Chapter 16
Contribution of Neural Networks in Different Applications

Bhushan Patil
Mumbai University, India

Manisha Vohra
Mumbai University, India

ABSTRACT

Neural networks are very useful and are proving to be very beneficial in various fields. Biomedical applications such as breast cancer image classification, differentiating between the malignant and benign type of breast cancer, etc. are now seen to be making use of neural networks rapidly. Neural networks are showing remarkable results of their effectiveness in these biomedical applications and are proving to be immensely profitable. Another field such as agriculture, which is a very crucial field for survival of human life, can be benefitted from neural networks. Likewise, various fields can gain enormous benefits from the usage of neural networks. This chapter shall explain neural networks in detail. Also, the authors shall provide a brief and detailed insight of the contribution of neural networks in different applications, along with its analysis.

WHAT IS NEURAL NETWORK?

A system consisting of a combination of hardware and software platform which is developed and modelled on the basis of human brain neurons is called as neural network. It consists of artificial neurons. It is basically a type of deep learning technology. It has the human ability of learning things and it keeps on learning and acts accordingly.

OVERVIEW OF HISTORY OF NEURAL NETWORKS

Many people have contributed in the development of neural networks. Their contributions are as follows:

- **1943**: Warren McCulloch, a neurophysiologist and Walter Pitts, a mathematician came together and wrote regarding artificial neurons. They also developed and modeled neural network. This was the first time when neural networks were introduced to the world.
- **1949**: Donald O. Hebb wrote a book titled “The Organization of Behavior” which gave information regarding neural networks learning process and explained regarding neurons. It stated that connection of two neurons strengthens when both of them are activated at the same time.
- **1951**: Marvin Minsky developed a neurocomputer for neural networks that adjusted weights automatically but it was not implemented practically.
- **1956**: A memory network was developed and research regarding neural networks and neurons was continued.
- **1958**: Frank Rosenblatt developed and successfully implemented Mark I Perceptron which was a neurocomputer having the capability of recognizing different numerical using image sensor and it helped in cases where input classes were separable linearly.
- **1960**: Bernard Widrow and Marcian E. Hoff developed Adaptive Linear Neuron (ADALINE). It was the first commercially used neural network.
- **1961**: Karl Steinbuch implemented the concept of associative memory. These implementations are seen as the predecessors of present neural networks associative memory. He even explained various concepts for neural networks.
- **1965**: In this year, Nils Nilsson wrote a book titled Learning Machines which explained about neural networks and also stated regarding their progress.
- **1969**: Marvin Minsky and Seymour Papret published a discovery regarding Perceptron.
- **1972**: During this year, Teuvo Kohonen developed associative memory.
- **1973**: Christoph Malsburgh made use of a neuron model.
- **1974**: Paul Werbos introduced and developed a learning method called backpropagation of error.
- **1976**: Gail Carpenter and Stephen Grossberg introduced and developed adaptive resonance theory.
- **1982**: John Hopfield developed the energy network called the Hopfield energy network.
- **1985**: Hinton, Sejnowski and Ackley introduced and developed Boltzmann machine.
- **1986**: Hinton, Rumelhart and Williams introduced the generalized Delta rule.
- **1988**: In this year, Kosko introduced fuzzy logic concept in ANN and also introduced and developed Binary Associative Memory (BAM).

Time to time constant progress was made in development of neural networks and till today neural networks are constantly improving and are being included in various applications. The constant progress of neural networks are providing enormous opportunities to different sectors as neural networks can help and benefit different sectors to a great extent. Sectors like biomedical, agricultural, etc. can largely gain advantages from introduction of neural networks. These applications shall be viewed and explained in brief later on in this chapter.
10 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product’s webpage: www.igi-global.com/chapter/contribution-of-neural-networks-in-different-applications/234130?camid=4v1

This title is available in Advances in Computational Intelligence and Robotics, InfoSci-Books, InfoSci-Computer Science and Information Technology, InfoSci-Science and Engineering, Science, Engineering, and Information Technology. Recommend this product to your librarian: www.igi-global.com/e-resources/library-recommendation/?id=77

Related Content

Complex-Valued Symmetric Radial Basis Function Network for Beamforming
Sheng Chen (2009). Complex-Valued Neural Networks: Utilizing High-Dimensional Parameters (pp. 143-167).
www.igi-global.com/chapter/complex-valued-symmetric-radial-basis/6768?camid=4v1a

A Theoretical and Empirical Study of Functional Link Neural Networks (FLANNs) for Classification
www.igi-global.com/chapter/theoretical-empirical-study-functional-link/41681?camid=4v1a

Introduction to Machine Learning and Its Implementation Techniques
www.igi-global.com/chapter/introduction-to-machine-learning-and-its-implementation-techniques/234132?camid=4v1a

Deep Learning: Architectures and Applications
www.igi-global.com/chapter/deep-learning/227847?camid=4v1a