



DELHI PUBLIC SCHOOL BANGALORE - EAST

ARTIFICIAL INTELLIGENCE

NEURAL NETWORKS

NAME: _____ **CLASS: IX** **SEC:** _____ **DATE:** _____

Q1. Multiple Choice Questions:

1. Which one of the following is used to take the input from the user?
 - a. Hidden Layer
 - b. Input Layer
 - c. Output Layer
 - d. None of the above
2. Which one of the following is not the function of the Hidden Layer?
 - a. To display the result
 - b. Receive data from the Input Layer
 - c. Process the data
 - d. Give the data to the Output Layer
3. Each hidden layer in Neural Network is divided into several blocks called _____.
 - a. Branch
 - b. Nodes
 - c. Root
 - d. Leaf
4. _____ is a Supervised learning model which works with discrete dataset.
 - a. Regression
 - b. Clustering
 - c. Classification
 - d. None of the above
5. Which algorithm of machine learning is mainly used in gaming?
 - a. Supervised Learning
 - b. Unsupervised Learning
 - c. Reinforcement Learning
 - d. None of the above
6. The spam filter in an email is an example of how _____ works.
 - a. Classification
 - b. Regression
 - c. Clustering
 - d. None of the above
7. _____ is entered into the AI machine to predict the output.
 - a. Training Data
 - b. Testing Data
 - c. Data Feature
 - d. All of the above
8. Artificial neural networks learn by _____.
 - a. experience i.e. processing data
 - b. knowledge i.e. storing all the information
 - c. creation i.e. executing programs created for teaching
 - d. mimicking i.e. observing the humans operating them

Q2. Fill in the blanks:

1. Machine learning is a component of _____ that learns from previous dataset.
2. _____ and _____ works on discrete dataset.
3. Classification is a _____ grouping of observations into categories.
4. In _____ learning, the algorithm learns from a dataset which is labelled.
5. _____ learning is used in gaming.
6. _____ data is used to check the efficiency of the model.
7. _____ works with continuous data.

Q3. Match the following:

1. Input Layer
 2. Synapse
 3. Axon
 4. Hidden Layer
 5. First layer of Neural Network
 6. Supervised learning
 7. Cell body
 8. Autodraw
- a. fast drawing tool
 - b. responsible for processing
 - c. Input Layer
 - d. labelled dataset
 - e. Soma
 - f. Interconnections
 - g. Dendrites
 - h. Output Layer

Q4. Answer the following:

1. Explain how machine learning algorithms can be classified.

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small margins at the top and bottom. There are no vertical margin lines, text, or other markings on the page.

2. Explain Supervised Learning along with the two models which comes under it.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

3.Explain Unsupervised Learning along with the model which comes under it.

4. Explain how a neural network works with the help of a diagram.

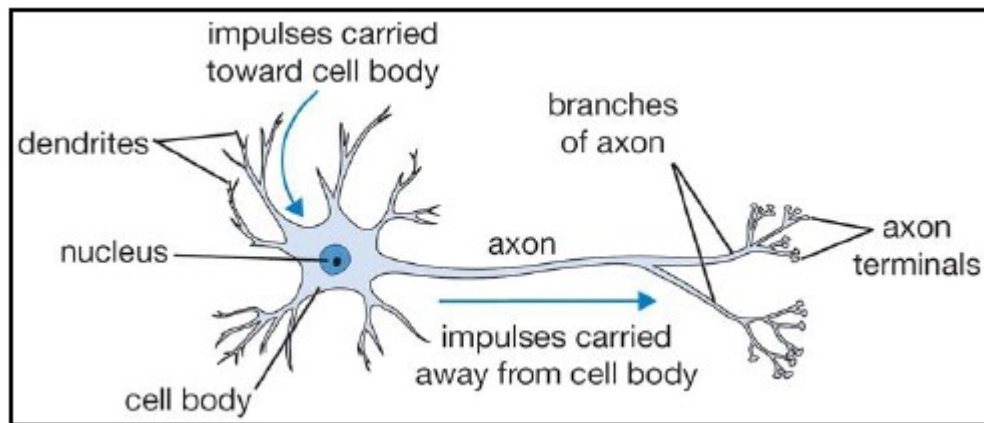
[illegible]

