man, and Cybernetics Society (SMCS) (2012-2013), where he also has been a distinguished lecturer for many years and received Outstanding Service Awards 4 times. Currently, he is the Editor-in-Chief of IEEE Transactions on Systems, Man, and Cybernetics: Systems (2014-). He has been an Associate Editor of several IEEE Transactions, and currently he is an Associate Editor of IEEE Trans on Fuzzy Systems, IEEE

Trans on Cybernetics, and IEEE/CAA Automatica Sinica. He was the Chair of TC 9.1 Economic and Business Systems of IFAC (2015-2017). He is also a Fellow of CAA and Fellow of HKIE and an Academician of International Academy of Systems and Cybernetics Science (IASCYS). In March 2018, he is listed in world top 14 having the most highly cited paper in computer science area by WoS. In addition, he is an ABET (Accreditation Board of Engineering and Technology Education, USA) Program Evaluator for Computer, Electrical, and Software Engineering programs. University of Macau's Engineering and Computer Science programs receiving HKIE's accreditation and Washington/Seoul Accord is his utmost contribution in engineering education for Macau as the former Dean. During his deanship, the engineering and computer science programs both have been ranked at world top 200 in the Times Higher Education (THE) world university ranking. The computer science program is also ranked at world top 161 in the US News and World Report global university ranking. Dr. Chen received Outstanding Electrical and Computer Engineering Award in 2016 from his alma mater, Purdue University, West Lafayette, where he received his Ph.D. degree in 1988, after he received his M.S. degree in electrical engineering from the University of Michigan, Ann Arbor, in 1985.