Name: Akashdeep Soni
Roll No: 1816410036
Branch & Section: CS3B
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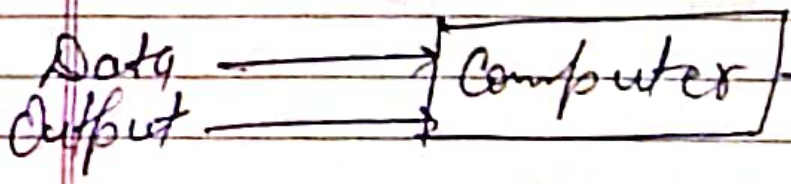
Assignment → 1

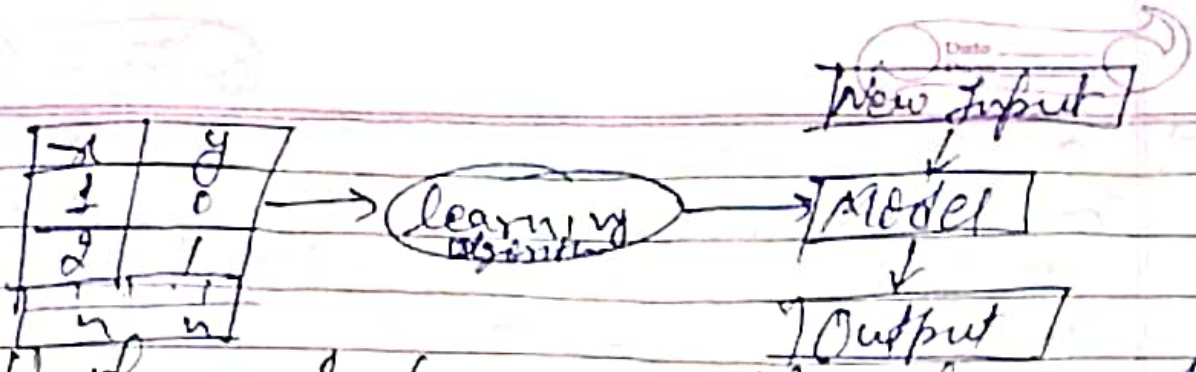
Answer → 1

Machine Learning: Machine Learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.

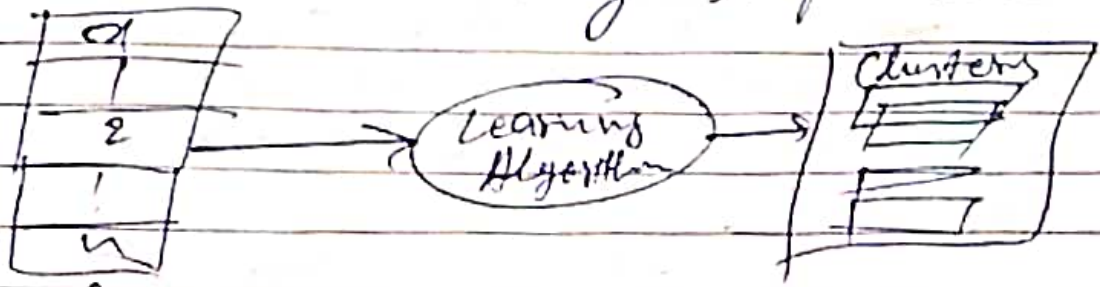


Types of Machine Learning:

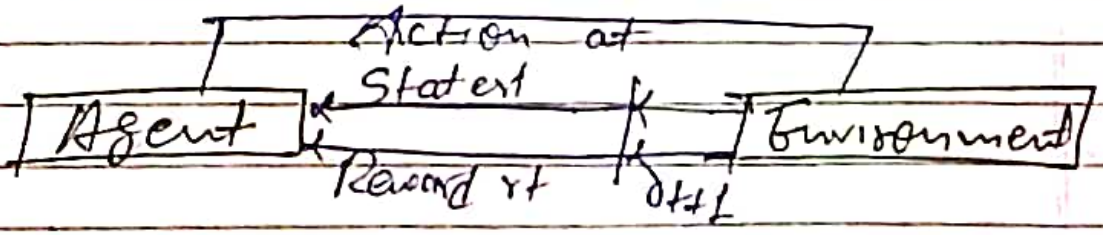
[1] **Supervised Learning:** It is a type of machine learning method in which we provide sample labled data to the machine learning system in order to train it and that basis it provides the output



[2] Unsupervised Learning: Unsupervised learning is a learning method in which a machine learn without any supervision



[3] Reinforcement Learning: It is the ability of an agent to interact with the environment and find out what is the best outcome. It follows the concept of hit and trial method.



Answer → 2

Requirements of Clustering Algorithm:

1. We need highly scalable clustering algorithms to deal with large databases.

2. Algorithms should be capable to be applied on any kind of data such as interval based (numerical) data, categorical, binary data.

3. The clustering algorithm should be capable of detect clusters of arbitrary shape. The should not be bounded to only distance measures that tend to find spherical cluster of small size.

4. The clustering algorithm should not only be able to handle low-dimensional data but also the high dimensional space.

5. Ability to deal with noisy data.

6. Interpretability the clustering results should be interpretable, comparable and usable.

Answer 3

Steps in designing a machine learning problem

1. Choosing the training experience

Whether the training experience provides direct or indirect feedback regarding the choices made by the performance system

* The degree to which the learner controls the sequence of training examples
* In general learning is most reliable when the training example follow a distribution similar to that of future test examples

2. Choosing the target function: To determine what type of knowledge will be learned and how this will be used by the performance program

3. Choosing a representation for the target functions: Given the ideal target function V, we choose a representation that the learning system will use to describe V' that it will learn

4. Choosing a function Approximation Algorithm: Each training example is given by $\langle b, V_{train}(b) \rangle$ > where $V_{train}(b)$ is the training value for a board b.

* Estimating Training values:
$V_{train}(b) \leftarrow V'(Successor(b))$

* Adjusting the weights :-
$E = \sum (V_{train}(b) - V'(b))^2 \langle b, V_{train}(b) \rangle$
estimating example

- To minimise E, LMS weight-update rule used.

$$w_i \leftarrow w_i + \eta (V_{train}(b) - V'(b)) x_i$$

5. The Final Design: Performance System: To solve the given performance task by using the learned target function (s). It takes an instance of a new problem (new game) as input and a trace of its solution (game history) as output.

Checkers problem: Checkers learning problem is come under the example of well-posed learning problems.

- Checkers problem states that
- Task T: play checkers
- Performance measure P: percent of games won against opponent.
- Training Experience E: playing practice games against itself.

For designing the final design of Checkers problem we have to follow above five steps to design the machine learning problem.