5. Why do we use Neural Networks?

[illegible]

6. List four features of Neural Networks.

7. Give the similarities between Artificial Neural Network and Biological Neural Network (Human Brain).



Artificial Neural Network	Biological Neural Network	Function



DELHI PUBLIC SCHOOL BANGALORE - EAST

ARTIFICIAL INTELLIGENCE

NEURAL NETWORKS(Solutions)

NAME: _____ CLASS: IX SEC: _____ DATE: _____

Q1. Multiple Choice Questions:

1. Which one of the following is used to take the input from the user?
a. Hidden Layer
b. **Input Layer**
c. Output Layer
d. None of the above
2. Which one of the following is not the function of the Hidden Layer?
a. **To display the result**
b. Receive data from the Input Layer
c. Process the data
d. Give the data to the Output Layer
3. Each hidden layer in Neural Network is divided into several blocks called **Nodes**.
a. Branch
b. **Nodes**
c. Root
d. Leaf
4. **Classification** is a Supervised learning model which works with discrete dataset.
a. Regression
b. Clustering
c. **Classification**
d. None of the above
5. Which algorithm of machine learning is mainly used in gaming?
a. Supervised Learning
b. Unsupervised Learning
c. **Reinforcement Learning**
d. None of the above
6. The spam filter in an email is an example of how **Classification** works.
a. **Classification**
b. Regression
c. Clustering
d. None of the above
7. **Testing Data** is entered into the AI machine to predict the output.
a. Training Data
b. **Testing Data**
c. Data Feature
d. All of the above
8. Artificial neural networks learn by **experience i.e. processing data**
a. **experience i.e. processing data**
b. knowledge i.e. storing all the information
c. creation i.e. executing programs created for teaching
d. mimicking i.e. observing the humans operating them

Q2. Fill in the blanks:

1. Machine learning is a component of **Artificial Intelligence** that learns from previous dataset.
2. **Classification** and **Clustering** works on discrete dataset.
3. Classification is a **systematic** grouping of observations into categories.
4. In **supervised** learning, the algorithm learns from a dataset which is labelled.
5. **Reinforcement** learning is used in gaming.
6. **Testing** data is used to check the efficiency of the model.
7. **Regression** works with continuous data.

Q3. Match the following:

- | | |
|----------------------------------|-------------------------------|
| 1. Input Layer | a. fast drawing tool |
| 2. Synapse | b. responsible for processing |
| 3. Axon | c. Input Layer |
| 4. Hidden Layer | d. labelled dataset |
| 5. First layer of Neural Network | e. Soma |
| 6. Supervised learning | f. Interconnections |
| 7. Cell body | g. Dendrites |
| 8. Autodraw | h. Output Layer |

Answers: 1(g),2(f),3(h),4(b),5(c),6(d),7(e),8(a)

Q4. Answer the following:

1. Explain how machine learning algorithms can be classified.

Machine learning algorithms can be broadly classified as follows:

- a. Supervised Learning** – In this type of model, the algorithm learns from a dataset which is labelled, and the algorithm uses the answer keys to evaluate its accuracy on the training data. Classification and regression models are types of supervised learning.
- b. Unsupervised Learning** – In this type of model, the algorithm learns and makes sense by extracting features/patterns from the unlabelled dataset provided.
- c. Reinforcement Learning** – In this type of model, the algorithms are working towards accomplishing the goal or try to improve the performance in a particular task. This is used in gaming.

