

Artificial Intelligence in Machine

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ABSTRACT

Machine learning is one of the most exciting recent technologies in Artificial Intelligence. Learning algorithms in many applications that's we make use of daily. Every time a web search engine like Google or Bing is used to search the internet, one of the reasons that works so well is because a learning algorithm, one implemented by Google or Microsoft, has learned how to rank web pages. Every time Facebook is used and it recognizes friends' photos, that's also machine learning. Spam filters in email saves the user from having to wade through tons of spam email, that's also a

learning algorithm. In this paper, a brief review and future prospect of the vast applications of machine learning has been made.

Keywords

Artificial intelligence, Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning Applications.

1. INTRODUCTION

An Artificial Intelligence (AI) program is called Intelligent Agent. Intelligent agent gets to interact with the environment. The agent can identify the state of an environment through its sensors and then it can affect the state through its actuators.

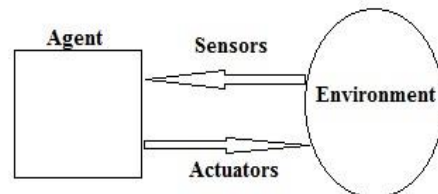


Figure 1: Perception cycle of AI

In this paper the various applications under the appropriate category of machine learning has been highlighted. This paper makes an effort to bring all the major areas of applications under one umbrella and present a more general and realistic view of the real world applications. Apart from this two application suggestions have been presented forward. The field of machine learning is so vast and ever growing that it proves to be useful in automating every facet of life.

2. MACHINE LEARNING

According to Arthur Samuel Machine learning is defined as the field of study that gives computers the ability to learn without being explicitly programmed. Arthur Samuel was famous for his checkers playing program.

Initially when he developed the checkers playing program, Arthur was better than the program. But over time the checkers playing program learned what were the good board positions and what were bad board positions are by playing many games against itself.

A more formal definition was given by Tom Mitchell as a computer program is said to learn from

experience (E) with respect to some task (T) and some performance measure (P), if its performance on T, as measured by P, improves with experience E then the program is called a machine learning program.

In the checkers playing example the experience E, was the experience of having the program playing games against itself. The task T was the task of playing checkers. And the performance measure P, was the probability that it won the next game of checkers against some new opponent.

In all fields of engineering, there are larger and larger data sets that are being understood using learning algorithms.

3. TYPES OF MACHINE LEARNING ALGORITHMS

3.1 Supervised Learning

This learning process is based on the comparison of computed output and expected output, that is learning refers to computing the error and adjusting the error for achieving the expected output. For example a data set of houses of particular size with actual prices is given, then the supervised algorithm is to produce more of these right answers such as for new house what would be the price.

3.2 Unsupervised Learning

Unsupervised learning is termed as learned by its own by discovering and adopting, based on the input pattern. In this learning the data are divided into different clusters and hence the learning is called a clustering algorithm. One example where clustering is used is in Google News (URL news.google.com). Google News groups new stories on the web and puts them into collective news stories.

3.3 Reinforcement Learning

Reinforcement learning is based on output with how an agent ought to take actions in an environment so as to maximize some notion of long-term reward. A reward is given for correct output and a penalty for wrong output. Reinforcement learning differs from the supervised learning problem in that correct input/output pairs are never presented, nor sub-optimal actions explicitly corrected.

3.4 Recommender Systems

Recommender systems can be defined as a learning techniques by virtue of which online user can customize their sites to meet customer's tastes. For example, online user can get a rating of a product or/ and related items when he/she searching an items because of the existing recommender system. That is why it changed the way people find products, information, and even other people. There are mainly two approaches: content based recommendation and collaborative recommendation, which help the user for obtaining and mining data, making intelligent and novel recommendations, ethics. Most e-commerce site uses this system.

4. APPLICATIONS OF MACHINE LEARNING AND LITERATURE SURVEY

4.1 Unsupervised Learning

In machine learning, the problem of unsupervised learning is that of trying to find hidden structure in unlabeled data. Since the examples given to the learner are unlabeled, there is no error or reward signal to evaluate a potential solution.

4.2 Supervised Learning

Supervised learning is the machine learning task of inferring a function from labeled training data. The training data consist of a set of training examples. In supervised learning, each example is a pair consisting of an input object (typically a vector) and a desired output value. A supervised learning algorithm analyzes the training data and produces an inferred function, which can be used for mapping new examples.

4.3 Recommender system

Recommender systems are a subclass of information-retrieval system that seeks to predict the 'rating' or 'preference' that user would give to an item, which allow the online customer to choose the best item.

4.4 Reinforcement learning

Reinforcement learning is an area of machine learning inspired by behaviorist psychology, concerned with how software agents ought to take actions in an environment so as to maximize some notion of cumulative reward.

5. IMPRESSION AND VIEWS

With the amount of data set getting large by every passing day, the analysis of these immense amounts of data is beyond the capacity of human eye. So Artificial agents take up the responsibility of interacting with the environment and in turn influence it. The inception of the —Big Data‖ has also resulted in improvisation of the machine learning algorithms as they have larger data sets to gain more experience. The concern is not how big —Big Data‖ is but it's more about finding patterns within it.

In Machine learning the artificial agents learns from training data or by

interacting with the environment and influences it to facilitate the best possible result. So Machine Learning is definitely a subfield of Artificial Intelligence. This notion has made the present day applications autonomous.

In the field of medicine and diagnosis AI has created virtual doctors as shown in Figure-12. Providing the early symptoms to a machine algorithm helps in early detection and diagnosis of the disease. The ultimate desire is to create a diagnostic dream machine for this purpose.

6. CONCLUSION

Humans have always sought to build a comfortable life, the proof of this lies in the fact that we have always depended on machines to get our work done more easily, in a faster and more efficient manner. In the past machines have been used to reduce the manual labor required get a job done, but at present, with the advent of machine learning humans seek to build machines which are not only strong but also intelligent and hence machine learning has emerged to become an area of study that is ever in the bloom. Machine learning has not just made the machines autonomous, bringing forward the concept of autonomous computing, but it has also reduced the constant vigilance users are required to keep upon the applications. In this paper, discusses the four categories of machine learning i.e. supervised learning, unsupervised learning, and reinforcement learning and recommender system and also presents the numerous applications under them. Apart from that two proposed applications namely information time machine and virtual doctor have been put forward. The main purpose of machine learning is to develop algorithms that assist in the creation of intelligent machines thus reducing the jobs of the programmers as the machine learns in due course of time to improve

its performance. Although a lot of advancements have been made in this field still then there exists glaring limitations in the data set from which machine learns. It can be rectified by constantly keeping the data sets up-to-date as learning is a continuous process. Apart from this issue, a great number of publications on machine learning evaluate new algorithms on a handful of isolated benchmark data sets. In spite of all these shortcomings machine learning has solved varying problems of global impact. Machine learning has proven to be vastly useful in a variety of fields such as data mining, artificial intelligence, OCR, statistics, computer vision, mathematical optimization, etc and its importance tends to remain ever on the increase. Machine learning theories and algorithm are inspired from the biological learning systems where the performance depends on factors like the amount of available data, the learning history and experience, etc, and thus help explaining human learning. The applications of machine learning are therefore never ending and it still remains an active field of research with immense development options and a promising future.

Future challenge is to develop emergence automated prescription at critical condition using machine learning concept, which can minimize the error in diagnosis.

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