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Deep Learning: A Solution for Huge Data

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ABSTRACT: Deep learning considered as a subset of machine learning. It is a field that is based on learning and improving on its own by examining computer algorithms. While machine learning uses simpler concepts, deep learning works with artificial neural networks, which are designed to imitate how humans think and learn. Deep learning is an important element of data science, which includes statistics and predictive modeling. It is extremely beneficial to data scientists who are tasked with collecting, analyzing and interpreting large amounts of data; deep learning makes this process faster and easier. This paper provides over all views of Deep Learning.

KEYWORDS: deep learning, artificial intelligence, data, learning, algorithm.

I. INTRODUCTION

Deep Learning is a subset of Machine Learning that uses mathematical functions to map the input to the output. These functions can extract non-redundant information or patterns from the data, which enables them to form a relationship between the input and the output. This is known as learning, and the process of learning is called training.

This is a part of a broader family of machine learning methods based on artificial neural networks with representation learning.

Deep learning is based on the branch of machine learning, which is a subset of artificial intelligence. Since neural networks imitate the human brain and so deep learning will do. In deep learning, nothing is programmed explicitly. Basically, it is a machine learning class that makes use of numerous nonlinear processing units so as to perform feature extraction as well as transformation. The output from each preceding layer is taken as input by each one of the successive layers.

Deep learning models are capable enough to focus on the accurate features themselves by requiring a little guidance from the programmer and are very helpful in solving out the problem of dimensionality. Deep learning algorithmsare used, especially when we have a huge no of inputs and outputs.Deep Learning is a subset of machine learning where artificial neural networks, algorithms based on the structure and functioning of the human brain, learn from large amounts of data to create patterns for decision-making. Neural networks with various (deep) layers enable learning through performing tasks repeatedly and tweaking them a little to improve the outcome.

Over the last few years, the availability of computing power and the amount of data being generated have led to an increase in deep learning capabilities. Today, deep learning engineers are highly sought after, and deep learning has become one of the most in-demand technical skills as it provides you with the toolbox to build robust AI systems that just weren't possible a few years ago. Mastering deep learning opens up numerous career opportunities.

Deep Learning is a machine learning method. It allows us to train an AI to predict outputs, given a set of inputs. Both supervised and unsupervised learning can be used to train the AI. The below block diagram explains the working of Deep Learning algorithm:

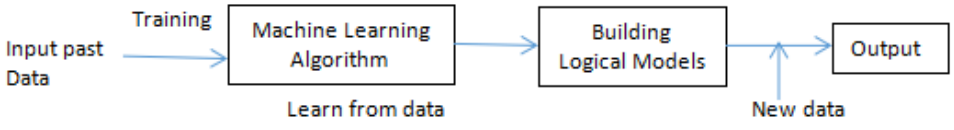

Figure1:Block diagram for working of Deep Learning

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There are five types of Deep learning Network : Feed Forward Neural Network, Recurrent Neural Network, Convolutional Neural Network ,Restricted Boltzmann Machine, Autoencoders.

II. FEED FORWARD NEURAL NETWORK

Feed-forward neural network is none other than an Artificial Neural Network, which ensures that the nodes do not form a cycle. In this kind of neural network, all the perceptrons are organized within layers, such that the input layer takes the input, and the output layer generates the output. Since the hidden layers do not link with the outside world, it is named as hidden layers. Each of the perceptrons contained in one single layer is associated with each node in the subsequent layer. It can be concluded that all of the nodes are fully connected. It does not contain any visible or invisible connection between the nodes in the same layer. There are no back-loops in the feed-forward network. To minimize the prediction error, the backpropagation algorithm can be used to update the weight values.

III. RECURRENT NEURAL NETWORK

Recurrent neural networks are yet another variation of feed-forward networks. Here each of the neurons present in the hidden layers receives an input with a specific delay in time. The Recurrent neural network mainly accesses the preceding info of existing iterations. For example, to guess the succeeding word in any sentence, one must have knowledge about the words that were previously used. It not only processes the inputs but also shares the length as well as weights crossways time. It does not let the size of the model to increase with the increase in the input size. However, the only problem with this recurrent neural network is that it has slow computational speed as well as it does not contemplate any future input for the current state. It has a problem with reminiscing prior information.

IV. CONVOLUTIONAL NEURAL NETWORK

Convolutional Neural Networks are a special kind of neural network mainly used for image classification, clustering of images and object recognition. DNNs enable unsupervised construction of hierarchical image representations. To achieve the best accuracy, deep convolutional neural networks are preferred more than any other neural network.

V. RESTRICTED BOLZMANN MACHINE

RBMs are yet another variant of Boltzmann Machines. Here the neurons present in the input layer and the hidden layer encompasses symmetric connections amid them. However, there is no internal association within the respective layer. But in contrast to RBM, Boltzmann machines do encompass internal connections inside the hidden layer. These restrictions in BMs helps the model to train efficiently.

VI. AUTOENCODERS

An autoencoder neural network is another kind of unsupervised machine learning algorithm. Here the number of hidden cells is merely small than that of the input cells. But the number of input cells is equivalent to the number of output cells. An autoencoder network is trained to display the output similar to the fed input to force AEs to find common patterns and generalize the data. The autoencoders are mainly used for the smaller representation of the input. It helps in the reconstruction of the original data from compressed data. This algorithm is comparatively simple as it only necessitates the output identical to the input.Encoder: Convert input data in lower dimensions.

Decoder: Reconstruct the compressed data.

