Write up on Machine learning

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What is Machine Learning?

Machine Learning is an application of Artificial Intelligence [AI] that provides system the ability to automatically learn and improve from the experience without being explicitly programmed. It is a set of techniques to make computers better at doing things that humans can do better than machines. Just as our brain has millions of neurons to capture inputs and store it in hidden network and execute the output, machine can also be able to train itself. This is how a ML works. It is a complete science field in Computer science where we use various techniques.

It is a combo of Deep learning and Mathematical models.

Machine learning has influenced the modern life greatly. ML is used in Spam filter of mails which filters the spam mails automatically. It is also used in Personal assistant type devices like Amazon Alexa etc, Recommended videos column in you tube and also driverless cars of google, uber etc.

Types of Machine Learning:

Machine learning is categorised primarily into 3 types:

a) Supervised Machine Learning
b) Unsupervised Machine Learning
c) Reinforcement Machine Learning

Supervised Machine Learning:- This is a category in which machine learns from training data that is labelled.

Unsupervised Machine Learning:- This is a category in which machine learns from training data that is not labelled.

Reinforcement Machine Learning:- This is a category in which machine learns on its own.

The major difference between supervised machine learning and unsupervised machine learning is as follows:

Supervised ML	Unsupervised ML
Labelled	Not labelled
Direct feed back is given	No feed back is given
This type can predict the output	It finds hidden pattern or structure

There are various algorithms in Machine learning. But the algorithm to be used depends on problem statement, size, quality, nature of data, complexity of task. For different method of tasks different algorithms should be used.

- Classification:- This method is used to predict yes or no outputs
  So ML algorithms like Decision tree, Naïve bayes, Random forest, Logistic regression, KNN are used
- Regression:- This method is used when a value needs to be predicted like stock prices. So ML algorithms like linear regression is used
- Clustering:- This method is used when data needs to be organized to find patterns in case of product recommendations. So ML algorithms like K Means is used

Applications of Machine learning:-

We are using machine learning in our daily life even without knowing it such as Google Maps, Google assistant, Alexa, etc.

1. Image Recognition: Image recognition is one of the most common applications of machine learning. It is used to identify objects, persons, places, digital images, etc. The popular use case of image recognition and face detection is, **Automatic friend tagging suggestion**: Facebook provides us a feature of auto friend tagging suggestion. Whenever we upload a photo with our Facebook friends, then we automatically get a tagging suggestion with name, and the technology behind this is machine learning's **face detection** and **recognition algorithm**. It is based on the Facebook project named "**Deep Face**," which is responsible for face recognition and person identification in the picture.
2. Speech Recognition: While using Google, we get an option of "Search by voice," it comes under speech recognition, and it's a popular application of machine learning.
3. Traffic Prediction: If we want to visit a new place, we take help of Google Maps, which shows us the correct path with the shortest route and predicts the traffic conditions.
4. Virtual Personal Assistant: We have various virtual personal assistants such as **Google assistant**, **Alexa**, **Cortana**, **Siri**. As the name suggests, they help us in finding the information using our voice instruction. These assistants can help us in various ways just by our voice instructions such as Play music, call someone, Open an email, Scheduling an appointment, etc.