**Machine Learning and it’s types**

**Intro:** In this article, I'll explain Machine Learning and the various types of Machine Learning.

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**Machine Learning**

Machine Learning is a subset of Artificial Intelligence. It's a technology that allows our computers to learn without having to be explicitly programmed. i.e., it allows our system to learn new things. Machine learning differs from artificial intelligence in that it may change over time. Machine learning algorithms can process vast volumes of data and extract meaningful information by employing a variety of programming techniques. By learning from the data, they are given, they can improve on earlier versions.

Big data, which is one of the most significant parts of machine learning algorithms, cannot be discussed without mentioning machine learning. Because AI is mostly based on statistical methodologies, the quality of a dataset is crucial to producing effective results.

Machine learning is no exception, and a reliable ML solution necessitates a steady influx of well-organized, diverse data. In today's online-first world, businesses have access to millions of records about their customers. Because of the vast amount of information it contains, this data is referred to as big data. It has a huge number of data points as well as a significant number of fields.

Diagram

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[Source](https://www.google.com/search?q=machine+learning+&tbm=isch&ved=2ahUKEwjHhOj-5svyAhXVVn0KHcC0AGcQ2-cCegQIABAA&oq=machine+learning+&gs_lcp=CgNpbWcQAzIECAAQQzIHCAAQsQMQQzIKCAAQsQMQgwEQQzIECAAQQzIECAAQQzIFCAAQgAQyCAgAEIAEELEDMgQIABBDMgsIABCABBCxAxCDATIECAAQQzoECCMQJzoECAAQGFCBFVjWMmDwNGgAcAB4AIABoAGIAdIRkgEEMC4xNpgBAKABAaoBC2d3cy13aXotaW1nwAEB&sclient=img&ei=6wUmYYfjM9Wt9QPA6YK4Bg&bih=754&biw=1536#imgrc=c7IhqdBiX6rc0M)

**Applications of Machine Learning**

1) **Virtual Assistant –** Intelligent Agents, Natural Language Processing, Speech Recognition etc.  
2) **Social Media -** Sentiment Analysis, Spam Filtering, Automatic Friend Tagging etc.  
3) **Healthcare -** Drug Discovery, Disease Diagnosis, Robotic Surgery  
4) **Transport –** Safety Monitoring, Air Traffic Control etc.  
5) **Financial Services –** Algorithmic Trading, Portfolio Management, Fraud Detection etc.  
6) **Ecommerce –** Customer Support, Product Recommendation etc.

**Types of Machine Learning**

1) **Supervised Machine Learning** - The training data in supervised learning is known or labelled data. Because the data is known, the learning is supervised, that is, led to a successful outcome. The data is fed into the Machine Learning algorithm, which is then used to train the model. You can put unknown data in the model after it has been trained on known data to produce a new result.

The model in this scenario is attempting to determine whether the data is an apple or another fruit. Once the model has been properly trained, it will recognize that the data is an apple and respond accordingly.

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**Supervised learning classified into two categories of algorithms:**

**1) Classification:** A classification problem is when the output variable may lie in one of the categories, like “Green” or “Yellow”, “Fruit” or “Vegetable” or “Educated” and “Uneducated”.

**2) Regression:** When the output variable is a real value, this is referred to as a regression problem, like “Prices”, “Height” or “Weight”.

**Techniques of Supervised Machine Learning algorithms includes: -**

* Linear Regression
* Logistic Regression
* Polynomial Regression
* Decision Trees
* Support Vector Machines
* K-Nearest Neighbors
* Naïve Bayes

**2) Unsupervised Machine Learning -** The training data in unsupervised learning is unknown and unlabeled, implying that no one has ever looked at it before. The input cannot be led to the algorithm without the aspect of known data, which is where the word "unsupervised" comes from. The model is trained using this data, which is input into the Machine Learning algorithm. The trained model tries to find a pattern and respond appropriately. In this scenario, it appears that the algorithm is attempting to break code in the same way as the Enigma machine did, but without the involvement of a human mind.

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[Source](https://www.google.com/search?q=unsupervised+machine+learning&tbm=isch&ved=2ahUKEwjT4pap6cvyAhVYbisKHZrcB1oQ2-cCegQIABAA&oq=unsupervised+machine+learning&gs_lcp=CgNpbWcQAzIECCMQJzIFCAAQgAQyBQgAEIAEMgUIABCABDIFCAAQgAQyBQgAEIAEMgUIABCABDIFCAAQgAQyBQgAEIAEMgUIABCABFCLtwhYgbgIYNW6CGgAcAB4AIABoQGIAbYCkgEDMC4ymAEAoAEBqgELZ3dzLXdpei1pbWfAAQE&sclient=img&ei=XQgmYZPAItjcrQGauZ_QBQ&bih=754&biw=1536#imgrc=Dvvld8ZWmmW2vM)

**Unsupervised learning classified into two categories of algorithms:**

**1) Clustering:** This is a clustering problem in which you want to extract the data's intrinsic categories, such as consumers by purchasing habits.

