Overview of Machine Learning Techniques

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ABSTRACT

Machine learning may be a data analytic technique that teaches computers to try to do what comes naturally to human and animals learn from experience. Machine learning algorithms use computational methods to find out information directly from data without replying on predetermined equation as model. The algorithms adaptively improves their performance because the number of sample available for learning increases. Machine learning cares with the planning and development algorithms and techniques that allow computers to "learn". the main focus of machine learning research is to extract information from data automatically, by computational and statistical methods. Deep learning may be a specialized of machine learning. (Machine learning technique include deep learning that train computers to try to to what comes naturally to humans: learn by example Deep learning is vital technology behind driverless cars, enabling them to acknowledge a stop sign)

Keywords : Machine Learning, Supervised Learning, Unsupervised Learning, Reinforcement Learning.

I. INTRODUCTION

Since their evolution, humans are using many sorts of tools to accomplish various tasks. The creativity of the human brain led to the invention of various machines. These machines made the human life easy by enabling people to satisfy various life needs, including travelling, industries, constructions, and computing. Despite quick growths within the machine industry, aptitude has remained the basic difference between humans and machines in performing their tasks. a person's uses his or her senses to collect information from the encompassing atmosphere; the human brain works to research that information and takines suitable decisions accordingly.
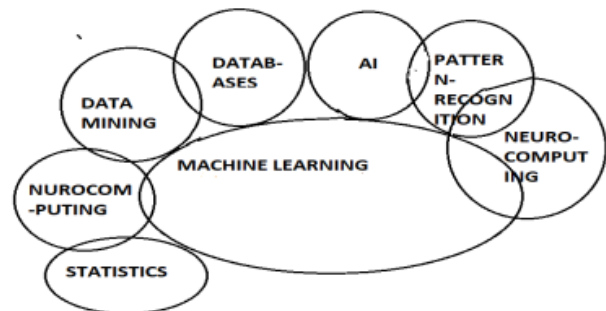

Fig 1. -Different disciplines of Knowledge and the disciplines of machine learning.

Machines, in contrast, aren't intelligent naturally. A machine doesn't have the power to research data and take decisions. for instance, a machine isn't expected to know the story of Harry Potter, skip a hole within the street, or interact with other machines through a standard language. Machines are naturally not intelligent. Mainly, machines were intended to do specific

tasks, like running on the railway, controlling the traffic flow, digging deep holes, traveling into the space, and shooting at moving things. Machines do their tasks much faster with a better level of precision compared to humans. they need made our lives easy and smooth. the elemental difference between humans and machines in performing their work is intelligence. The human brain receives data gathered by the five senses: taste, vision, smell, hearing, and tactility. These gathered data are sent to the human brain via the neural system for insight and taking action. within the perception process, the info is organized, recognized by comparing it to previous experiences that were stored within the memory, and interpreted. Accordingly, the brain takes the choice and directs the body parts to react against that action. At the top of the experience, it'd be stored within the memory for future benefits.

Machine learning may be a branch of AI that aims at enabling machines to perform their jobs skill fully by using intelligent software. The numerical learning methods establish the backbone of bright software that's wont to develop machine intelligence. Because machine learning algorithms require data to find out, the discipline must have reference to the discipline of database. Similarly, there are familiar terms like Knowledge Discovery from Data (KDD), data processing, and pattern recognition. One wonders the way to view the large picture during which such connection is illustrated. SAS Institute Inc., North Carolina, may be a developer of the famous analytical software Statistical Analysis System (SAS). so as to point out the connection of the discipline of machine learning with different related disciplines, we'll use the illustration from SAS. This illustration was actually utilized in a knowledge mining course that was offered by SAS in 1998.

