

Capabilities of Computer Algorithm Utilizing Artificial Neural Networks and its Implications to Economy: A Public Policy Analysis

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Abstract

The massive abundance of studies pertinent to Artificial Neural Networks (ANN) has produced exciting and dulcet effects on different industries and academic disciplines. Albeit the findings of the studies relating to ANNs invite potential enterprising opportunities, it is an incontestable fact that these enterprising opportunities, like fruits of the ANNs, valiantly interpose an economic threat to the working manpower. Employment retrenchment is portending as companies opt to enjoy the benefit yielded from the application and use of ANN mechanisms. ANNs will overshadow and replace the working manpower. This study is a meta-analysis that profoundly discourses on the implications of economic issues embedded in the application and use of ANNs. The findings hereof are critical and material considerations in the craft of effective public policy measures that necessarily balance the economic impact of the ANNs to working manpower. Thus this study aims to answer two primary inquiries; (1) what are the economic implications of the application and use of ANNs? and (2) what public policy measures balance the economic downsides of the application and use of ANNs?

Keywords: *Artificial Neural Networks, Algorithm, Central Processing Unit, Artificial Intelligence*



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INTRODUCTION

The artificial neural network is an arithmetic logic model for integrating sensory information received so that an action or response is generated between input and output. It is a computer architecture in which several processors interconnect between neurons in a human brain, which can learn by trial-and-error methods. Thus, ANNs can handle complex forms of data to generalize the indication of what is going to happen.

Artificial Neural Networks have known to be inefficient before the fusion of advances in artificial intelligence, IoT, etc. They gradually become powerful and are one of the most popular machine learning models and become a part of artificial intelligence because of the undefined result no other model can make it. To go upgrading of and innovation in technology which enhance human-machine relationships is the primary concern of having an artificial neural network. Because we face challenges in 4IR, accept that the opportunities and challenges are multifaceted and complex. Using automation and artificial intelligence are some of the 4th Industrial Revolution technology transfers. Artificial neural networks are the mainstream success of

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machine learning and artificial intelligence. Thus, this study focuses on the Capabilities of Computer algorithms like the Human Brain Utilizing Artificial Neural networks.

LITERATURE REVIEW

According to Wankar (2014), Artificial Neural Networks have characteristics in common, like the system unit of the computer interconnected with the input/output devices, including a processor and other interrelated technical support within the system.

According to Kumar (2017), Neural Network is a state that gives information or signal processing associated with a mathematical model based on the biological neural networks. Artificial neural networks are known for the function of iterative algorithms for creating networks, in feedbacks, dendrite, which can operate in supervised and unsupervised in interconnected neurons that provide an exciting alternative for complex problem solving and other applications. To address the issues of pattern recognition, prediction, optimization, etc., researchers from different disciplines have designed artificial neural networks in solving the problem, issues, and other concerns.

According to Sannaki (2016), the Artificial Neural Network is a fundamental means for providing a trial and error in modeling information processing capabilities in the artificial nervous system that plays a role in cognitive science. ANNs are a step-by-step procedure like computer algorithms that can learn by giving instructions on skills, knowledge, or experience acquired. Because of this feature, they are often well suited for modeling complex and not linear processes. They are greatly developed beyond an initial stage and able to compute like human beings.

According to Mijwil M.M., a piece of information such as the unprogressive programming in the past practices or established were usually stored in the whole network storage. The loss of data and other information in one place does not prevent the network from functioning.

Incomplete knowledge capability works: After ANN training, the missing data and incomplete information may produce inefficient outputs resulting in the loss of performance.

- Have fault-tolerance. The weak cells of an artificial neural network do not preclude it from generating output. This feature makes the networks fault-tolerant.
- Have a distributed memory. For ANN to learn, it is necessary to find out or come to a decision about the accuracy in terms of holistic testing of the network system according to the desired output by showing it to the networks. The network's success is dependent on the selected instances, but it doesn't mean that the networks in all aspects can produce false output.
- Gradual corruption: The gradual corruption of the network depends upon the periodic inspection from concerned maintenance. But it does not immediately corrode.
- The capability of machine learning. By looking at the same process, it can make decisions and learn events to Artificial Networks.
- The capability of parallel processing. An artificial neural network can withstand for a long period of time provides proper security and maintenance to ensure enough strength to perform more than one job simultaneously.

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RESEARCH METHODOLOGY

This is a meta-analysis study that employed a qualitative research method. Meta-analysis is a statistical approach to develop a systematic overview of the effects of points of a study. The process of gathering the data of this study was divided into four phases: Data import, Screening of articles, Extraction of data, and Statistical analysis. Each of the phases was subjected to critical review.

FINDINGS AND DISCUSSION

Result

Artificial neural networks are the essential tools used in machine learning. The artificial neural networks tend to replicate the way that the human learns in real-time. The input, hidden, and output layers are essential elements in the Artificial Neural Network that transform the raw data into something that the output layer can use.

