1.what is the concept of human learning please give two examples.?

Ans:.

The Concept of Learning. In common parlance the word ‘learning’ carries at least two meanings. There is a general one of some kind of change, often in knowledge but also in behavior. However, learning cannot be defined merely in terms of changes in behavior. To say that ‘learning is change’ is too simple.

Beside above, what is human learning? Human learning is a process of acquiring knowledge. Our behavior, skills, values and ethics are acquired when we process information through our minds and learn. Human learning may occur as part of education, personal development or any other informal/formal training.

Psychologists often define learning as a relatively permanent change in behavior as a result of experience. The psychology of learning focuses on a range of topics related to how people learn and interact with their environments. Watson who suggested that all behaviors are a result of the learning process.

There are three main types of learning: classical conditioning, operant conditioning, and observational learning. Both classical and operant conditioning are forms of associative learning, in which associations are made between events that occur together.

1. Motor learning:

Most of our activities in our day-to-days life refer to motor activities. The individual has to learn them in order to maintain his regular life, for example walking, running, skating, driving, climbing, etc. All these activities involve the muscular coordination.

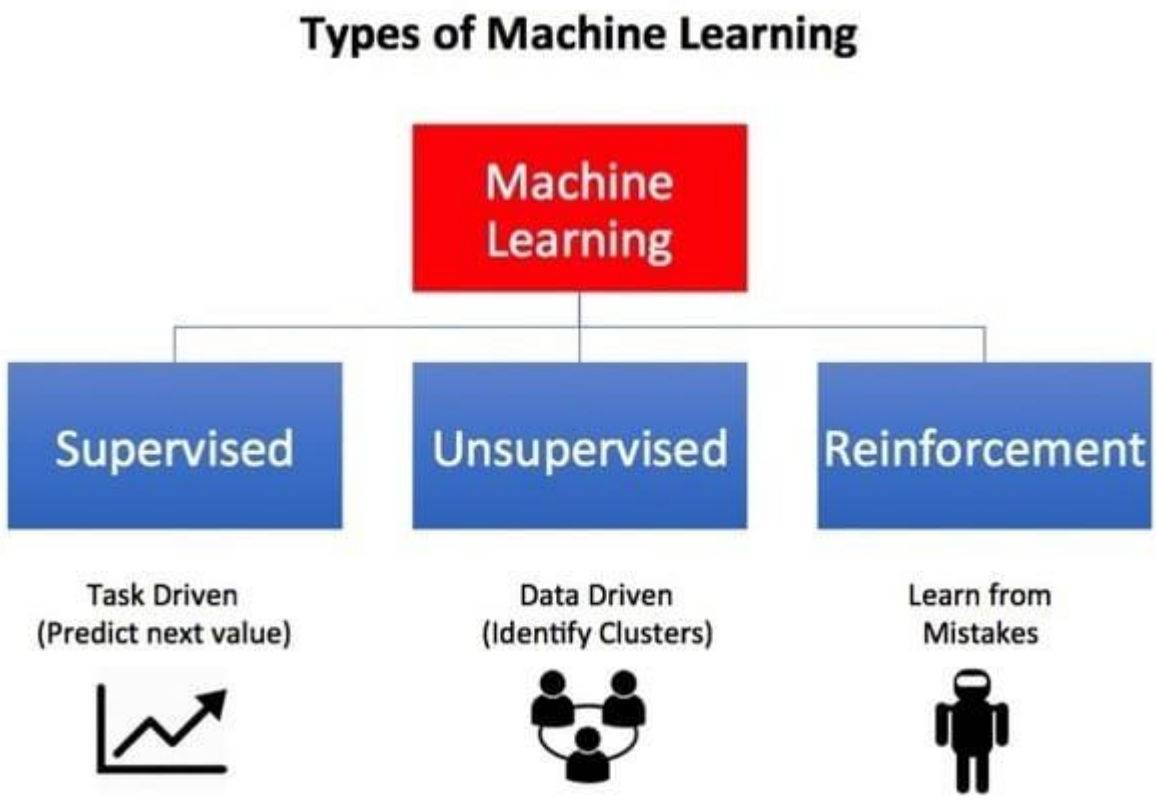
2. Verbal learning:

This type of learning involves the language we speak, the communication devices we use. Signs, pictures, symbols, words, figures, sounds, etc, are the tools used in such activities. We use words for communication.

2.What different forms of human learning are there ? Are there any machine learning equivalents.?

