

# Abstract

Feature selection and model selection are pillars of any classification problems. Bottom-up integrated feature and architecture selection is useful for the optimal neural networks construction for an available training data set. From the algorithm, it is easy to find appropriate architecture for any number of features with acceptable classification rate. Besides, the feature selection approach along with architecture selection gives an advantage of defeating a requirement of a prior knowledge of setting fixed number of features as other researchers did. Furthermore, proposed algorithm gives a chance to decide which pillar comes first for the acceptable solution of the underlie problem. Consequently, it enables practitioners to overcome the investigation of appropriate network topology using trial and error methodology. The proposed algorithm gives us faster, reliable accuracy and less resource usage with likelihood ratio test, cross validation and regularization measures. The other advantage of this algorithm overcomes the burden of computational cost and exhaustive searching for ideal architecture even though it may be not suitable for the proponent of middle ground between accuracy and speed. The algorithm is tested on new benchmark (Geez characters) and common available character recognition feature sets (“0” - “9”) handwritten English numerals.