

I.E. Livieris, M.S. Apostolopoulou, D.G. Sotiropoulos, S.A. Sioutas and P. Pintelas, [Classification of Large Biomedical Data using ANNs based on BFGS method](#)

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Abstract - Artificial neural networks (ANN) have been widely used for knowledge extraction from biomedical datasets and constitute an important role in bio-data exploration and analysis. In this work, we proposed a new curvilinear algorithm for training large neural networks which is based on the analysis of the eigenstructure of the memoryless BFGS matrices. The proposed method preserves the strong convergence properties provided by the quasi-Newton direction while simultaneously it exploits the nonconvexity of the error surface through the computation of the negative curvature direction without using any storage and matrix factorization. Moreover, for improving the generalization capability of trained ANNs, we explore the incorporation of several dimensionality reduction techniques as a pre-processing step.