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

Answers. Human acquire new understanding, knowledge, behaviors, skills, values, attitudes, and preferences through which he become a good learning and work accordingly

Examples

1. How to classify an animal or things based on features

2. Learning new Skills step by step (eg Walking, Running , Reading ,Talking)

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

Answer. Artificial Intelligence Learning Theories. Machine Learning. Reinforcement Learning. Supervised Learning. Unsupervised Learning.

ML equivalents like Linear regression, decision trees, random forest and support vector machines are some commonly used techniques that are actually examples of supervised learning.

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

Answer. Machine learning is a form of artificial intelligence (AI) that teaches computers to think in a similar way to how humans do: Learning and improving upon past experiences. It works by exploring data and identifying patterns, and involves minimal human intervention.

**Responsibilities**

* Perform statistical analysis.
* Fine tuning test results.
* Train and retrain systems.
* Work on frameworks.
* Undertaking machine learning experiments and test.
* Designing machine learning programs.

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

Answers.  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.

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

Answer. The Goal of machine learning, closely coupled with the goal of AI, is to achieve a understanding about the nature of learning process (both human learning and other forms of learning), about the computational aspects of learning behaviors, and to implant the learning capability in computer systems.

Humans have the ability to learn, however with the progress in artificial intelligence, machine learning has become a resource which can augment or even replace human learning. Learning does not happen all at once, but it builds upon and is shaped by previous knowledge.

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

Answers.  Real life examples like Sales Prediciton, Customer Segementation Image Recognition, Speech Recognition, Medical diagnosis, etc, all these can be solved when we have the following element.

Having sufficient Data to go further , Data validation, preprocessing, featuring, scaling,Model selection.

8. Provide an example of the abstraction method.

Answers. Suppose we are driving a car , we are only concerned with the how to start , stop, use clutch ,gear and accelerator but not its internal functioning

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

Answer. 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.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.

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

Answer. In Machine Learning, Classification refers to a predictive modeling problem where a class label is predicted for a given example of input data. Classification is the task of predicting a discrete class label where a threshold is decided whereas 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.

Answer. It is a continuous problem that deals with finding out the best possible relationship between the independent and dependent data. The ultimate goal of a regression algorithm is to plot a best-fit line or a curve between the data.

For example, if a company's sales have increased steadily every month for the past few years, by conducting a linear analysis on the sales data with monthly sales, the company could forecast sales in future months.

12. Describe the clustering mechanism in detail.

Answer. Clustering helps us to divide the data into clusters or a group of numbers such that the data in the group are more similar to other data. Mainly used in Unlabelled data

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.

**Machine learning algorithms are used**: Machine Learning uses programmed algorithms that receive and analyze input data to predict output values within an acceptable range. As new data is fed to these algorithms, they learn and optimize their operations to improve performance, developing intelligence over time.

**Studying Under Supervision**: In machine learning, there are two important categories- Supervised and Unsupervised learning. In supervised learning, an algorithm learns from a training dataset. We know the correct answers or desired output, the algorithm makes predictions using the given dataset and is corrected by the “supervisor”.

**Studying without supervision:** In unsupervised learning, an algorithm learns from a training dataset. But don’t know the correct answers or desired output, the algorithm tries to group similar types of data based on similarities even when we don’t know the desired output.

**Reinforcement learning is a form of learning based on positive reinforcement.**

Learning is based on a feedback-based mechanism where the agents learn according to the environment by performing actions based on reward-penalty-like systems.