VII. IMPORTANCE OF DEEP LEARNING

Deep learning contributes heavily towards making our daily lives more convenient, and this trend will grow in the future. Whether it is parking assistance through technology or face recognition at the airport, deep learning is fuelling a lot of automation in today's world. However, deep learning's relevance can be linked most to the fact that our world is generating exponential amounts of data today, which needs structuring on a large scale. Deep learning uses the growing volume and availability of data has been most aptly. All the information collected from these data is used to achieve accurate results through iterative learning models.The repeated analysis of massive datasets eradicates errors and discrepancies in findings which eventually leads to a reliable conclusion.

VIII. APPLICATION OF DEEP LEARNING

The Some of the most dramatic improvements brought about by deep learning have been in the field of computer vision. For decades, computer vision relied heavily on image processing methods, which means a

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whole lot of manual tuning and specialization. Deep learning, on the other hand, ignores nearly all traditional image processing, and it has resulted in dramatic improvements to every computer vision task.

IX. ADVANTAGES AND DISADVANTAGES

Deep Learning allows us to teach a specific task rather than teaching the system how to learn. We can use different examples to train a particular model or we can use a very simple training set and simply ask it to learn.This learning can become any kind of system. It can be for one thing, such as just a face recognition, or for another, such as an image reconstruction. It can be with a large number of weights, or with a very small number. It can be linear or nonlinear.It will be much harder to determine where the flaws exist, or where it is creating false positives.

Deep Learning doesn't give us a ton of accurate data. What you're getting are approximate statistics.It tends to learn on its own, and it's also hard to see the evolution of a system in time. Deep Learning requires huge data sets in order to train. They can be huge, especially when you consider that we only know the image and not the context.

X. CONCLUSION

Deep learning is an approach to Artificial Intelligence, a smart combination of hardware and software to solve tasks requiring human intelligence.Deep learning models are capable enough to focus on the accurate features themselves by requiring a little guidance from the programmer and are very helpful in solving out the problem of dimensionality. Deep learning algorithmsare used, especially when we have a huge no of inputs and outputs.

REFERENCES

1. Zhong-Qiu Zhao,Peng Zheng,Shou-Tao Xu,Xindong Wu,"Object Detection With Deep Learning: A Review", IEEE Transactions on Neural Networks and Learning Systems.
2. Ajay Shrestha; Ausif Mahmood,"Review of Deep Learning Algorithms and Architectures", IEEE Access (Volume: 7),Page(s): 53040 - 53065, 22 April 2019 , ISSN: 2169-3536.
3. Xin Jia,"Image recognition method based on deep learning", 2017 29th Chinese Control And Decision Conference (CCDC),ISSN: 1948-9447,28-30 May 2017
4. Francis Quintal Lauzon,"An introduction to deep learning", 2012 11th International Conference on Information Science, Signal Processing and their Applications (ISSPA),02-05 July 2012.
5. Dong Yu; Geoffrey Hinton; Nelson Morgan; Jen-Tzung Chien; Shigeki Sagayama,"Introduction to the Special Section on Deep Learning for Speech and Language Processing", IEEE Transactions on Audio, Speech, and Language Processing (Volume: 20, Issue: 1, January 2012),Page(s): 4 - 6, 25 October 2011.
6. Daniele Ravì; Charence Wong; Fani Deligianni; Melissa Berthelot; Javier Andreu-Perez; Benny Lo; Guang-Zhong Yang,"Deep Learning for Health Informatics", IEEE Journal of
7. Biomedical and Health Informatics (Volume: 21, Issue: 1, January 2017),Page(s): 4 - 21, 29 December 2016 .
8. Shahbaz Rezaei; Xin Liu,"Deep Learning for Encrypted Traffic Classification: An Overview",IEEE Communications Magazine (Volume: 57, Issue: 5, May 2019),Page(s): 76 - 81,13 May 2019.
9. Shahbaz Rezaei; Xin Liu,"Deep Learning for Encrypted Traffic Classification: An Overview",IEEE Communications Magazine (Volume: 57, Issue: 5, May 2019),Page(s): 76 - 81,13 May 2019.
10. Yushi Chen; Zhouhan Lin; Xing Zhao; Gang Wang; Yanfeng Gu,"Deep Learning-Based Classification of Hyperspectral Data",IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (Volume: 7, Issue: 6, June 2014),Page(s): 2094 - 2107, 26 June 2014 .
11. Toufique Ahmed Soomro; Ahmed J. Afifi; Lihong Zheng; Shafiullah Soomro; Junbin Gao; Olaf Hellwich; Manoranjan Paul,"Deep Learning Models for Retinal Blood Vessels Segmentation: A Review", IEEE Access (Volume: 7),Page(s): 71696 - 71717,03 June 2019,E- ISSN: 2169-3536.
12. Yibo Han; Zheng Zhang,"Notice of Violation of IEEE Publication Principles: Deep Learning Assisted Image Interactive Framework for Brain Image Segmentation," IEEE Access (Volume: 8),Page(s): 117028 - 117035, 19 June 2020 ,E- ISSN: 2169-3536.
13. Yi Zhang; Akash Doshi; Rob Liston; Wai-Tian Tan; Xiaoqing Zhu; Jeffrey G. Andrews; Robert W. Heath,"DeepWiPHY: Deep Learning-Based Receiver Design and Dataset for IEEE 802.11ax Systems", IEEE Transactions on Wireless Communications (Volume: 20, Issue: 3, March 2021),Page(s): 1596 - 1611, 05 November 2020.
14. Duy Thanh Nguyen; Nguyen Huy Hung; Hyun Kim; Hyuk-Jae Lee,"An Approximate Memory Architecture for Energy Saving in Deep Learning Applications", IEEE Transactions on Circuits and Systems I: Regular Papers (Volume: 67, Issue: 5, May 2020),Page(s): 1588 - 1601,14 January 2020.

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