Ans:. The origins of machine learning are not easy to determine as it is a field that borrowed many ideas from various disciplines to evolve into what it is today. Some consider machine learning to have developed from statistics as most of its methods are statistically based, while others believe that one of the first few examples of machine learning is Arthur Samuel’s (1959) work in creating a checkers playing computer program that constantly updated its strategies to become better at winning [1].

Nonetheless, it is undeniable that the term “machine learning” has been inspired by the organic nature



of continuous improvement in human learning. The process of human learning builds upon pre-existing knowledge, where the knowledge is either modified or reinforced to make it more accurate, and subsequently used to improve decision making .

There are many ways to frame this idea, but largely there are three major recognized categories: supervised learning, unsupervised learning, and reinforcement learning.

Supervised Learning

Supervised learning is the most popular paradigm for machine learning. It is the easiest to understand and the simplest to implement. It is very similar to teaching a child with the use of flash cards.

Unsupervised Learning

Unsupervised learning is very much the opposite of supervised learning. It features no labels. Instead, our algorithm would be fed a lot of data and given the tools to understand the properties of the data. From there, it can learn to group, cluster, and/or organize the data in a way such that a human (or other intelligent algorithm) can come in and make sense of the newly organized data.

Reinforcement Learning

Reinforcement learning is fairly different when compared to supervised and unsupervised learning. Where we can easily see the relationship between supervised and unsupMachine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting

outcomes without being explicitly programmed to do so. Machine learning algorithms use historical data as input to predict new output values.

Recommendation engines are a common use case for machine learning. Other popular uses include fraud detection, spam filtering, malware threat detection, business process automation (BPA) and Predictive maintenance.Recommendation engines are a common use case for machine learning. Other popular uses include fraud detection, spam filtering, malware threat detection, business process automation (BPA) and Predictive maintenance.

Classical machine learning is often categorized by how an algorithm learns to become more accurate in its predictions. There are four basic approaches:supervised learning, unsupervised learning, semi-supervised learning and reinforcement learning. The type of algorithm data scientists choose to use depends on what type of data they want to predic

3. What is machine learning, and how does it work? What are the key responsibilities of machine learning?

Ans: Machine learning is a data analytics technique that teaches computers to do what comes naturally to humans and animals: learn from experience. Machine learning algorithms use computational methods to “learn” information directly from data without relying on a predetermined equation as a model.Why Machine Learning Matters With the rise in big data, machine learning has become a key technique for solving problems in areas, such as: computational finance, for credit scoring and algorithmic trading Image processing and computer vision, for face recognition, motion detection, and object detectionComputational biology, for tumor detection, drug discovery, and DNA sequencing Energy production, for price and load forecasting Automotive, aerospace, and manufacturing, for predictive maintenance Natural language processing, for voice recognition applications Machine learning algorithms find natural patterns in data that generate insight and help you make better decisions and predictions. They are used every day to make critical decisions in medical diagnosis, stock trading, energy load forecasting, and more. For example, media sites rely on machine learning to sift through millions of options to give you song or movie recommendations. Retailers use it to gain insight into their customers’ purchasing behavior.

Responsibilities:

Study and transform data science prototypes

Design machine learning systems

Research and implement appropriate ML algorithms and tools

Develop machine learning applications according to requirements

Select appropriate datasets and data representation methods

Run machine learning tests and experiments

Perform statistical analysis and fine-tuning using test results

Train and retrain systems when necessary

Extend existing ML libraries and frameworks

Keep abreast of developments in the field.

4.Define the terms penality and reward in the context of reinforce learning.?

Ans:. Reinforcement learning (RL) is an area of machine learning concerned with how intelligent agents ought to take actions in an environment in order to maximize the notion of cumulative reward. Reinforcement learning is one of three basic machine learning paradigms, alongside supervised learning and unsupervised learning.

Reinforcement learning differs from supervised learning in not needing labelled input/output pairs be presented, and in not needing sub-optimal actions to be explicitly corrected. Instead the focus is on finding a balance between exploration (of uncharted territory) and exploitation (of current knowledge).Partially supervised RL algorithms can combine the advantages of supervised and RL algorithms.

Reinforcement learning, in the context of machine learning and artificial intelligence (AI), is a type of dynamic programming that trains algorithms using a system of reward and punishment.

A reinforcement learning algorithm, which may also be referred to as an agent, learns by interacting with its environment. The agent receives rewards by performing correctly and penalties for performing incorrectly. The agent learns without intervention from a human by maximizing its reward and minimizing its penalty.

