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

Answer: Concept of learning in general is the process of gaining knowledge, skills , values and observations over a period of time with/without having some observations.

Examples for the same are:

1. Learning of numbers,letters by small kids in school
2. Humans in general know not to go near the wild animals because we’ve been taught so all our life.

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

Answer: There are different types of human learning such as non- associative, active and associative learning as well. As of my understanding associative and non-associative machine learning works very similar to supervised machine learning algorithms and active learning for humans is very similar to reinforcement and unsupervised machine learning procedure.

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

Answer: Machine learning is a method by which we train computers to think on it’s own without programming it explicitly.

The main responsibilities of machine learning are:

1. understand the pattern present in the data and find an appropriate mathematical function which will help in correct prediction.
2. Eliminate human intervention and their time but still work for prediction just like a normal human.
3. Understand the situation/problem and act accordingly.

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

Answer: Whenever machine performs an action correctly he receives something called a reward and when an action is done incorrectly then machine is given a penalty.

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

Answer: Sometimes , learning is not just give and take relation and we have to do some research on our own and perform the relevant activities accordingly to understand a particular concept more clearly. This is called learning as a search.

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

Answer: Machine learning’s main intention is predict the future based on the data we feed it and through it’s past experiences as well where scope of error is minimized. Human beings are also similar to machines in this case as machines get data/environment in terms of rows and tries to make the accurate prediction with error minimization done nearest to 0.

A human being also learns in the same way i.e from past experience and the current scenario which serves him as data and then we decide the correct action to be done depending on the scenario.

7. Provide an example of the abstraction method.

Answer: An abstract method is a method which only has a declaration but no implementation and same method can be present in any number of child classes of 1 particular parent abstract class.

Example:

Class Polygon:

@abstractmethod

Defnoofsides(self):

Pass # no implementation

Class Triangle(Polygon):

Defnoofsides(self):

Return 3

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

Answer: Generalization is the process by which we test our trained model on unknown dataset and we try to find out how well our trained model perform on any upcoming unknown datasets.

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

Answer: Classification is one of the supervised machine learning tasks where we categorize our unknown upcoming dataset with certain features/properties into a particular list of available classes on which our model is trained on. Following are the differences between classification and regression:

1. In regression, the output to be predicted is continuous numerical value whereas in classification, the output is a particular discrete value.
2. Regression algos are trained on continuous values whereas in classification, they are trained on discrete dependent values .
3. In regression, we try to find the best fit line to minimize the errors which can predict output more accurately whereas in classification we try to find a decision boundary to separate the points into different classes available.

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

Answer: Regression is one of the supervised machine learning tasks where we try to find a continuous numerical value by try to find a best find line to minimize the actual value and predicted value. One of the real world problem which is solved via regression is income prediction.

11. Describe the clustering mechanism in detail.

Answer: Clustering is an unsupervised machine learning task. The main task performed is to group different data points into similar groups where points with similar properties are put in a same group and it is made sure that the dissimilar points are put as far as possible.

12. 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:

ii. Studying under supervision: as per the name , here the learning is done by feeding some initial data, understanding the patterns and different experiences to do as well and using all of these things combined, we will now predict a continuous or discrete value for the new unknown data.

Iii. Studying without supervision: here as well as per the name , the underlying learning by the model is done from on an unlabelled dataset without any label outcomes or predictions.