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Machine Learning Algorithms - A Systematic Review

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Abstract:
The analysis of algorithms and statistical approaches that computer systems employ to carry out a particular task without being explicitly taught is known as machine learning (ML). There are several daily-used programmes that incorporate learning algorithms. One of the reasons an online search engine like Google works so well every time it is used to scour the web is because of a machine learning approach that has mastered the art of ranking web sites. These technologies are used for a number of different tasks, including data analysis, image recognition, predictive analytics, etc. The main benefit of machine learning is that once an algorithm understands how to use data, it can carry out its work autonomously. This paper provides a quick overview and outlook on the numerous uses of machine learning methods.
Keywords: *Artificial Intelligence, Machine Learning & Machine Learning Algorithm's.*

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I. Introduction:

The term Artificial Intelligence is made from two words "Artificial" and "Intelligence" artificial means those things or substance that do not be innately and generate individually, for example Robotics, Science. Intelligence means the capability of learning and implementation by something. Specialist accepts it includes cleverness such as logics, skills and thinking [1].

Artificial intelligence is a technique that is used to make machines act like human beings. The competence of a digital super-system performs typically as individual. It makes a machine more intelligent artificially with the help of programs and special technologies. It builds our life is too effective routines. It controls the schedule and tasks they help do routine life activities like establishing a communications connection such as social media, emails, etc. when we talk about that person who is away from the society of technical industry, it's difficult to understand how computer replace humans. But they don't know how actually ai is worked.

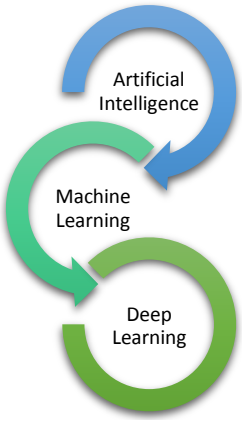


Figure 1 Machine learning and Artificial Intelligence are both types of learning includes deep learning

II. Machine Learning

Artificial intelligence contains machine learning, it is the capability of a machine to learn with its previous experience where humans no need to train machines regularly, machines are run with expert programs and their different algorithms. machine-learning algorithms are most beneficial nowadays: the machine learning-based systems are working more efficiently and are able to work with changing environments [2].
Machine Learning is divided into 4 Types:

1. Supervised Learning.
2. Unsupervised Learning.
3. Semi-supervised Learning.
4. Reinforcement Learning.

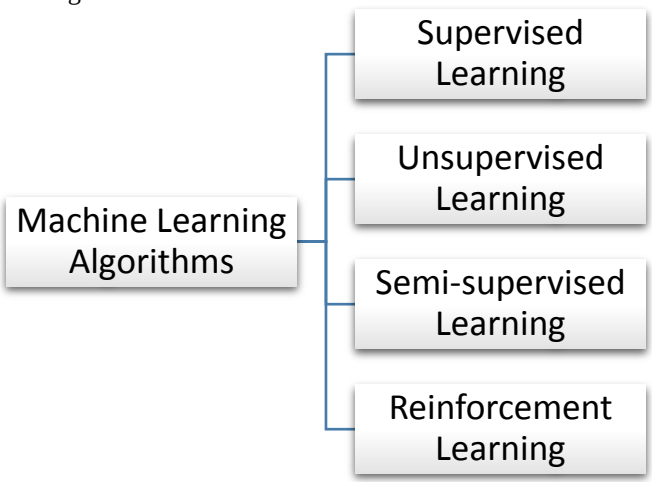


Figure 2: Types of Machine Learning

In Machine Learning we can mainly use the Supervised and Unsupervised learning algorithms.

1.1 Supervised Learning Algorithms: Supervised Learning is a type of Machine Learning where a machine typically needs to learn with supervision externally. the main functionality of Supervised Learning is to map the input data with output datasets. whenever machine processing and programs are done it was tested and checked to whether it provides a correct output or not. supervised learning is authentically based on supervision [3].

