**ASSIGNMENT-2**

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

Ans:- Human Learning Systems is an alternative approach to public management which embraces the complexity of the real world, and enables us to work effectively in that complexity. Learning to drive a motor-car, typewriting, singing or memorizing a poem or a mathematical table, and music etc

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

Ans:- 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.

The three machine learning types are supervised, unsupervised, and reinforcement learning.

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

Ans:- 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.

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

Ans:- Reinforcement learning is all about gamifying the learning process. This type of machine learning uses a reward-penalty method to teach an AI system. If it makes the right move, it gets rewarded. If it makes a mistake, it receives a penalty.

1. **Explain the term "learning as a search"?**

Ans:- 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

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

Ans:- The goal of machine learning, closely coupled with the goal of AI, is to achieve a thorough 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.

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

### Ans:- 1.Image Recognition:-  It is used to identify objects, persons, places, digital images, etc. The popular use case of image recognition and face detection is, Automatic friend tagging suggestion.

### 2. Speech Recognition:- While using Google, we get an option of "Search by voice," it comes under speech recognition, and it's a popular application of machine learning.

**3. Traffic prediction**:- If we want to visit a new place, we take help of Google Maps, which shows us the correct path with the shortest route and predicts the traffic conditions.

It predicts the traffic conditions such as whether traffic is cleared, slow-moving, or heavily congested with the help of two ways:

* Real Time location of the vehicle form Google Map app and sensors
* Average time has taken on past days at the same time.

Everyone who is using Google Map is helping this app to make it better. It takes information from the user and sends back to its database to improve the performance.

**4. Product recommendations**:- Machine learning is widely used by various e-commerce and entertainment companies such as **Amazon**, **Netflix**, etc., for product recommendation to the user. Whenever we search for some product on Amazon, then we started getting an advertisement for the same product while internet surfing on the same browser and this is because of machine learning.

**5.  Medical Diagnosis**:- In medical science, machine learning is used for diseases diagnoses. With this, medical technology is growing very fast and able to build 3D models that can predict the exact position of lesions in the brain.

It helps in finding brain tumors and other brain-related diseases easily.

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

Ans:- For example, as X.ai sells to more customers, they get more scheduling emails in their dataset, which means they can continually improve the accuracy of their models and add new features

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

Ans:- 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.

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

Ans:- In machine learning, classification is a predictive modeling problem where the class label is anticipated for a specific example of input data. For example, in determining handwriting characters, identifying spam, and so on, the classification requires training data with a large number of datasets of input and output.The main difference between Regression and Classification algorithms that Regression algorithms are used to predict the continuous values such as price, salary, age, etc. and Classification algorithms are used to predict/Classify the discrete values such as Male or Female, True or False, Spam or Not Spam, etc.

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

Ans:- 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.

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

Ans:- 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 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:- i. Machine learning algorithms are used:-**

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.

* Linear regression
* Logistic regression
* Decision tree
* SVM algorithm
* Naive Bayes algorithm
* KNN algorithm
* K-means
* Random forest algorithm
* Dimensionality reduction algorithms
* Gradient boosting algorithm and AdaBoosting algorithm