<u>Machine Learning Assignment-2</u>

1) The concept of human learning is the process of acquiring new knowledge, skills, and behaviors through experience. It is a lifelong process that begins at birth and continues until death.

For example: **A student learns a new language.** The student may start by learning the basic vocabulary and grammar of the language. They then practice speaking and listening to the language, and eventually they become fluent in the language.

A Child learns to ride bicycle: The child first observes their parents or older siblings riding a bike. They then try to imitate the behavior, and eventually they learn how to ride a bike on their own.

2)

<u>Human Learning</u>	<u>Machine Learning</u>
Inductive learning: Human learn by seeing the examples of a particular concept or rule, and then we use those examples to generalize to new cases.	Supervised learning : Machine learn after training of labeled data and predicts a approptiate value.
Deductive learning:This type of learning occurs when we apply rules to specific cases.	Unsupervised learning: Machines learn by clustering data of same nature and predicts the out comes.
Experiential learning: This type of learning occurs through our own experiences. We learn by doing things and by reflecting on our experiences	Reinforcement learning: This type of machine learning algorithm learns by trial and error. The algorithm is given a reward for taking actions that lead to a desired outcome, and it is penalized for taking actions that lead to an undesired outcome.

 The different forms of human learning and machine learning algorithms are not perfectly equivalent, but there are some similarities.

3) Machine learning is the subset of AI(artificial intelligence). Machine(computer) learns from historical data and train those data and predict the result with out any human intervention. The key responsibilities of machine learning is natural language processing, image processing, patteren matching, speech-text conversion,etc.

4) In reinforcement learning, penalty and reward are terms used to refer to the consequences of an agent's actions. A penalty is a negative consequence that discourages the agent from taking a particular action, while a reward is a positive consequence that encourages the agent to take a particular action.

5) Learning as a search is a way of thinking about machine learning that views the learning process as a search through a space of possible hypotheses. The goal of learning is to find the hypothesis that best explains the data. It is a useful way to think about machine learning, helps us to understand the different steps involved in the learning process.

6) The various goals of machine learning is fraud detection, forecasting of outcomes/weather, patteren matching,
- To make computer more smarter and intelligent
- To develope computer models of human learning and perform computer simulations
- It helps to analyze data as well as predict trends.

Machine learning algorithms are inspired by human learning, and they often use techniques that are similar to those used by humans. Machine learning algorithms can learn from very large datasets, and they can make predictions much faster than humans.

7) The illustration of the machine learning elements in real life :

Data: This is the 1st element of machine learning. Data is needed to train a model for predicting values. For example: In hospital, the data of patient is recorded and also used to train a model.

Algorithm: The next step would be to choose an algorithm. There are many different algorithms that could be used for this task, such as support vector machines, decision trees, or neural networks.

Models: The third element of machine learning is models. Models are the representations of the data that the machine learning algorithm creates. Models are used to make predictions about future events.

Training: The patient data is used as input for machine learning algorithm, allowing it to learn from the data.

Prediction: Once the algorithm has been trained, it could be used to make predictions about new patients. The predictions would be based on the model that the algorithm created during the training process.

8) Abstraction is the technique to hide the implementataion detatils of model and only expose the functionality use for users. It is a powerful technique that can be used to make machine learning models more user-friendly and reusable with out caring the complexity of algorithm.

9) Generalisation refers to a machine learning model's capacity to generate correct predictions on fresh data that it has not seen previously. This is an important aim of machine learning since it permits models to be employed in real-world applications.

10) Classification is a supervised learning technique that predict a level like email is spam or not, mallicious IP, image classification, etc. Regression is a supervised learning technique that predicts a continuous value like house price based on area, wether forecasting, trading.

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For example: Marketing: Marketers use regression to predict customer behavior. This information can be used to target ads and to develop marketing campaigns.

Government agencies: Government agencies use regression to predict everything from crime rates to economic growth. This information can be used to make policy decisions and to allocate resource

12) Clustering mechanism – It is a unsupervised machine learning algorithm takes input of unlabeled data. Thid algorithm creats cluster of data of same nature. If any new entry comes, this models learns the nature and predicts in which cluster it matches and gives accuracy result.

13) Machine learning algorithms are used

i. Studying under supervision: Machine learning algorithms are used to study under supervision in a process called supervised learning. In supervised learning, the machine learning algorithm is given a set of labeled data. The labeled data consists of input data and the desired output for that input data. The machine learning algorithm then learns to map the input data to the desired output. Decision tree, random forest, Naive bayes, KNN are the supervised algorithms.

ii. Studying under unsupervision: Unsupervised learning is a type of machine learning where the model is trained on unlabeled data. This means that the data has not been classified or regressed. For example, if you are trying to build a clustering algorithm, you would need a dataset of images that have not been labeled with any categories.

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Iii. Reinforcement learning:
It is a type of machine learning where the agent learns to act in an environment by trial and error. The agent receives rewards for taking actions that lead to desired outcomes, and punishments for taking actions that lead to undesired outcomes. The agent learns to maximize the total reward it receives over time. It is often used in games, robotics, and finance.