**2) Association:** An association rule learning problem is where you would like to get rules that describe large portions of your data, like folks that buy X also tend to buy Y.

**Types of Unsupervised Machine Learning: -**

**Clustering**  
1. Exclusive (partitioning)  
2. Agglomerative  
3. Overlapping  
4. Probabilistic

**Types of Clustering: -**  
1. Hierarchical clustering  
2. K-means clustering  
3. Principal Component Analysis  
4. Singular Value Decomposition  
5. Independent Component Analysis

**Techniques of Unsupervised Machine Learning algorithms includes: -**

* Apriori
* Hierarchical Clustering
* Principal Component Analysis (PCA)
* K-means Clustering

**3) Reinforcement Machine Learning -** The algorithm here, like in traditional methods of data analysis, discovers data through trial and error and then selects which action yields better rewards. The agent, the environment, and the actions are the three major components of reinforcement learning. The learner or decision-maker is the agent, the environment is everything the agent interacts with, and the actions are the things the agent does.

When an agent chooses actions that maximize the predicted reward over a set period of time, it is said to be practicing reinforcement learning. When the agent is functioning under a well-defined policy framework, this is the easiest to accomplish.

Playing a game where the agent can make moves in the game and receive feedback in the form of punishments or rewards is an example of a reinforcement problem.

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[Source](https://www.google.com/search?q=reinforcement+machine+learning&tbm=isch&ved=2ahUKEwjG_ND36cvyAhUJGHIKHZjAC6IQ2-cCegQIABAA&oq=reinforcement+machine+learning&gs_lcp=CgNpbWcQAzIFCAAQgAQyBQgAEIAEMgUIABCABDIGCAAQBxAeMgYIABAHEB4yBggAEAUQHjIGCAAQCBAeMgYIABAIEB4yBggAEAgQHjIECAAQGDoECAAQQzoICAAQBxAFEB46CAgAEAgQBxAeUMeOBVitogVgmaQFaABwAHgAgAHVAYgBuA-SAQYwLjEyLjGYAQCgAQGqAQtnd3Mtd2l6LWltZ8ABAQ&sclient=img&ei=AgkmYcbzBYmwyAOYga-QCg&bih=754&biw=1536#imgrc=jiv0CUmdXx9toM)

**4) Semi-Supervised Machine Learning –** it is supervised learning with a small number of labelled instances and a big number of unlabeled examples in the training data.

In contrast to supervised learning, the purpose of a semi-supervised learning model is to make good use of all available data rather than just the labelled data.

We are given a few labelled instances in semi-supervised learning and must make the best of a big array of unlabeled samples. Even the labels themselves may not be the prophetic truths we expect.

Unsupervised approaches such as clustering and density estimation may be required or inspired for making optimal use of unlabeled data. Once groupings or patterns have been identified, supervised methods or ideas from supervised learning can be used to label unlabeled samples or apply labels to unlabeled representations that will be used for prediction in the future.

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[Source](https://www.google.com/search?q=semi+supervised+machine+learning&tbm=isch&ved=2ahUKEwju-v3r6cvyAhVKHCsKHd6_AfcQ2-cCegQIABAA&oq=semi+supervised+machine+learning&gs_lcp=CgNpbWcQAzIGCAAQBxAeMgYIABAHEB46CAgAEAgQBxAeOgQIIxAnOgUIABCABFClpQFYy7IBYJy2AWgAcAB4AIAB-AGIAfwIkgEFMC4zLjOYAQCgAQGqAQtnd3Mtd2l6LWltZ8ABAQ&sclient=img&ei=6QgmYa7iKMq4rAHe_4a4Dw&bih=754&biw=1536#imgrc=TDjDExfkF0yOgM)

**Use of Semi-Supervised Machine Learning**

When you don’t have enough labelled data to produce an accurate model and you don’t have the ability or resources to get more data, you can use semi-supervised techniques to increase the size of your training data.

### End Notes:

Thank you for following with me all the way to the end. By the end of this article, we should have a good understanding of Machine Learning and the many forms of Machine Learning.

I hope you found this article useful. Please feel free to distribute it to your peers.

**Author**

Hello, I'm **Gunjan Agarwal** from Gurugram, and I graduated from Amity University in Gurgaon with a master's degree in data science. Participate in Data Science hackathons, blogathons, and workshops with zeal.

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