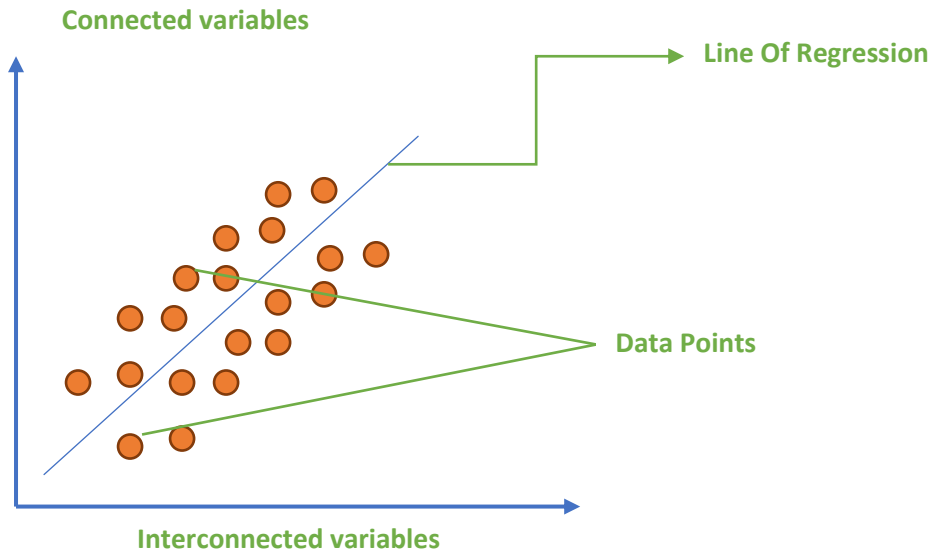
Supervised Learning is used following Algorithms:

- Linear
- SVM
- KNN
- Decision Tree Algorithm
- Naive-Bayes

i) Linear Regression Learning Algorithms:

The Linear Regression algorithm is a supervised learning Algorithm of machine learning. That are used to perform regression tasks. most of the time it is used to get on the interconnection between variables and forecasting.[4]

The Linear Regression Model gives a Diagonal line that shows the connection between the variables:



ii) SVM (Support Vector Machine Algorithm):

The SVM stands for Support Vector machine algorithm in supervised machine learning. it is one of the most used algorithms in machine learning, it is used to find classification problems in machine learning as well as to detect regression problems. It selects the furthermost points or vectors that help in creating a hyper plane. These vectors are called Support Vectors and the algorithm are called Support Vector Machine Algorithm.[5]

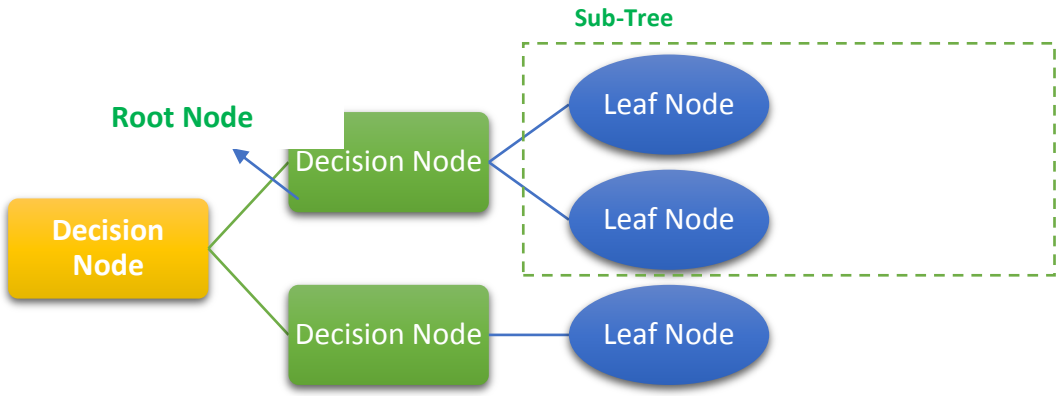
iii) KNN

The KNN stands for K- Nearest Neighbours in supervised learning, it is one of the simplest algorithms in machine learning. KNN algorithm finds the similarity between the available data and new data. KNN is used for Regression as well as Classification but most of the time it is used in Classification Problems.