II. SUPERVISED LEARNING

In supervised learning, the target is to infer a function or mapping from training data that's labelled. supervised learning algorithm consists of learning agent, Environment and supervisor. Learning agent learn from environment and create own output. Standard output is present in supervised learning as well as trainer is also present which is responsible for modification in output created by the learning agent. Desired answer key is present towards supervisor hence called as supervised learning.
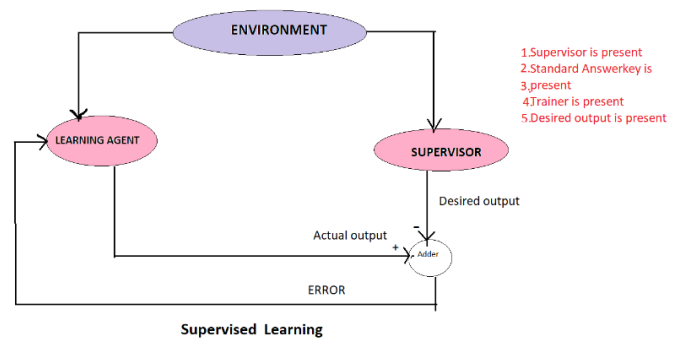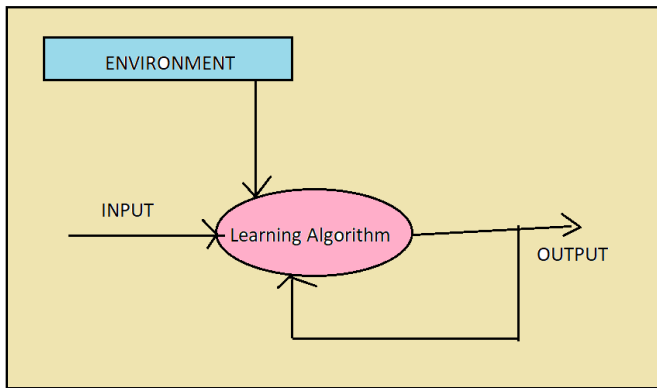

Fig 2.

III. UNSUPERVISED LEARNING

In unsupervised learning, we absence supervisors or training data. Unsupervised learning take input from environment and create output but the trainer i.e. supervisor is absent in these learning hence called as unsupervised learning. Self-learning is done in these algorithms.

UNSUPERVISED LEARNING

Fig 3.

In this sort of learning, the given data are a mix of classified and unclassified data. this mix of labelled and unlabelled data is employed to get an appropriate model for the classification of knowledge.
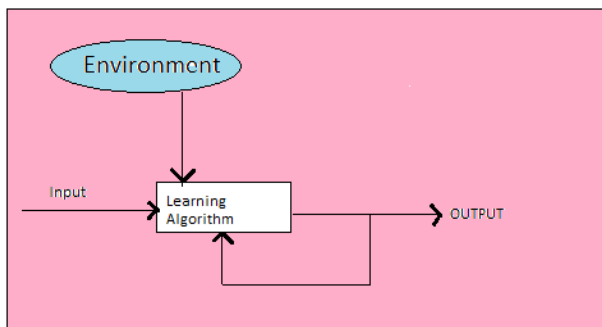
IV. REINFORCEMENT LEARNING

Fig 4. Reinforcement learning

The reinforcement learning method aims at using observations gathered from the interaction with the environment to require actions that might maximize the reward or minimize the danger. so as to supply intelligent programs (also called agents), reinforcement learning goes through the subsequent steps:

1. Input state is observed by the agent.
2. Deciding function is employed to form the agent perform an action.

3. After the action is completed, the agent obtains reward or reinforcement from the atmosphere.
4. The state-action pair information about the repayment is kept. Using the stored information, policy for particular state in terms of action are often fine-tuned, thus helping in optimal deciding for our agent.

Supervised Learning Algorithm include:
- Decision tree
- Ruled-Based classification
- Naïve Bayesian classification
- K-nearest neighbours classification
- Support vector machine

Unsupervised Learning algorithm:
- K-mean clustering
- Gaussian Mixture
- Hidden markova model
- Principel component analysis

- Decision Tree
  - A decision tree is a display that uses a branching method to demonstrate every possible outcome of a result.
  - Decision tree castoff in data mining are of two key types:
  - Classification Tree and
  - Regression Tree
  - A decision tree generates a smaller and smaller subset of a problem while an related decision tree is established incrementally.

- Naïve Bayes:
  - It is based on the conditional probability.
  - In 2012 Shadab Adam Pattekari and Asma Parveen both vacant the Naïve Bayes to analyze heart risk. This system provides effectives result for prediction of heart disease.

- In 2017 Sushmita Manikandan used Gaussian Naïve Bayes for the classification. It gives an accuracy of 81.25%.

- **K-Nearest Neighbor:**
  - A K-nearest neighbor is a data organization algorithm that goes to determine what group a data point is in by looking at the data points about it.
  - In 1951, Hodges et al. introduced a nonparametric technique for pattern classification which is popularly known the K-Nearest Neighbor technique.

