Abstract

In this paper we are studying the tolerance of Hopfield neural network for storage and recalling of fingerprint images. The feature extraction of these images is performed with FFT, DWT and SOM. These feature vectors are stored as associative memory in Hopfield Neural Network with Hebbian learning and Pseudoinverse learning rules. The objective of this study is to determine the optimal weight matrix for efficient recalling of the memorized pattern for the presented noisy or distorted and incomplete prototype patterns from the Hopfield network. This study also explores the tolerance in Hopfield neural network for reducing the effect of false minima in the recalling process. Besides this the capabilities of learning rules for pattern storage is also analyzed. This study also exhibits the analysis as pattern storage networks for feature vectors obtained from SOM with FFT and DWT

References

- W. Tarkowski, M. Lewenstein, A. Nowak, "Optimal Architectures for Storage of Spatially Correlated Data in Neural Network Memories", ACTA Physica Polonica B, 1997,
- Gang Wei, Zheyuan Yu, "Storage Capacity of Letter Recognition in Hopfield Networks", Faculty of Computer Science, Dalhousie University, http://citeseer.ist.psu.edu/584397.html
- Christophe L. Labiouse, Albert A. Salah, Irina Starikova, "The Impact of Connectivity on the Memory Capacity and the Retrieval Dynamics of Hopfield –type Networks", Proc. Of the Santa Fe Complex Systems Summer School, pp. 77-84
Tolerance of Pattern Storage Network for Storage and Recalling of Compressed Image using SOM


Index Terms

Computer Science
Pattern Recognition
Keywords
Pattern Storage Network  Hopfield Neural Network  Associative Memory  SOM
Unsupervised Learning
Fast Fourier Transform
Discrete Wavelet Transform