Another name of KNN is 'the Lazy Learning Algorithm' because it doesn't learn from training set directly, it stores the data set and at the run time classification, it performs the action on the dataset.[6]

iv) Decision Tree Algorithm:

The Decision Tree Classification Algorithm of supervised learning in machine learning is helping to solve the classification problems it is also used to solve regression problems. it is the tree structure where internal nodes hold the features of datasets, their sub-nodes or branches store the decision rules, and leaf nodes contain the outcome of the given datasets.[7]

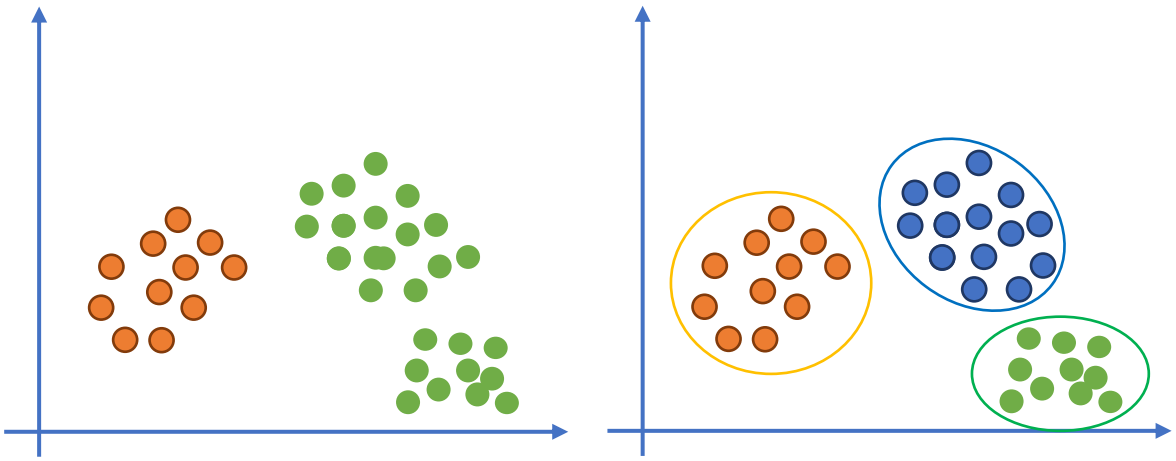


v) **Naive-Bayes:**
It is a machine learning supervised algorithm, based on Bayes Theorem and used to solve the classification problems. [8] it is the most important and most usable classification algorithm in machine learning that helps to build the machine learning models and is used to make the quick guess

1.2 **Unsupervised Learning Algorithms**: It is a kind of algorithm that study arrangement from unexplored results. unsupervised learning can be higher unstable as to other regular learning channels. It cannot be straight activated to a backsliding or coordination problem.[9]

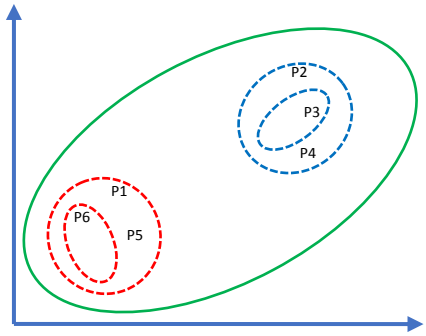
2.2.1 Unsupervised Learning is used following Algorithms:
1. K-means clustering.
2. Apriori Algorithm.
3. Hierarchal clustering.
4. Anomaly detection.
5. Neural Networks.

i) K-means clustering: It is an unsupervised learning algorithm that is used to find out the clustering issues in machine learning. It is generally used access for clustering. The target of this algorithm is to find a group in the data.[10]



ii) Apriori Algorithm:
Apriori is commonly consciously for unsupervised learning access since it is generally used to invent or reserve attractive arrangements and links. Apriori can be more altered to do analysis based on prepared data.

iii) Hierarchal clustering:
Hierarchical clustering is some other unsupervised machine learning algorithm, which is used to the collection of the unlabelled dataset into clusters and is also known as hierarchical clustering.[11]



iv) Anomaly detection: It is the classifying of items, unique events, or measurements that are doubtful because they alter typically from classic nature or arrangement. Anomalies in data are also called a classic irregularity, exception, and noise.[12]

v) Neural Networks:
Neural networks are a group of machine learning. The neural network is at the heart of a deep learning algorithm.

