

FASTA-ELM: a fast adaptive shrinkage/thresholding algorithm for extreme learning machine and its application to gender recognition

ABSTRACT

Extreme learning machine (ELM) is an interesting algorithm for learning the hidden layer of single layer feed forward neural networks. However, one of the main shortcomings restricting further improvement of ELM is the complexity of singular value decomposition(SVD) for computing the Moore-Penrose generalized inverse of the hidden layer matrix. This paper presents a new algorithm named fast adaptive shrinkage/thresholding algorithm ELM (FASTA-ELM) which uses an extension of forward-backward splitting (FBS) to compute the smallest norm of the output weights in ELM. The proposed FASTA-ELM algorithm is evaluated on face gender recognition problem using 5 benchmarked datasets. The results indicate that FASTA-ELM provides efficient performance and outperforms the standard ELM and two other variants of ELM in terms of generalization ability and computational time. Furthermore, the recognition performance of FASTA-ELM is comparable to other state-of-the-art face gender recognition methods.

Keyword: Fast adaptive shrinkage/thresholding; Extreme learning machine; Hidden node selection; Feature representation; Face gender recognition