2. Explain Supervised Learning along with the two models which comes under it.

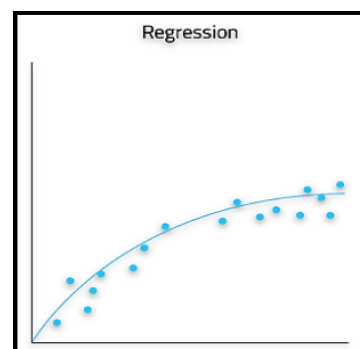
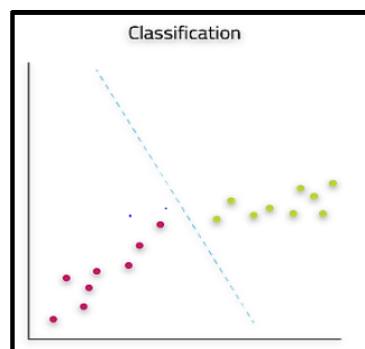
Supervised Learning

In a supervised learning model, the dataset which is fed to the machine is labelled. In other words, we can say that the dataset is known to the person who is training the machine only then he/she is able to label the data. A label is some information which can be used as a tag for data. For example, students get grades according to the marks they secure in examinations. These grades are labels which categorise the students according to their marks.

There are two types of Supervised Learning models:

Classification: Where the data is classified according to the labels. For example, in the grading system, students are classified on the basis of the grades they obtain with respect to their marks in the examination. This model works on discrete dataset which means the data need not be continuous.

Regression: Such models work on continuous data. For example, if you wish to predict your next salary, then you would put in the data of your previous salary, any increments, etc and would train the model. Here, the data which has been fed to the machine is continuous.



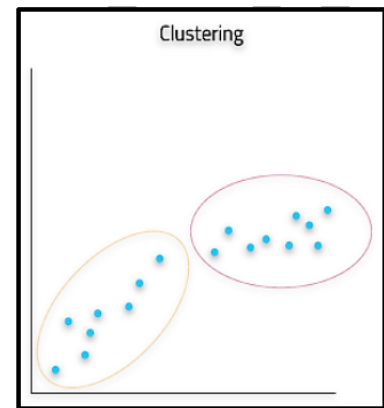
3. Explain Unsupervised Learning along with the model which comes under it.

Unsupervised Learning

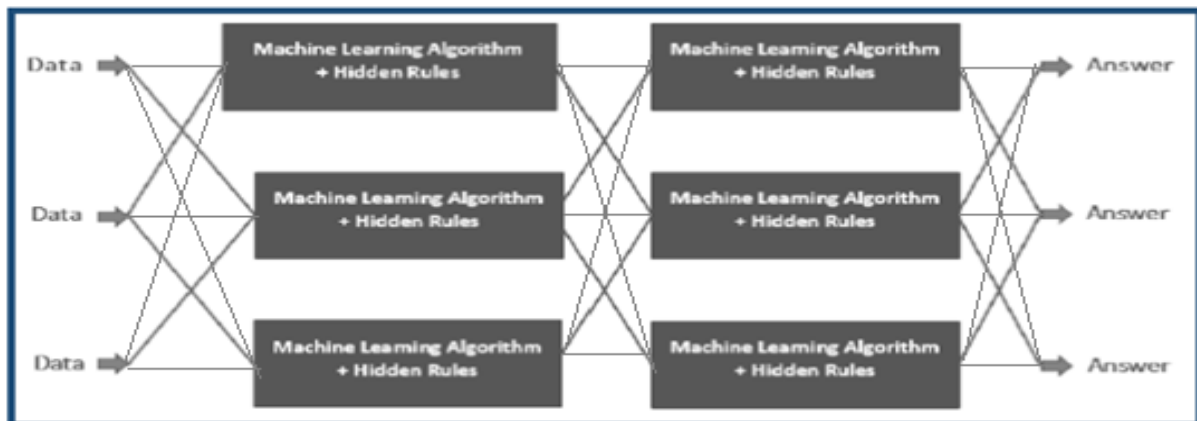
An unsupervised learning model works on unlabelled dataset. This means that the data which is fed to the machine is random and there is a possibility that the person who is training the model does not have any information regarding it. The unsupervised learning models are used to identify relationships, patterns and trends out of the data which is fed into it. It helps the user in understanding what the data is about and what are the major features identified by the machine in it.

