
Review Paper on Deep Learning

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Abstract –

This paper illuminates outline and ongoing advances in Profound Learning. Profound Learning is the subjectivity of AI and AI is the subclass of Man-made consciousness (artificial intelligence). Presently a day's Profound Learning is one of the most exceptional logical examination regions in all spaces. Profound learning is driving critical headways across ventures, endeavors, medical care, retail and monetary administrations, auto and day to day existence too. In this information is handled by means of brain organizations and consequently machine works the same human does. So the strategies for Profound learning makes world breaking in all areas particularly AI. AI and Profound Learning innovations work on calculations and programming that enacts the PC to have a similar outlook as a human and take a choice like advance as a visual cue. Profound learning utilizes AI innovations to get arrangement of issues and simply decide. Step by step another profound learning procedure comes into the market and it gives great execution for example answer for the issue. Since Profound Learning advances huge and quickest developing piece of computerized reasoning.

Keywords - Artificial Intelligence, Neural Networks, Machine Learning, Deep Learning, Technologies

I. INTRODUCTION

Profound Learning is an accomplishment of Man-made reasoning. The primary idea of a computerized intellectual is the way human demonstrations and thinks like framework can do. It livens up the ability of PCs to take care of business consequently by taking bygone ages of involvement. Profound Learning accentuated on the advancement of projects that can recover information and utilize its learning. Man-made brainpower is the field of study that portrays any human like knowledge displayed by a PC framework. It alludes to the capacity of a framework to communicate the capacities of the human psyche by utilizing gaining from past models and experience to distinguish, understanding, answering, pursuing choice and critical thinking and so on. So on which can be verified by using testing techniques and ai methods [8, 9, 10]. What not every single thing. AI is an indispensable part or subset of artificial intelligence application that advances without help from anyone else. A review gives machines the capacity to learn without composing programs expressly to play out the particular undertaking. Profound learning is a basic part or sub part some portion of AI application that trains itself to play out an undertaking without human collaboration. In 1986, the word Profound Learning came into AI. Later it in the year 2000 it was utilized in Counterfeit Brain Organizations. Profound Learning utilizes many layered brain organizations to learn level of deliberation and portrayal that gives feeling of information. It utilizes many administered and unaided learning strategies and portrayals to make best in class. Present day Man-made brainpower molded by utilizing the strategies for advance Profound Learning draws near. In this paper, prior to leaving the new advances in Profound Learning first I will examine the connected work on profound learning models and approaches and after that I will discuss late advances in Profound Learning approaches, profound designs for example Profound Brain Organizations and Profound Generative Models, Preparing, Regularization and Streamlining strategies.

II. CONNECTED WORKS

The below table describes related works under Deep learning.

S.No.	Name of the Author & Year	Title	Domain
1	Young et al, 2017	DL models and Architecture	Natural Language Processing
2	Zhang et al, 2017	DL techniques	Front end & Back end speech recognition
3	Zhu, 2017	DL Frameworks	Remote Sensing
4	Ronen and Bouquet, 2017	DL concepts	Geometry

5	Wang, 2017	DL models in Time Series	Neural Networks
6	Goodfellow et al, 2016	Deep Networks and Generative Models	Machine Learning
7	Lecun et al, 2015	DL with CNN and RNN	Predictive Future Learning
8	Wang and Raj, 2015	Evolution of DL	Artificial Neural Networks

III. HISTORY OF DEEP LEARNING ARCHITECTURE

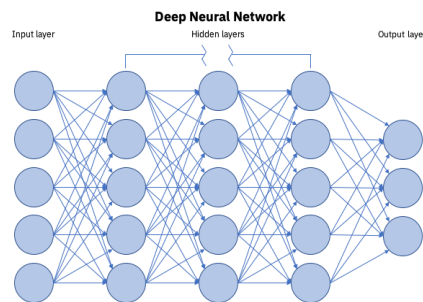


Fig. 3.1 Basic Neural Networks

Artificial Neural Networks (ANN) or Neural networks (NN) are a collection of connected units or nodes called artificial Neurons. These neurons transmit the signals. In ANN, three components are there called Neurons (input), Connections and Weights (neuron to neuron) and Prorogation function (sum of weights of neurons). Examples train neural networks. Each example contains input and output. To get desired output we use Model, it is a Data Structure consist of algorithms and Directed Weighted Graph. The following figure represents Basic Neural Network.

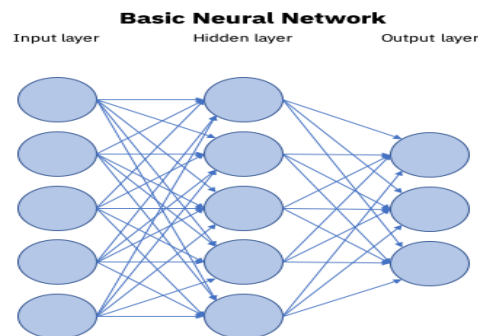


Fig. 3.2 Deep Neural Networks

The conventional ANN made up with simple neural layers and used for simple calculations. Next Back Propagation came into ANN after that Support Vector Machine (SVM) and it is better than ANN. Later we got a new network called Boltzmann Machine makes learning easier. Machine learning models are based on artificial neural networks.