III. Applications of Artificial intelligence:

There are lots of applications of artificial intelligence we will discuss only some important applications of AI. it is important in our daily life nowadays because it helps to find solutions to difficult situations in different industries such as the Healthcare systems, Gaming, Accounting, Automation, social media, etc
Following are some applications of the Artificial intelligence: -

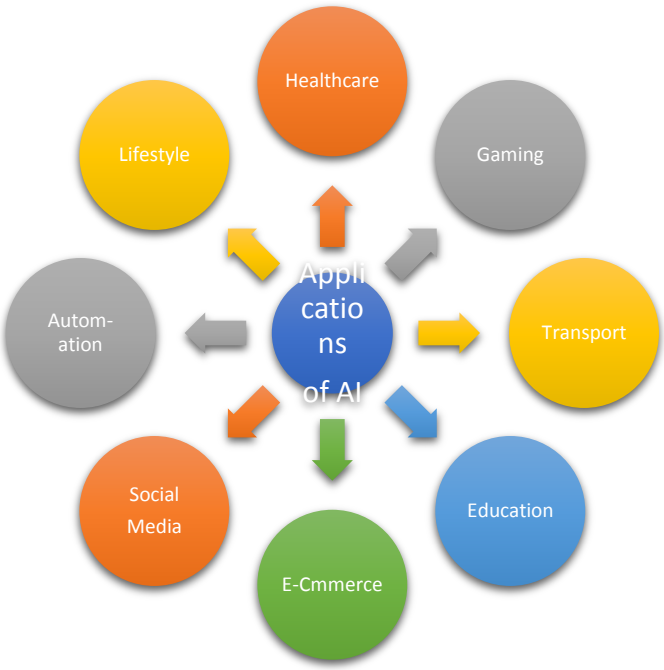


Figure 2 Applications of AI

- Healthcare System
- Gaming
- Transportation
- Education
- E-Commerce

- Social Media
- Automation
- Lifestyle

1. **Healthcare System:** Artificial Intelligence is most preferable in the Healthcare system for the last 1 decade and makes a crucial effect on this industry. It helps the doctor to make a better decision regarding the diagnosis of the patient [13].

2. **Gaming:** Nowadays it is used in gaming; the ai based games play a number of minds games where a machine needs to think like a human such as chess, ludo, etc.

3. **Transportation:** in the travel industry, AI is most used nowadays. Most of the work is done in travel agencies by AI such as chatting with customers, booking flights, searching for best routes, and book hotel rooms, etc. Chabot is the most used in travel industries to fast conversation with customers [14].

4. **Education:** AI tools are to help the education system to make a global classroom where a machine is communicating with students as a teaching guide. For Example: Brainly, KidSense & Thinkster Math, etc [15].

5. **E-Commerce:** AI plays the most important role in the e-commerce industry. AI helps the e-commerce industry to start a business effectively and efficiently and analyse customer behaviour [16].

6. **Social Media:** Do you know over 3.96 billion people is on social media. A large no of social media platforms is used AI to make a user better experience. A large no of social media platforms is used AI to make a user better experience. For example, Face book uses machine learning for image recognition, Snapchat filters & LinkedIn recommends jobs according to user interest.

7. **Automotive:** AI is most important in the automotive industry nowadays; it makes our driving secure and more effective. Ai provides some advanced features like driverless cars, Automatic Emergency Braking, Forward impact warning, and auto parking [17].

8. **Lifestyle:** AI plays a common and more important role in our lifestyle, for example, Automotive Vehicles, Spam Filters, recommendation systems, etc.

IV. Conclusion:

Both supervised and unsupervised machine learning are possible. Choose supervised learning if you have fewer data points with well marked training data. For huge data sets, unsupervised learning would typically perform and produce superior outcomes. Consider using deep learning techniques if you have a sizable data set that is easily accessible. Additionally, you studied Deep Reinforcement Learning and Reinforcement Learning. You now have a better understanding of neural networks, their uses, and their drawbacks. In this work, numerous machine learning algorithms are surveyed. Today, whether intentionally or not, everyone uses machine learning. from updating images on social networking sites to receiving product recommendations when buying online. The vast majority of the well-known machine learning methods and their applications in our day to day life are introduced in this publication.

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