



HOW NEURAL NETWORKS WORK

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Manuscript History

Number: IJIRAE/RS/Vol.05/Issue01/DCAE10085

DOI: 10.26562/IJIRAE.2018.DCAE10085

Received: 02, December 2017

Final Correction: 27, December 2017

Final Accepted: 19, January 2018

Published: **January 2018**

Citation: Balakrishnan, Ragul & Hijaz (2018). HOW NEURAL NETWORKS WORK. IJIRAE::International Journal of Innovative Research in Advanced Engineering, Volume V, 19-21. doi: 10.26562/IJIRAE.2018.DCAE10085

Editor: Dr.A.Arul L.S, Chief Editor, IJIRAE, AM Publications, India

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Abstract— A neural is a system hardware or software that is patterned to function and was named after the neurons in the brains of humans. A neural network is known to involve several huge processors that are arranged and work in the parallel format for effectiveness. Applications include: handwriting recognition, oil data analysis, weather forecast prediction and face recognition.

Keywords— Neural; Networks; brain; data; system;

I. INTRODUCTION

In computing and computer science, a neural is a system hardware or software that are patterned to function and was named after the neurons in the brains of humans (Hagan et al, 8). They are several and different types of learning technologies. In most times they are used commercially to solve very complex problems that would otherwise not be solved by the human brain itself.

II. WORKINGS AND APPLICATIONS

Most common examples of the application of this since 2000 include: handwriting recognition, oil data analysis, weather forecast prediction and face recognition. A neural network is known to involve several huge processors that are arranged and work in the parallel format for effectiveness. They are arranged in tiers. The tiers work in a successive system in that raw output is received by the first tier which decodes it. The successive tiers obtain this processed information from the first tier hence they do not receive raw data. They only receive the processed input and pass it on to the next tier in that order. The last tier in this sequence is the line that produces the output of the system.



In neural networking, there are processors arranged in nodes that are said to have their knowledge of what they are expected to do. In other words, the nodes are programmed in such a way that they only perform the duties for which they were made to do (Dayhoff, 24). Because there are several tiers in this system, they are highly interconnected with each other. Each tier is connected to a node from which it operates forming a chain.

Just like the neurons in the human brain, neural have a unique characteristic of being adaptive to their environment. To perform the desired function, a neural has to adapt to its environment. It is very interesting that they have a capability of learning the environment in which they are in first. This is done through the collection of information concerning a particular environment. They can learn in all types of environments across the world. The main reason as to why they have to learn first is to provide detailed information about the world. The simplest tested way that neural learns is through the input they receive. The nodes through these inputs can weigh which input is more important and hence is given more weight. As a result, they are processed fast as they are passed from one node to the other, one tier to the other till the input data is ready and decoded for output.

The learning process is a little complex because it also involves training. The training involves the input of huge data into the neural network and telling the system which output it should give. A typical example on this is a case where students are to be identified in class. Because it has to be a specific class, pictures of students from that class, as well as pictures of those students who are not members of the class, has to be fed to the system continuously. This is an induction form of training. Animal faces and masks must also be run through the system to develop accuracy.

These inputs are accompanied by the matching names of the images fed to it. For example, students from that class may be given the title of "student," and those from other class may be given the title "non-student." Because the system is dealing with human beings in this regard, the animal faces and masks are likely to be named "non-human." This is an induction form of training because providing the system with such systems makes it learn how to work better eliminating minor errors (Lam et al, 113). This training has been proven to be so, and effective has been used since the development of neural networks. To test the system, it is put to work to enable it to reduce the weight it gives to information that it considers not accurate. For example, when it is tested, and it gives an output that is not correct, it is corrected, and the right information fed to it. After receiving this new information, the systems automatically give lighter weight to such and puts more weight on the correct information.

There are rules that are defined by the system, for example, each node has to decide on the information it passes to the next tie. This is determined by the input of information that it receives from the previous tier. Neural networks are known to use very many principles. Sometimes when training neural, they are given specific relationships between objects. For example, in the face recognition technology, neural may be programmed and made aware that the eyebrows are just above the eyes. This relationship makes it easy to identify the face of a person with very minimal or no error at all.

Neural networks have been defined by their depths in the past (Latham, Peter & Venkatesh N Murthy, 321). These depths are determined in terms of the number of layers a neural has between the input and the output. They also have a model known as the hidden layers. The number of input and output each node has may also be used to define a neural system.

III. CONCLUSION

The way in which neural networks work is similar to the human brain. The human brain is the part of the body or part that controls the entire body of a being. The neurons in the brain are known to adapt to situations or conditions in an environment and adapt to it. This is the same way the neural works. The human brain uses its neurons to process information that it receives before deciding on the best way to react to it. Sometimes it chooses to react, and sometimes it doesn't. A neural network system also works the same as far as the decoding of information is concerned. The same way a neural system is designed in the same way the neurons in the human brains work. The major difference is that the neurons are natural while a neural system is artificial and only borrowing the manner in which the human brain works.



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