

# 1. What is the concept of human learning? Please give two examples.

Answer::

Image result for 1. What is the concept of human learning? Please give two examples. Learning is the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences. The ability to learn is possessed by humans, animals, and some machines; there is also evidence for some kind of learning in certain plants. Many examples of this case are found in case of human learning. Learning to drive a motor-car, typewriting, singing or memorizing a poem or a mathematical table, and music etc. need exercise and repetition of various movements and actions many times.

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

Answer::Contents Classical and operant conditioning Categories of learning and the problem of definition Representativeness of rote verbal learning Centrality of verbal learning Probability learning Evaluation of stimulus sampling theory Short-term memory and incidental learning Behavioral effects of instruction to learn Are there equivalent forms of machine learning? There are many ways to frame this idea, but largely there are three major recognized categories: supervised learning, unsupervised learning, and reinforcement learning. Artificial neural networks follow the neuronal principle of Hebbian learning, where the algorithm centres on inputs with similar properties, just like how neurons that activate simultaneously strengthen the synaptic link between each other

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

learning?

Answer:Machine learning is a subfield of artificial intelligence, which is broadly defined as the capability of a machine to imitate intelligent human behavior. Artificial intelligence systems are used to perform complex tasks in a way that is similar to how humans solve problems. Machine Learning is an AI technique that teaches computers to learn from experience. Machine learning algorithms use computational methods to “learn” information directly from data without relying on a predetermined equation as a model.

Roles and responsibilities of a machine learning engineer

An ML engineer's primary goals are the creation of machine learning models and retraining systems when needed. Responsibilities vary, depending on the organization, but some common responsibilities for this role include:

Designing ML systems.

Researching and implementing ML algorithms and tools.

Selecting appropriate data sets.

Picking appropriate data representation methods.

Identifying differences in data distribution that affects model performance.

Verifying data quality.

Transforming and converting data science prototypes.

Performing statistical analysis.

Running machine learning tests.

Using results to improve models.

Training and retraining systems when needed.

Extending machine learning libraries.

Developing machine learning apps according to client requirements.

## **4. Define the terms "penalty" and "reward" in the context of reinforcement learning.**

Answer::Action(): Actions are the moves taken by an agent within the environment. State(): State is a situation returned by the environment after each action taken by the agent. Reward(): A feedback returned to the agent from the environment to evaluate the action of the agent. 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.

## **5. Explain the term "learning as a search"?**

Answer: Learning can be viewed as a search through the space of all sentences in a concept description language for a sentence that best describes the data. Alternatively, it can be viewed as a search through all hypotheses in a hypothesis space. Concept learning also refers to a learning task in which a human or machine learner is trained to classify objects by being shown a set of example objects along with their class labels. The learner will simplify what has been observed in an example.

## **6. What are the various goals of machine learning? What is the relationship between these and**

human learning?

Answer: Modern-day machine learning has two objectives, one is to classify data based on models which have been developed, the other purpose is to make predictions for future outcomes based on these models. The end-goal is for the machine to execute actions in an increasingly optimized manner by refining patterns and behavior through continuous learning. The three main types of learning algorithms are Supervised, Unsupervised, and Reinforcement. Regardless of whether the learner is a human or machine, the basic learning process is similar. It can be divided into four interrelated components: Data storage utilizes observation, memory, and recall to provide a factual basis for further reasoning. Let us examine the difference between human and machine learning process in detail in this blog. Humans acquire knowledge through experience either directly or shared by others. Machines acquire knowledge through experience shared in the form of past data.

## **7. Illustrate the various elements of machine learning using a real-life illustration.**

Answer: There are three main elements to every machine learning algorithm, and they include: Representation: what the model looks like; how knowledge is represented. Evaluation: how good models are differentiated; how programs are evaluated. Optimization: the process for finding good models; how programs are generated. Today we can see many machine learning real-world examples. We may or may not be aware that machine learning is used in various applications like – voice search technology, image recognition, automated translation, self-driven cars

## **8. Provide an example of the abstraction method.**

Answer: Abstraction means displaying only essential information and hiding the details. Data abstraction refers to providing only essential information about the data to the outside world, hiding the background details or implementation. Consider a real life example of a man driving a car.

## **9. What is the concept of generalization? What function does it play in the machine learning**

process?

Answer:: Generalization (or transfer) of learning is the ability to take skills or concepts learned in one context and apply them to novel problems in different contexts. Generalization refers to your model's ability to adapt properly to new, previously unseen data, drawn from the same distribution as the one used to create the model. Develop intuition about overfitting. Determine whether a model is good or not. Divide a data set into a training set and a test set. generalization, in

psychology, the tendency to respond in the same way to different but similar stimuli. For example, a dog conditioned to salivate to a tone of a particular pitch and loudness will also salivate with considerable regularity in response to tones of higher and lower pitch.

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

solved using regression.

Answer: A regression is a statistical technique that relates a dependent variable to one or more independent (explanatory) variables. A regression model is able to show whether changes observed in the dependent variable are associated with changes in one or more of the explanatory variables. For example, researchers might administer various dosages of a certain drug to patients and observe how their blood pressure responds. They might fit a simple linear regression model using dosage as the predictor variable and blood pressure as the response variable. Formulating a regression analysis helps you predict the effects of the independent variable on the dependent one. Example: we can say that age and height can be described using a linear regression model. Since a person's height increases as age increases, they have a linear relationship.

## **12. Describe the clustering mechanism in detail.**

Answer: 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. Clustering is the task of dividing the population or data points into a number of groups such that data points in the same groups are more similar to other data points in the same group than those in other groups. In simple words, the aim is to segregate groups with similar traits and assign them into clusters. Image result for 12. Describe the clustering mechanism in detail. Types of Clustering Centroid-based Clustering. Density-based Clustering. Distribution-based Clustering. Hierarchical Clustering.

## **13. Make brief observations on two of the following topics:**

- i. Machine learning algorithms are used
- ii. Studying under supervision
- iii. Studying without supervision
- iv. Reinforcement learning is a form of learning based on positive reinforcement.

Answer: 1... These are three types of machine learning: supervised learning, unsupervised learning, and reinforcement learning. An ML algorithm, which is a part of AI, uses an assortment of accurate, probabilistic, and upgraded techniques that empower computers to pick up from the past point of reference and perceive hard-to-perceive patterns from massive, noisy, or complex datasets. A

machine learning algorithm is the method by which the AI system conducts its task, generally predicting output values from given input data. The two main processes of machine learning algorithms are classification and regression.

## ii. Studying under supervision

Answer::Supervised learning, also known as supervised machine learning, is a subcategory of machine learning and artificial intelligence. It is defined by its use of labeled datasets to train algorithms that to classify data or predict outcomes accurately. Parameters Supervised machine learning

Accuracy Highly accurate

No. of classes No. of classes is known

Data Analysis Uses offline analysis

Algorithms used Linear and Logistics regression, Random forest, Support Vector Machine, Neural Network, etc.

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