These are capable of Supervised Learning. Like that neural networks came with different technologies.

Deep Learning is modern technology based on neural networks that try to work like a human cortex. Deep learning architecture consists of neural networks and based on several layers that process data into outcome result.

There are mainly three layers called input layer, hidden layers and an output layer.

Input layer: raw data. Hidden layers: where algorithms process the inputs. Output layer: various conclusions and result.

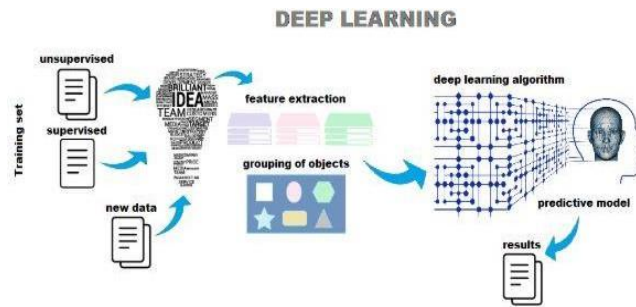


Fig. 3.3 Deep learning process

Deep learning models are based on deep neural networks with large set of labeled data and back propagation and forward propagation methods. These are capable of Supervised and Unsupervised Learning.

IV. Create and Train Deep Learning Models

Three ways are there to create and train.

- 1) Training from Scratch
- 2) Transfer Learning
- 3) Feature Extraction

In deep learning totally ten popular architectures are there.

- 1) Back Propagation
- 2) Stochastic Gradient descent
- 3) Learning Rate decay
- 4) Drop Out
- 5) Max Pooling
- 6) Batch Normalization
- 7) Long Short Term Memory
- 8) Skip gram
- 9) Continuo Bag of words
- 10) Transfer Learning

- 1) CNN - Convolutional Neural Network

It is a subclass of DNN. It is used to analyzing audio and video.

- 1.1) Flattened CNN
- 1.2) Depth wise separable CNN
- 1.3) Grouped CNN
- 1.4) Shuffled Grouped CNN

- 2) DBN - Deep Belief Network

It is used to create to recognize image.

- 3) DSN - Deep Stacking Network

- 4) FNN – Forward Neural Network

- 5) Auto-Encoders : outputs are the inputs.

- 5.1) Variational Auto-encoders
- 5.2) Stacked Denoising Auto-encoders
- 5.3) Transforming Auto-encoders

- 6) Deep Generative Models

In this DNN we used multiple levels of abstraction and representation. The list of techniques is

Boltzmann Machine probability distribution

Restricted Boltzmann Machine – Document processing

Recurrent Support Vector Machine objective discrimination will be in sequence level.

7) Training and Optimization Techniques

Here we are going to discuss the different techniques for this category.

- 7.1) Dropout – prevent over fitting in NN
 - 7.2) Maxout – output gives maximum
 - 7.3) Zoneout – regularization method for RNN
 - 7.4) Batch Normalization – accelerating DNN
 - 7.5) Distillation – NN composed into smaller Model
 - 7.6) Layer Normalization – Speedup of NN
- ## DEEP LEARNING FRAMEWORKS

For deep learning more number of open-source libraries and frameworks are available. The below figure represent different types of frameworks.

All most all used Python programming language.



Fig. 4.1 Different Frameworks

V. APPLICATIONS OF DEEP LEARNING

Supervised, semi-supervised or reinforcement learning used in DL methods.

Image classification and recognition • video classification • sequence generation • Defect classification

- text, speech, image and video processing • text Classification • Speech processing • speech recognition and spoken language understanding • Text-to-speech generation • query classification • sentence classification • sentence modeling • Word processing • document and sentence processing • generating image captions • Photographic style transfer • image colorization • generating textures and stylized images • Visual and textual question answering • visual recognition and description and visual art processing • object detection • document processing • character motion synthesis and editing • Person identification • face recognition and verification • action recognition in videos • Human action recognition • action recognition • classifying and visualizing motion capture sequences • Handwriting generation and prediction • automated and machine translation • Named entity recognition • mobile vision and advertising • conversational agents • calling genetic variants and Bioinformatics • Cancer detection • X-ray CT reconstruction • Epileptic Seizure Prediction • hardware acceleration • Robotics, speech and audio processing • Information retrieval, object recognition and computer vision • Financial fraud detection, Medical Image Analysis Military, Image Restoration • Customer Relationship management, Drug Discovery and Toxicology • Multimodal and multi-task learning.

VI. DISCUSSION

Deep Learning itself proved it gives good results in all most all areas are domains.

But still few areas are left over to use this technique to get better results like psychology and cognitive sense.

The main drawback of DL Models is large set of labeled data and it is not suit for hierarchical structure.

VII. CONCLUSION

The objective is to make a decision similar to human beings. Deep Learning is safe to assume that we have some solid progress in

understanding why and how deep learning models work. Day by day, deep learning models and approaches are becoming more popular to get accurate result or outcome from data in more efficient way. But still so many problems which are related to health issues like Cancer and Covid-19. We hope by using deep learning researchers can do miracles and they will give accurate values.

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