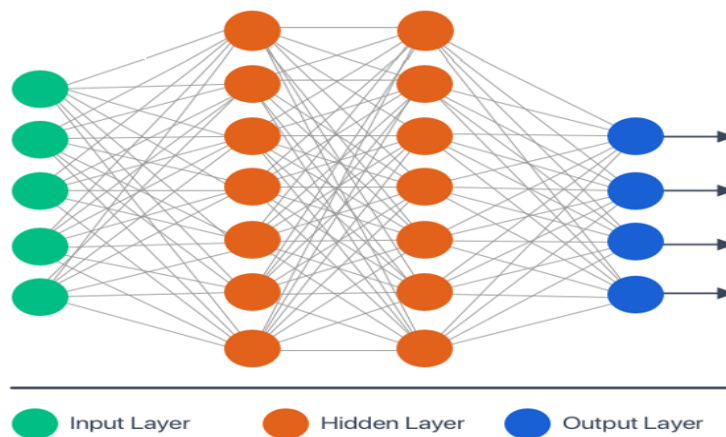


Figure 1. Artificial Neural Network

The artificial neural network has a learning ability that makes them so powerful and essential for various tasks. It is a piece of a computing design to stimulate in such a way the human brain analyzes and processes information. It is how a biological neuron works by adding together the values of the inputs it receives. If it is more than the threshold, it sends its signal to its output to which other neurons receive, and the process is called a feedforward network. Feedforward is a neural network that operates only in one direction from the input layer pass through the hidden layer, and goes forward to the output layer. The cell is a node in the layer-able to receive conveying nerve impulses from the sense organs to the nerve centers within the neural networks.

To know an Artificial Neural Network, one must go beyond what it has done wrong and is doing right, which is called feedback. It is how we learn what it has done wrong and doing

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right, and this is also what ANNs need to know. It is where you start to see similarities to the human brain.

If you want to learn Volleyball, and if you strongly hit the ball, it will go outside the court and lose the points. But if you hit it enough over the net onto the other side in the court, you could gain a point. It is a classic example of feedback where you lose the score or potentially earn points. And this is what we learn about right or wrongdoing. It is what a neural network needs to know.

Feedback is the process in which neural networks have learn something the way the human brain learns. Backpropagation is just a way of the spreading of something that uses a step-by-step procedure of

the disappearance of all cells within the neural networks and determines the loss of every node, who is responsible for providing and updating the weights as well as to minimizing the node with higher errors, functioning from the result in the artificial neural network, in the hidden neurons, and pass through the input layer going backward. Backpropagation is an algorithm used in the training of neural network simulation or design to calculate a graded difference in psychological activity along an axis.

The primary function of artificial neurons is to take into one's mind and conceptualize a model of biological neurons and neural networks.

It receives more than one inputs and adds all the data it receives to produce an output.

The type of artificial neural network where data in the datasets is labeled is called Supervised Learning. A supervisory signal through supervised learning has a pair of inputs with the desired output value.

Independent learning is the step-by-step procedure used to draw a conclusion from datasets comprising input information without labeled responses. You can do a lot of unique research because there is so much unlabeled data in the world. Basically, cluster analysis is the most common unsupervised learning method used for exploratory data analysis, searching the number of hidden neurons.

Artificial Neural Networks are an alternative to conventional programmed computing is based on the operation of the brain is most likely depending upon their generalization capability, especially the ability to handle unseen data. This time, ANN's ability to generate output or decisions is subject to comparison to what the human brain can do.

DISCUSSION

In our daily life and current situation, ANNs are rapidly developing, and they do continuous tests and evaluations on their advantages and the problems encountered during utilization. Don't forget that the disadvantages of artificial neural networks, which are a branch of science, are gradually excluded one by one on their advantages that are increasing day by day. The artificial neural network has a learning ability that makes them so powerful and essential for various tasks. It is a piece of computing designed to stimulate in such a way the human brain analyzes and processes information. Artificial Neural networks are the type of computer algorithm models in which many non-linear processing elements align in parallel networks. These networks are the basis of the current understanding of biological nervous systems that have proven useable in pattern or sequence recognition problems.

Advantages of Artificial Neural Networks

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The capability of parallel processing. An artificial neural network can withstand for a long period of time provides proper security and maintenance to ensure enough strength to perform more than one job simultaneously.

Disadvantages of Artificial Neural Networks

- According to Mijwil, Maad, the disadvantage of the Artificial Neural Network is hardware dependent. Being hardware-dependent equipment, it requires a processor with parallel processing.
- Unexplained behavior of the network. It is the most significant issue of ANN. Artificial Neural Network produces a probing solution. It will not provide a clue as to why? How? It abridges the problem of the network.
- Determination of network structure. To determine the network structure, it is the usual practice to take trial and error in doing some experimental study.
- The difficult revelation of issues and problems of the network. In revealing issues and problems of artificial neural networks can work with the arithmetic logic unit in the computer system. The converted numeric value of the problem will be forwarded to the neural network. To directly influence the behavior of the network, will display mechanism to be determined, depending on the user's ability.
- Unknown duration of the network. The training will be complete if it reduces to a specific error in the sample. This value does not give us optimum results.

CONCLUSION AND FURTHER RESEARCH

An artificial Neural Network is a computer algorithm mimicking the human brain. It is like a human being, learning through the training experience. Because of this feature, they are often well suited for modeling complex and non-linear processes. The synaptic connections that exist between the neurons involve adjustment from learning in biological systems.

Artificial Neural Networks are responsible for the mathematical representation of something to animate the structure of biological neural networks and functionalities. ANNs are well

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advanced and able to compute and behave like human beings. Artificial Neural networks are the types of computer algorithm models in which many non-linear processing elements align in parallel networks. These are usually based on the current understanding of biological nervous systems that have proven useable in the pattern or sequence recognition problems in the current situation. Artificial Neural Network will be mimicking how the human brains perform in decision making

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