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Techopedia Explains Reinforcement Learning (RL)

Reinforcement learning is an approach to machine learning that is inspired by behaviorist psychology. It is similar to how a child learns to perform a new task. Reinforcement learning contrasts with other machine learning approaches in that the algorithm is not explicitly told how to perform a task, but works through the problem on its own.

As an agent, which could be a self-driving car or a program playing chess, interacts with its environment, receives a reward state depending on how it performs, such as driving to destination safely or winning a game. Conversely, the agent receives a penalty for performing incorrectly, such as going off the road or being checkmated.

The agent over time makes decisions to maximize its reward and minimize its penalty using dynamic programming. The advantage of this approach to artificial intelligence is that it allows an AI program to learn without a programmer spelling out how an agent should perform the task.

4. Explain the term “learning as a search”?

Ans:. In general, we can think of concept learning as a search problem. The learner searches through a space of hypotheses (we will explain what they are), to find the best oneSearching through a large space of hypotheses implicitly defined by the hypothesis representation (same for more general learning). The hypothesis representation defines the space of hypotheses the program can ever represent and therefore can ever learn.Concept Learning as Search

Searching through a large space of hypotheses implicitly defined by the hypothesis representation (same for more general learning).

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For example, Sky has 3 possible values and Temp,Humidity,Wind,Water, and Forecast each have 2 possible values

5. What are the various goals of machine learning? What is the relationship between These and human learning?

Ans:. The Goals of Machine Learning.

The goal of ML, in simples words, is to understand the nature of (human and other forms of) learn-

Ing, and to build learning capability in computers. To be more specific, there are three aspects of the goals

Of ML.

(1) To make the computers smarter, more intelligent. The more direct objective in this aspect is to

Develop systems (programs) for specific practical learning tasks in application domains.

(2) To dev elop computational models of human learning process and perform computer simulations.

The study in this aspect is also called cognitive modeling.

(3) To explore new learning methods and develop general learning algorithms independent of applicaTions.

Why the goals of ML are important and desirable.It is self-evident that the goals of ML are important and desirable. However, we still give some more

Supporting argument to this issue. First of all, implanting learning ability in computers is practically necesSary. Present day computer applications require the representation of huge amount of complex knowledge And data in programs and thus require tremendous amount of work. Our ability to code the computers falls

Short of the demand for applications. If the computers are endowed with the learning ability, then our bur

Den of coding the machine is eased (or at least reduced). This is particularly true for developing expert sys-

Tems where the "bottle-neck" is to extract the expert's knowledge and feed the knowledge to computers.

The present day computer programs in general (with the exception of some ML programs) cannot correct

Their own errors or improve from past mistakes, or learn to perform a new task by analogy to a previously Seen task. In contrast, human beings are capable of all the above. ML will produce smarter computersCapable of all the above intelligent behavior.

Second, the understanding of human learning and its computational aspect is a worthy scientific goal.

We human beings have long been fascinated by our capabilities of intelligent behaviors and have been trying to understand the nature of intelligence. It is clear that central to our intelligence is our ability to learn.

Thus a thorough understanding of human learning process is crucial to understand human intelligence. ML

Will gain us the insight into the underlying principles of human learning and that may lead to the discovery

Of more effective education techniques. It will also contribute to the design of machine learning system

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9. What is the concept of generalization? What function does it play in the machine Learning process?

Ans:. IN machine learning, generalization is a definition to demonstrate how well is a trained model to classify or forecast unseen data. Training a generalized machine learning model means, in general, it works for all subset of unseen data. An example is when we train a model to classify between dogs and cats. If the model is provided with dogs images dataset with only two breeds, it may obtain a good performance. But, it possibly gets a low classification score when it is tested by other breeds of dogs as well. This issue can result to classify an actual dog image as a cat from the unseen dataset. Therefore, data diversity is very important factor in order to make a good prediction. In the sample above, the model may obtain 85% performance score when it is tested by only two dog breeds and gains 70% if trained by all breeds. However, the first possibly gets a very low score (e.g. 45%) if it is evaluated by an unseen dataset with all breed dogs. This for the latter can be unchanged given than it has been trained by high data diversity including all possible breeds.

It should be taken into account that data diversity is not the only point to care in order to have a generalized model. It can be resulted by nature of a machine learning algorithm, or by poor hyper-parameter configuration. In this post we explain all determinant factors. There are some methods (regularization) to apply during model training to ensure about generalization. But before, we explain bias and variance as well as underfitting and overfitting.

10.What is classification, exactly? What are the main distinctions between classification and regression?