- **Support Vector Machine (SVM):**
  - The points which positions are in the separating hyper plane is called support vectors.
  - SVM algorithm uses a set of mathematical functions called Kernel.
  - In 2010, Young–Jung son and Hong-Gee Kim used SVM for heart failure diagnosis.
  - It was perform on data with 11 variables and author achieve 77.63% high accuracy using this model.
  - SVM are used in text categorization, Image classification, handwriting recognition and in the science.
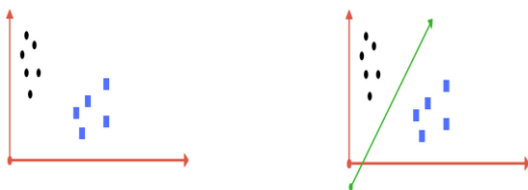

Fig A: draw a line that separates black circles and blue squares

Fig B: Sample cut to divide into two classes.

Application of Machine Learning Techniques:

KUKA:
KUKA is a German production of industrial robots and results for factory automation is an application of machine learning. Heat and dirt resistance robots, Industrial robots for cleaning and hygiene requirements and these are done by using machine learning.

MOLEY:
It is fully expressed robots' hand which reproduce function of human hand with same speed, compassion and movement. Moley is a robotic chief which can replicate dish cooked by any master chief in the world. Founder of Moley is Mark Olynik in 2015.The robotic company is present in Landon. Moley is a robot which is able to perform various services such as preparing food and cleaning dishes. Moley is fully functional and cooks with skill of a master chief.

NETFLIX RECOMMENDATION SYSTEM:
Many time we get a list of movies like to your interest. How fixes Netflix generate a list of movies similar to your interest? These is all because of machine learning techniques as 75% of users selects movies based on Netflix's recommendation. The recommendation system works pushing together data together from different spaces. Recommended rows are seen to your viewing habit. Not only Netflix but also Amazon, youtube or Pandora use recommender.

MACHINE LEARNING AT APPLE:
As we know i-phone is having face recognition technology and having face recognition technology is not easy thing. Core of face detection takes place through the machine leaning. Touch id has 1 and 50% chance that random person unlock your mobile , face id has huge 1 and 100% chance.

SCANNING:

Driverless cars: Self driving car / no need of driver. Tesla is mainly based on based on unsupervised learning mean no supervisor is present .The car learn from by its own experiences. It get data from all of its vehicles and its drivers from internal or external sensors by watching how driver handles car and operate the car. la's AI is driven by Nvidia's H/W Focusing mainly on unsupervised learning.

V. CONCLUSION

Machine learning may be supervised or unsupervised depend on the amount of data present. If there is lesser amount of data and clearly labelled then there is supervised learning. Unsupervised learning gives better performance and results for large data set. Finally, when it comes to the development of machine learning models of your own, you look at the choices of various development languages, IDEs and platforms.

VI. REFERENCES

[1]. Durant, W. Is man a machine? In the Pleasures of Philosophy: A Survey of Human Life and Destiny. New York: Simon and Schuster, 1953, p. 60.

[2]. Guthrie. Looking backwards, looking forwards: SAS, Data mining and Machine Learning, 2014, http://blogs.sas.com/content /subconsciousmusings/2014/08/22/looking-backwards-looking -forwards-sas-data-mining-and-machine-learning/.

[3]. Mitchell, T. M. The discipline of Machine Learning, Machine Learning Department Technical Report CMU-ML-06-108. Pittsburgh, PA: Carnegie Mellon University, July 2006.

[4]. Mitchell, T. M. Machine Learning. New York: McGraw-Hill, 1997.

[5]. Carroll, L. and Kelly, R. M. Alice's Adventures in Wonderland. Peterborough, ON: Broadview Press, 2000.

[6]. Bill Gates. AZQuotes.com, Wind and Fly LTD, 2016. http:// www.azquotes.com/quote/850928 (accessed April 13, 2016).

[7]. United States Postal Service. https://about.usps.com/who-weare/postal-facts/innovation-technologies.htm (accessed October 4, 2015).

[8]. Toyota Global Newsroom. http://http://newsroom.toyota.co.jp/ en/detail/9753831 (accessed April 14, 2016).

[9]. Luhn, H. P. A business intelligence system, IBM Journal 2(4):314-319, 1958.