Advanced Machine Learning Approach: Deep Learning

Lakshmi C
Keraleeya Samajam Dombivli's Model College
Dombivli East, Mumbai, Maharashtra, India

Abstract:- **Deep learning can say a set of AI (AI) machine learning networks that can learn from unstructured or unlabeled knowledge. This uses multiple layers to remove collections at higher levels from raw inputs and heaps. As an example, lower layers in image technique can ensure edges, whereas higher layers can ensure that ideas are important to someone like digits or letters or faces. Deep Learning is associated AI performing that imitates human brain processing in process information to be used in higher cognitive processes. Deep Learning AI is capable of discovering from information that each is unstructured and unlabeled. Deep learning, a range of machine learning, can make sight fraud or concealment simpler.**

This paper mainly focuses on the ideas of Deep Learning, why we should we use Deep Learning over Machine Learning, its basic architectures, characteristics and the limitation.

The main intention of this paper is to explore and present a comprehensive survey of Deep Learning awareness among technical people, deep learning applications, architectures used, and any contribution of the various applications worldwide at intervals. The paper ends with the conclusion and future aspects of Deep Learning.

Keywords:- Artificial Intelligence, Machine Learning, Neural Networks.

I. INTRODUCTION

Machine learning, a self-adaptive algorithmic system that gets increasingly higher analyzes and patterns expertly or with new additional data, is one of the big AI techniques we use.

In today's world, deep learning can be a current and an energizing part of machine learning. Deep learning is the only, supervised, time-consuming and cost-effective approach to machine learning. Deep learning is not a restricted approach to learning, but it abides by various procedures and topographies that can be applied to an enormous speculum of subtle issues. The technique learns differential choices from the illustrative associate in an extremely stratified manner.

Deep Learning is just like Machine Learning where the algorithms and performance are almost similar. These algorithms are called as Artificial neural network(ANN).ANN's function is similar to human brain it just imitates the human neural networks..

Deep learning has created important developments and enormous performance in several applications, the extensive fields which are using Deep Learning in business, science and government that any embrace reconciling testing, laptop computer vision, cancer detection, tongue method, object detection, face recognition, hand writing recognition, speech recognition, securities market analysis, sensible city and plenty of further.

The great superiority of deep learning is that the two different things are not categorized by using structured / labeled knowledge. The incredible manipulation of deep learning neural networks sends the input (image information) through entirely different layers of the network, with similar image choices being made by each network hierarchically. This is an equivalent as our human brain works to solve problems throughout a fashion— by passing queries through varied hierarchies of ideas and connected inquiries to note a response. Machine learning algorithmic program requires labeled / structured information to grasp the differences between photos, learn classification, and then produce output.

On the other side, a deep learning network was able to identify images of each object through the information processed inside network layers. As a result, it relied on the varied outputs processed by each layer that amalgamated to form a unified way of classifying the images, it did not want any labeled / structured material.

The key distinction between deep learning and machine learning stems from the way the system receives information. Almost inevitably, machine learning algorithms want structured knowledge, while deep learning networks embrace ANN (artificial neural networks) layers.

Machine learning algorithms unit of measurement designed to "learn" to undertake and do things by understanding labeled information, then use it to supply any outputs with further sets of knowledge. However, they need to be retrained through human intervention once the actual output isn't the desired one.

Deep learning networks do not want human intervention as a result of the nested layers among the neural networks place information through hierarchies of varied ideas, that eventually learn through their own errors.

II. LITERATURE REVIEW

Machine learning and Deep learning are two AI subsets that have attracted tons of attention over the past several years.

The analysis paper by Esam Kamal Maried, Mansour Abdalla Elidali and Osama Omar Ziada introduces some Deep Learning algorithms. many classic deep learning algorithms like restricted physicist machines and convolutional neural networks are introduced.

In recent years, deep learning has been extensively studied. As a consequence, the related category of linked approaches is outsized. Such algorithms are usually grouped into two groups that support their architecture:
➤ Restricted Boltzmann Machines (RBMs)
➤ Convolutional neural networks (CNNs)

A. Restricted Boltzmann Machines(RBMs)

RBM is an energy-based probabilistic generative model with a university degree. This consists of one visible unit layer and one hidden unit layer. The visible units represent the corresponding data sample input vector and therefore the hidden units represent options that have been abstracted from the visible units. Every visible unit is connected to each hidden unit, whereas the visible layer or hidden layer does not have an association.

B. Convolutional Neural Network (CNNs)

Due to the deep learning approach, the efficiency of image recognition and object detection has increased dramatically over the past seven years. Convolutional neural networks (CNNs) gave the computer vision field a revolution at intervals. It does not fully improve the accuracy of image classification, but plays a significant role in the extraction of common features, such as scene classification, object detection, linguistic segmentation, image recovery and image caption. Convolutional neural network (CNNs) is one of the most important classes of image system tasks of deep neural networks. It is highly efficient and commonly used in computer vision applications. The neural network of convolution includes three forms of layers: layers of convolution, layers of subsampling, and layers of complete association.

