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

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. 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?

The three major types of learning described by behavioral psychology are classical conditioning, operant conditioning, and observational learning. Humans acquire knowledge through experience either directly or shared by others. Machines acquire knowledge through experience shared in the form of past data.

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

Machine 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.

Roles and responsibilities of a machine learning engineer

* 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.

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

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"?

Concept learning can be viewed as the task of searching through a large space of hypotheses implicitly defined by the hypothesis representation. The goal of this search is to find the hypothesis that best fits the training examples.

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

The Goals of Machine Learning.

(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.

Human-guided machine learning is a process whereby subject matter experts accelerate the learning process by teaching the technology in real-time. For example, if the machine learning model comes across a piece of data it is uncertain about, a human can be asked to weigh in and give feedback.

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

Image recognition is a well-known and widespread example of machine learning in the real world. It can identify an object as a digital image, based on the intensity of the pixels in black and white images or colour images. Real-world examples of image recognition: Label an x-ray as cancerous or not.

8. Provide an example of the abstraction method.

In simple terms, abstraction “displays” only the relevant attributes of objects and “hides” the unnecessary details. For example, when we are driving a car, we are only concerned about driving the car like start/stop the car, accelerate/ break, etc.

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

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.

A model's ability to generalize is central to the success of a model. If a model has been trained too well on training data, it will be unable to generalize. It will make inaccurate predictions when given new data, making the model useless even though it is able to make accurate predictions for the training data.

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

Classification is a process of categorizing a given set of data into classes, It can be performed on both structured or unstructured data.

Classification is the task of predicting a discrete class label. Regression is the task of predicting a continuous quantity.

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

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.

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.

12. Describe the clustering mechanism in detail.

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.

13. Make brief observations on any 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.

Ans.

1. Machine learning algorithms are used

machine learning uses programmed algorithms that receive and analyse input data to predict output values within an acceptable range. As new data is fed to these algorithms, they learn and optimise their operations to improve performance, developing 'intelligence' over time

1. Studying under supervision

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.

Some popular examples of supervised machine learning algorithms are: Linear regression for regression problems. Random forest for classification and regression problems. Support vector machines for classification problems.