Ans:. Classification is a process of finding a function which helps in dividing the dataset into classes based on different parameters. In Classification, a computer program is trained on the training dataset and based on that training, it categorizes the data into different classes.

The task of the classification algorithm is to find the mapping function to map the input(x) to the discrete output(y).

Regression Algorithm Classification Algorithm

In Regression, the output variable must be of continuous nature or real value. In Classification, the output variable must be a discrete value.

The task of the regression algorithm is to map the input value (x) with the continuous output variable(y). The task of the classification algorithm is to map the input value(x) with the discrete output variable(y).

Regression Algorithms are used with continuous data. Classification Algorithms are used with discrete data.

In Regression, we try to find the best fit line, which can predict the output more accurately. In Classification, we try to find the decision boundary, which can divide the dataset into different classes.

Regression algorithms can be used to solve the regression problems such as Weather Prediction, House price prediction, etc. Classification Algorithms can be used to solve classification problems such as Identification of spam emails, Speech Recognition, Identification of cancer cells, etc.

The regression Algorithm can be further divided into Linear and Non-linear Regression. The Classification algorithms can be divided into Binary Classifier and Multi-class Classifier.

11.What is regression, and how does it work? Give an example of a real-world problem that was solved using regression.?

Ans:. Regression is a technique for investigating the relationship between independent variables or features and a dependent variable or outcome. It's used as a method for predictive modelling in machine learning, in which an algorithm is used to predict continuous outcomes.

Solving regression problems is one of the most common applications for machine learning models, especially in supervised machine learning. Algorithms are trained to understand the relationship between independent variables and an outcome or dependent variable. The model can then be leveraged to predict the outcome of new and unseen input data, or to fill a gap in missing data.

Regression analysis is an integral part of any forecasting or predictive model, so is a common method found in machine learning powered predictive analytics. Alongside classification, regression is a common use for supervised machine learning models. This approach to training models required labelled input and output training data. Machine learning regression models need to understand the relationship between features and outcome variables, so accurately labelled training data is vital.

Example: we can say that age and height can be described using a linear regression model. Since a person's height increases as its age increases, they have a linear relationship. Regression models are commonly used as a statistical proof of claims regarding everyday facts.Linear Regression Real Life

Example #2

Medical researchers often use linear regression to understand the relationship between drug dosage and blood pressure of patients. For example, researchers might administer various dosages of a certain drug to patients and observe how their blood pressure responds.We could use the equation to predict weight if we knew an individual's height. In this example, if an individual was 70 inches tall, we would predict his weight to be: Weight = 80 + 2 x (70) = 220 lbs. In this simple linear regression, we are examining the impact of one independent variable on the outcome

12. Describe the clustering mechanism in detail.?

Ans:. Cluster is a group of objects that belongs to the same class. In other words, similar objects are grouped in one cluster and dissimilar objects are grouped in another cluster.

What is Clustering?

Clustering is the process of making a group of abstract objects into classes of similar objects.

Points to Remember

A cluster of data objects can be treated as one group.

While doing cluster analysis, we first partition the set of data into groups based on data similarity and then assign the labels to the groups.

The main advantage of clustering over classification is that, it is adaptable to changes and helps single out useful features that distinguish different groups.

Applications of Cluster Analysis

Clustering analysis is broadly used in many applications such as market research, pattern recognition, data analysis, and image processing.

Clustering can also help marketers discover distinct groups in their customer base. And they can characterize their customer groups based on the purchasing patterns.

In the field of biology, it can be used to derive plant and animal taxonomies, categorize genes with similar functionalities and gain insight into structures inherent to populations.

Clustering also helps in identification of areas of similar land use in an earth observation database. It also helps in the identification of groups of houses in a city according to house type, value, and geographic location.

Clustering also helps in classifying documents on the web for information discovery.

Clustering is also used in outlier detection applications such as detection of credit card fraud.

As a data mining function, cluster analysis serves as a tool to gain insight into the distribution of data to observe characteristics of each cluster.

Requirements of Clustering in Data Mining

The following points throw light on why clustering is required in data mining –

Scalability – We need highly scalable clustering algorithms to deal with large databases.

Ability to deal with different kinds of attributes – Algorithms should be capable to be applied on any kind of data such as interval-based (numerical) data, categorical, and binary data.

Discovery of clusters with attribute shape – The clustering algorithm should be capable of detecting clusters of arbitrary shape. They should not be bounded to only distance measures that tend to find spherical cluster of small size