III. METHODS AND APPROACHES

First I conducted an online survey by asking a set of questions to few people and asked them to respond to it by providing an answer, if they don't know they can simply write "Don't Know".

I have got around 50 responses from my colleagues and friends. Most of the people doesn't even heard about, they simply wrote that they don't know and most of them are not preferring Deep Learning over Machine Learning because they don't know that Deep Learning is better than Machine Learning.

After got the information, the collected data can be exported to .csv format.

IV. PUBLIC SURVEY AND EXPERIMENT

After doing the survey I send it to various people and collected information regarding Deep learning. I have created some questions regarding Deep Learning to get the people's awareness about it. I developed 7 questions about Deep Learning and collected their responses. Most of the people doesn't fill the answers which is not mandatory, thus shows that they don't even know half of the question's answers. It simply implies the awareness of Deep Learning of various people.

➤ *Questions and Results*

- Have you heard about Deep Learning?
- Is it related with Machine Learning?
- Can you explain Deep Learning in 1 sentence?
- Which are the social websites that using Deep Learning technique?
- Would you think it's better to use Deep Learning than using Machine Learning?
- What is perceptron? How does it work?
- What is multilayer perceptron?

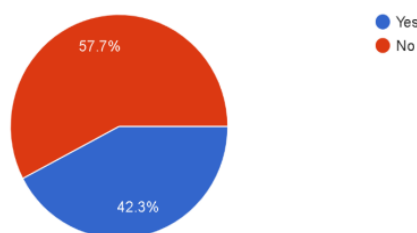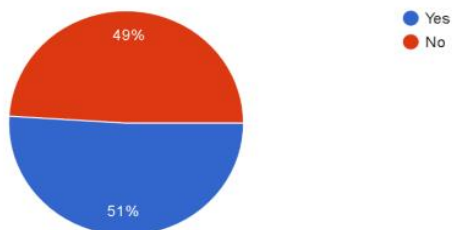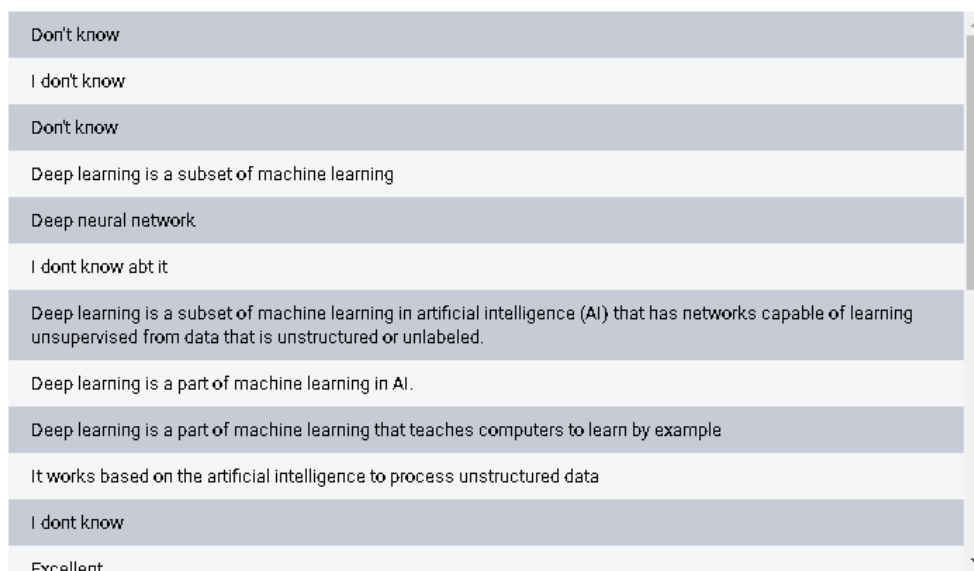Have you heard about Deep Learning?
52 responses
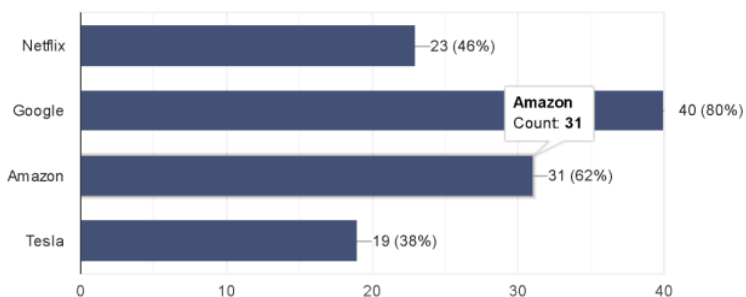
Fig 1

Fig 2

Fig 3

Fig 4

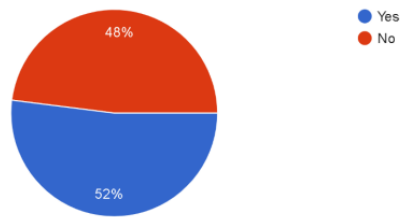Do you think Deep Learning is better than Machine Learning?
50 responses

