



Cover Image

## Similarity of Thorn Bush with Neuronal Network and its Interconnectivity in Neuroscience

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### Abstract

Our brain has 100 billion neurons with trillions of synaptic connections between them which interact to form a coherent representation of the outside world. The simplest definition of a neural network, more properly referred to as an 'artificial' neural network, is provided by Dr. Robert Hecht-Nielsen. He defines a neural network as a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs. There are many neuron wallpapers in the world of neuroscience that gives us a realistic image of the neurons and the network connectivity, but it is interesting when we see such an image in the nature. We present a photograph taken from a thorn bush in a hill near Shiraz, Iran, that at the first glance shares a striking resemblance with a neuronal network and its interconnectivity of the human brain.

### Keywords

Neuronal network; Brain, Neuron; Synaptic connections; Thorn bush

### Image Description

The most sophisticated part of the nervous system is the brain. It can be considered as a highly complex, nonlinear and parallel information-processing system [1]. The basic elements of the brain are the neural cells called neurons [2]. The phenomenal features of the brain would not be possible without the hundreds of billions of neurons with trillions of synaptic connections between them which interact to form a coherent representation of the outside world [1,3]. On average, each neuron is connected to other neurons through about 10 000 synapses [4]. The neurons are joined into neural networks [5]. The extraordinary strength of neural network results from the immense number of neurons in the network and the number of connections between neurons. The human brain can be described as a biological neural network-an interconnected web of neurons transmitting elaborate patterns of electrical signals [5]. Naturally enough, a network of neurons is the composition of the nonlinear functions of two or more neurons [6]. A true neural network does



**Figure 1:** A photograph taken from a thorn bush in a hill near Shiraz, Iran, shares a striking resemblance with a neuronal network and its interconnectivity of the human brain.

not follow a linear path. Rather, information is processed collectively, in parallel throughout a network of nodes (i.e., neurons). The simplest definition of a neural network, more properly referred to as an 'artificial' neural network, is provided by the inventor of one of the first neurocomputers, Dr. Robert Hecht-Nielsen [5,7]. He defines a neural network as a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs [5]. A first wave of interest in neural networks (also known as 'connectionist models' or 'parallel distributed processing') emerged after the introduction of simplified neurons by McCulloch and Pitts in 1943 [8]. Although the mathematics involved with neural networking is not a trivial matter, a user can rather easily gain at least an operational understanding of their structure and function. There are many neuron wallpapers in the world of neuroscience that gives us a realistic image of the neurons and the network connectivity. It is also interesting when we see such an image in the nature. At the first glance, Figure 1, which is a photograph taken from a thorn bush in a hill near Shiraz, Iran, shares a striking resemblance with a neuronal network and its interconnectivity of the human brain (Figure 1).

### Conflicts of Interest

The authors declare no conflict of interest.

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