

# A SURVEY ON ADVANCEMENTS IN THE MACHINE LEARNING ALGORITHMS:THE NEURAL NETWORKS

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**Abstract** -Today machine learning is amazing branch in the field of the computer science. Everything in this world needs advancements and modifications according to new requirements .So also in the case of the machine learning ,the algorithms needs advancements and modifications according to the new requirements .

This paper discuss the brief classification and the explanation of the algorithm (only neural networks) used in the field of the machine learning and afterwards survey of the advancements that can be applied to the machine learning algorithms .

## 1.INTRODUCTION

Today machine learning is considered as a very interesting topic in the field of the computer science. Machine learning have various applications in today's world . There are various algorithms that are used in the machine learning such as neural network , ridge regressions etc. Every algorithm have their own pros and cons. The algorithms need some advancements and modifications. The main algorithm that we are going to discuss in the paper are NEURAL NETWORK .The main text section of the research paper is divided into part each part describing details as follows.

1-First part gives the detailed classification of the various algorithms used in machine learning .

2-Second part gives the detailed modifications and advancements that can be made on the algorithms.

## 2. SUPERVISED AND UNSUPERVISED LEARNING

Starting from the first part which gives the detailed classification of the various algorithm used in the machine learning. There are 8 major machine learning algorithms and these algorithm can be divided into two types in accordance to their use in the machine learning. First is supervised learning and second one is unsupervised learning. As we can know by the name that supervised learning simply means controlled learning(having labeled data) and unsupervised learning means uncontrolled learning(having unordered data).

Firstly supervised learning, major supervised learning algorithm are classified as follows .There are six major supervised learning algorithm(K.NERAST NEIGHBOUR, NAÏVE BAISEN CLASSIFICATION, HIDDEN MARKOV MODELS,SUPPORT VECTOR MACHINE AND RIDGE REGRESSION).

Secondly we have unsupervised learning ,major unsupervised learning algorithms can be classified as follows. There are two major types of unsupervised learning algorithms CLUSTERING and NEURAL NETWORKS.

As this paper is mainly discussion about the advancements in the one major type of the unsupervised learning algorithm . NEURAL NETWORKS., NEURAL NETWORKS are widely and mostly used algorithms . These algorithms are used to make a human neural network like structures. These are nonlinear functional approximation type algorithms having a little restriction bias and these algorithms prefers binary inputs.

## 3.Advancements in Neural Networks

1] Now moving to the first advancement in the neural network that is BAM neural network model algorithm.

The full form of the BAM is bidirectional associate memory model. It is known that neural network model has two meanings first one is its structure and the second one is its training algorithm. BAM model is more powerful than the other neural network models.

The information flow that is used in the BAM model is the forward and backward flow which provides associative search for stored stimulus response association. Both the layers of neuron uses the same firing function .It model uses delta learning algorithm. During learning the two layer network is treated as free forward neural network, here a activation formula is used for the output layered neuron which is sinsod function with high  $\lambda$  .

BAM model is divided into two layers each layers containing neurons , each of the neurons are connected to each others making a bidirectional network.

2] Use of the EA's in the neural network programming. EA's means evolutionary algorithms. Evolutionary algorithms generally refers to the class of the programming algorithms which is population based stochastic search algorithms. These algorithms are developed from ideas and the basic principles of the natural evolution. There is a general framework for EA's which is described below.

1.Generation of the initial population  $G(0)$ ,  $G(0)$ is at random and set  $i=0$ ;

2.REPEAT a)evaluation of the each individual in the population b)select parents from G(i) based on the fitness c)applying the search operators to parents and producing offspring which forms the equation G(i+1)

3.Until ‘Termination criterion ‘ is satisfied

The EA’s are independent of the gradient information and thus area quite suitable for the tough problems such as where the information is unavailable .

Here the important topic to be discussed is ANN’s which is discussed above but needs a further discussion. The ANN’s means artificial neural networks. It consists of the processing elements called the nodes.ANN’s can be described as the directed graphs in which the each nodes performs a transfer function which is in the form

$$y_i = f_i \left( \sum_{j=1}^n w_{ij}x_j - \theta_i \right)$$

The terms used in the equation are meaningful. There meanings are they are  $y_i$  is the output node of I,  $x_j$  is the input to the node and  $w_{ij}$  is the connection weight between nodes i and j and  $\theta_j$  representing threshold or bias of the node. The architecture of the ANN is determined by its topological structure.

When we combine the ANN’s and EA’s we get the term which is called EANN’s. EANN’s means evolutionary artificial neural networks. The evolution is introduced in the ANN’s . The evolution in the in the ANN’s is introduced in the three different levels generally termed as connection weights architectures and learning rules.

1-The evolution of connection weights introduces a global and adaptive approach to training, especially in the recurrent network learning paradigm where gradient-based training algorithms often experience great difficulties .

2- The evolution of architectures enables to adapt their topologies to different tasks without human intervention and thus provides an approach to automatic ANN design .

3- The evolution of learning rules can be regarded as a process of “learning to learn” in ANN’s where the adaptation of learning rules is achieved through evolution.

The evolution in the learning rules can bring revolution, if the computer learns to learn then it can learn without human intervention.

#### 4. CONCLUSIONS

After the detailed study of the both the advancement in the neural networks , we can conclude that both the advancements are useful in difference perspectives and they both have their different pros and cons.

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