Fig 5

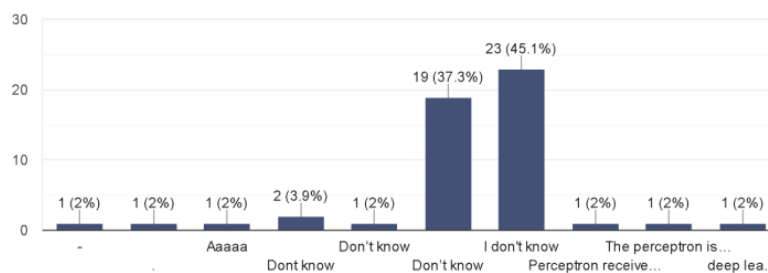What is Perceptron?How does it work?
51 responses

Fig 6

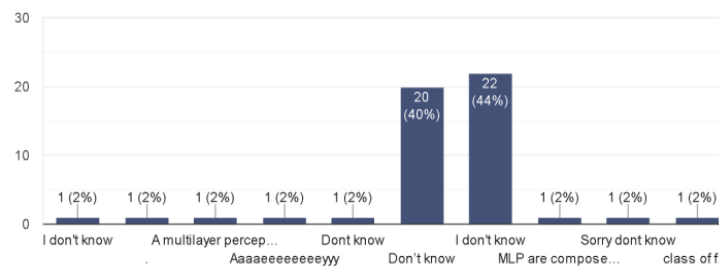What is a Multi-Layer-Perceptron?
50 responses

Fig 7

V. DISCUSSION

This area of machine learning is undergoing its golden age as deep learning becomes gradually the pioneer in this field. Deep learning uses multiple layers to represent information abstractions to construct machine models. Some key enablers of deep learning algorithms such as generative adversarial networks, convolutionary neural networks, and model transfers have completely altered our information process perception. There is, however, an underlying opening of understanding behind this stunningly quick area, as a result of which, from a multi-scale viewpoint, it was simply never previously diagrammatic. The lack of core understanding allows these effective techniques like blackbox machines that hinder simple creation. In addition, deep learning has been perceived repeatedly as a solution to all or any obstacles in the field of machine learning, which is a lot of reality.

This article presents a comprehensive review of historical and up-to-date revolutionary methods during the process of visual, audio and text, social network analysis, and language analysis, accompanied by a thorough analysis of pivoting and innovative developments in deep learning applications. Furthermore, it was imperative to investigate the problems of deep learning, such as unattended learning, black-box models, and online learning, and as an example, however, these challenges are transformed into prolific avenues for future analysis.

VI.   CONCLUSION

After conducting the survey, I came to know that, most of the people even Technical people don't have any idea about Deep Learning at all. I have received around 50 responses from people and most of them are technical people, then also they are not even aware or heard about Deep Learning.

This is the reason why I selected this topic over Machine Learning. Even though the architectures and models are almost similar Deep Learning is better than Machine Learning.

The reports conferred on top of illustrated that Deep Learning encompasses a heap of potential, however must overcome a number of challenges before changing into additional versatile tool. The interest and enthusiasm for the sector is, however, growing and already nowadays we have a tendency to see unimaginable real-world applications of this technology. Additional applications like the serving to voices of Siri and Cortana, Google Photo's people tagging feature and sportify's music recommendations.

In the business world, however, there is a greater practice of deep learning.

Deep learning algorithms applied to higher section customer information in CRM systems, social media and alternate online information, forecast churn and detect fraud. Money trading relies on deep learning to deliver stock-worthy predictions and execute trades at the right time. Within the healthcare business Deep Learning networks are exploring the likelihood of repurposing the noted and tested medicine to be used against new diseases in order to shorten the time before the medicine can be obtained by the general public.

Government institutions are shifting to Deep Learning by analyzing satellite imagery to promote time insights into metrics such as food production and energy infrastructure.

We can expect to create giant investments to further enhance this technology, and to solve additional and additional challenges in the future.

➢ *Findings*
- Very good at delivering top quality results.
- No need for information marking.
- Best results with unstructured information.
- Elimination of the requirement for future engineering.
- Elimination of needless prices.
- The design is versatile to customize in the future for new problems
- Avoids time overwhelming Machine learning techniques.

➢ *Applications*
- Self-driving cars
- News aggregation and fraud news detection
- Natural language process
- Virtual assistants
- Entertainment (Netflix)
- Visual recognition
- Cancer Detection
- Computer vision
- Object detection
- Stock market research
- Automatic Game playing
- Medical image analysis
- Health care
- Automatic machine translation

➢ *Limitations*
- Deep learning needs huge amounts of coaching information.
- To this point, deep learning was not well integrated with previous data.
- Deep Learning is very costly to coach.

ACKNOWLEDGMENT

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