For example, you have a random data of 1000 dog images and you wish to understand some pattern out of it, you would feed this data into the unsupervised learning model and would train the machine on it. After training, the machine would come up with patterns which it was able to identify out of it. The Machine might come up with patterns which are already known to the user like colour or it might even come up with something very unusual like the size of the dogs.

Clustering: Refers to the unsupervised learning algorithm which can cluster the unknown data according to the patterns or trends identified out of it. The patterns observed might be the ones which are known to the developer or it might even come up with some unique patterns out of it.



4. Explain how a neural network works with the help of a diagram.



A Neural Network is divided into multiple layers and each layer is further divided into several blocks called nodes. Each node has its own task to accomplish which is then passed to the next layer. The first layer of a Neural Network is known as the Input layer. The job of an **Input layer** is to acquire data and feed it to the Neural Network. No processing occurs at the input layer. Next to it, are the Hidden layers. **Hidden layers** are the layers in which the whole processing occurs. Their name essentially means that these layers are hidden and are not visible to the user. Each node of these hidden layers has its own machine learning algorithm which it executes on the data received from the input layer. The processed output is then fed to the subsequent hidden layer of the network. There can be multiple hidden layers in a neural network system and their number depends upon the complexity of the function for which the network has been configured. Also, the number of nodes in each layer can vary accordingly. The last hidden layer passes the final processed data to the Output layer which then gives it to the user as the final output. Similar to the input layer, **Output layer** too does not process the data which it acquires. It is meant for user-interface.

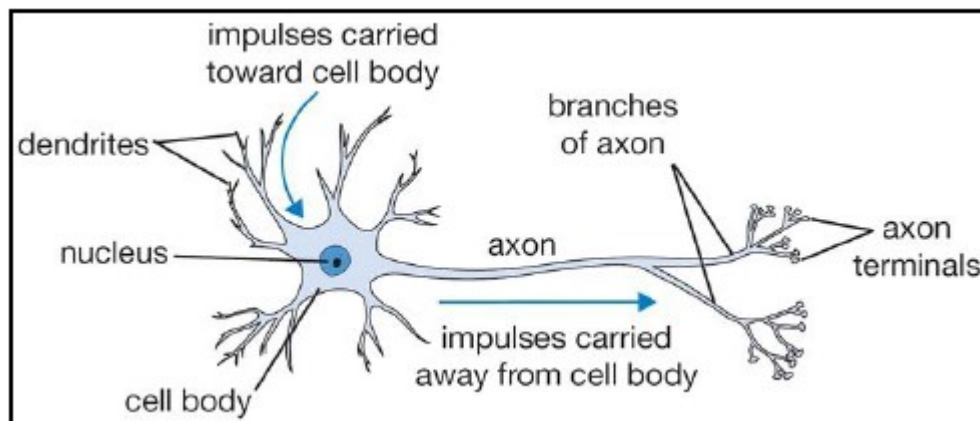
5. Why do we use Neural Networks?

Neural Networks are one of the most commonly, powerful, and widely used algorithms which actually use deep learning algorithms. They are used to solve real-life complex problems. These networks can learn and create the relationships between all the inputs and gives the result. They can handle non-linear and complex problems very effectively. They can even work and give Output if the data is missing. The main advantage of neural networks is that they are able to extract data features automatically without needing any input from the programmer. We find their application in chat-bots to make work easy like auto replying the emails, suggesting email replies, spam filtering, Facebook image tagging, showing the items of our interest in e-shopping web portals, and many more.

6. List four features of Neural Networks.

- Neural Network systems are modelled on the human brain and nervous system.
- They are able to automatically extract features without input from the programmer.
- Every neural network node is essentially a machine learning algorithm.
- It is useful when solving problems for which the dataset is very large.

7. Give the similarities between Artificial Neural Network and Biological Neural Network (Human Brain).



Artificial Neural Network	Biological Neural Network	Function
Input Layer	Dendrites	Takes input for the system
Node	Soma/Cell body	Responsible for processing of the information
Interconnections	Synapse	These are the connections between the input and output.
Output Layer	Axon	This sends out the result.
