

## Chapter 3

# Fundamental Categories of Artificial Neural Networks

**Arunaben Prahladbhai Gurjar**  
*Ganpat University, India*

**Shitalben Bhagubhai Patel**  
*Ganpat University, India*

### ABSTRACT

*The new era of the world uses artificial intelligence (AI) and machine learning. The combination of AI and machine learning is called artificial neural network (ANN). Artificial neural network can be used as hardware or software-based components. Different topology and learning algorithms are used in artificial neural networks. Artificial neural network works similarly to the functionality of the human nervous system. ANN is working as a nonlinear computing model based on activities performed by human brain such as classification, prediction, decision making, visualization just by considering previous experience. ANN is used to solve complex, hard-to-manage problems by accruing knowledge about the environment. There are different types of artificial neural networks available in machine learning. All types of artificial neural networks work based of mathematical operation and require a set of parameters to get results. This chapter gives overview on the various types of neural networks like feed forward, recurrent, feedback, classification-predication.*

DOI: 10.4018/978-1-7998-4042-8.ch003

## CONVOLUTIONAL NEURAL NETWORKS

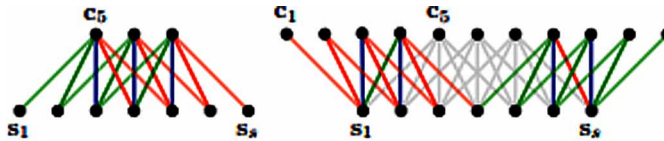
A CNN architecture consists of different ConvNet stages. For each degree winding of the following comparison module / Sub sampling order module. While the traditional clustering ConvNet modules conceal the average or most of the groups, this grouping uses LP. Ordinance and that, unless it is to become a parameter, as opposed to subtractive. Subtractive is not division, that is, on the average of the value of each of its immediate surroundings; own extended withdrawn(Lawrence,1997). Finally, as is known, also multi-stage the functions that are used in place of the same rank.

One-dimensional convolution is an operation between a vector of weight  $m \times 2$  Rs and vector entries seen as a series of  $s \times 2$  Rs. The carrier  $m$  is the convolution filter. In particular, we think of it as an insertion phrase and yes  $2 \times R$  is a unique function value associated with the  $i^{\text{th}}$  word of the phrase. The idea behind the one-dimensional convolution is to take the point product of the vector  $m$  with every  $m$ -gram in the sentence  $s$  another series  $c$ :

$$c_j = m \mid s_j - m + 1 : j \quad (1)$$

Equation 1 gives rise to two types of convolutions according to the scope of the J. Lo trait index the type of convolution requires that  $s \geq$  give me a series  $c \times 2$  Rs- $m + 1$  with  $j$  going from  $m$  one  $s$ . The broad type of convolution does not have this requirements for  $s$  or  $m$  and give a series of  $c \times 2$  Rs +  $m-1$  where the index  $j$  varies from 1 to  $s + m - 1$ . Enter out of range values where  $i < 1$  where  $i > s$  are considered zero. The result of the narrow convolution is a partial sequence of the result of wide convolution (Cireřan,2011). Two types of one dimensional convolution are illustrated in Fig. 1.

Figure 1. Narrow and wide types of CNN  
 $m=5$



33 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/fundamental-categories-of-artificial-neural-networks/262908](http://www.igi-global.com/chapter/fundamental-categories-of-artificial-neural-networks/262908)

## Related Content

---

### Astrocytes and the Biological Neural Networks

Eduardo D. Martinand Alfonso Araque (2006). *Artificial Neural Networks in Real-Life Applications* (pp. 22-46).

[www.irma-international.org/chapter/astrocytes-biological-neural-networks/5362](http://www.irma-international.org/chapter/astrocytes-biological-neural-networks/5362)

### A Journey From Neural Networks to Deep Networks: Comprehensive Understanding for Deep Learning

Priyanka P. Patel and Amit R. Thakkar (2022). *Research Anthology on Artificial Neural Network Applications* (pp. 85-110).

[www.irma-international.org/chapter/a-journey-from-neural-networks-to-deep-networks/288952](http://www.irma-international.org/chapter/a-journey-from-neural-networks-to-deep-networks/288952)

### Financial Asset Management Using Artificial Neural Networks

Roohollah Younes Sinaki, Azadeh Sadeghi, Dustin S. Lynch, William A. Young and Gary R. Weckman (2022). *Research Anthology on Artificial Neural Network Applications* (pp. 1359-1380).

[www.irma-international.org/chapter/financial-asset-management-using-artificial-neural-networks/289017](http://www.irma-international.org/chapter/financial-asset-management-using-artificial-neural-networks/289017)

### Flexible Blind Signal Separation in the Complex Domain

Michele Scarpiniti, Daniele Vigliano, Raffaele Parisi and Aurelio Uncini (2009). *Complex-Valued Neural Networks: Utilizing High-Dimensional Parameters* (pp. 284-323).

[www.irma-international.org/chapter/flexible-blind-signal-separation-complex/6773](http://www.irma-international.org/chapter/flexible-blind-signal-separation-complex/6773)

### Digital Mechanisms of Management System Optimization in the Forest Industry

Yulia Vertakova, Saniyat Agamagomedova, Irina Sergeeva, Andrey Tarasov, Svetlana Morkovina, Enric Seedine and Potapova Irina (2020). *Avatar-Based Control, Estimation, Communications, and Development of Neuron Multi-Functional Technology Platforms* (pp. 174-198).

[www.irma-international.org/chapter/digital-mechanisms-of-management-system-optimization-in-the-forest-industry/244792](http://www.irma-international.org/chapter/digital-mechanisms-of-management-system-optimization-in-the-forest-industry/244792)