**WORKSHEET-1**

**DEEP LEARNING**

**Q1 to Q8 are MCQs with only one correct answer. Choose the correct option.**

**1**. Which of the following can approximate any function universally (i.e. universal approximators)?

A) Boosted Decision Trees B) Neural Networks

C) Kernel SVM D) All of the above

**ANS:** **B) Neural Networks**

**2**. In which of the following domains we cannot use neural networks?

A) Image Processing B) Speech Processing

C) Fraud Detection D) None of the above

**ANS: D) None of the above**

**3**. Rearrange the following steps of a gradient descent algorithm in correct order of their occurrence?

i. Initialize random weight and bias

ii. Repeat the process until you find the best weights of network

iii. Change weights and biases for each neuron to reduce the error

iv. Calculate error distances between the actual and the predicted value

v. Pass an input through the network and get values from output layer

Choose the correct option:

A) iv – i – iii – v – ii B) v – i – iii – iv –ii

C) i – v – iv – iii – ii D) i – v – iii –iv –ii

**ANS: C) i-v-iv-iii-ii**

**4**. What is the full form of RNN?

A) Recurrent Neural Network B) Recursive Neural Network

C) Redundant Neural Network D) Resurrection Neural Network

**ANS: A)** **Recurrent Neural Network**

**5**. What is plasticity in neural networks?

A) input pattern keeps on changing B) input pattern has become static

C) output pattern keeps on changing D) output is static

**ANS: A) input pattern keeps on changing**

**6**. What is stability plasticity dilemma?

A) system can neither be stable nor plastic

B) static inputs & categorization can’t be handled

C) dynamic inputs & categorization can’t be handled

D) none of the above

**ANS: C) dynamic inputs & categorization can’t be handled**

**7**. Read the following statements:

**Statement 1**: It is possible to train a network well by initializing all the weights as 0

**Statement 2**: It is possible to train a network well by initializing biases as 0

Which of the statements given above is true, Choose the correct option?

A) Statement 1 is true while Statement 2 is false

B) Statement 2 is true while statement 1 is false

C) Both statements are true

D) Both statements are false

**ANS: B) Statement 2 is true while statement 1 is false**

**8**. Which of the following architecture has feedback connections?

A) Recurrent Neural network B) Convolutional Neural Network

C) Restricted Boltzmann Machine D) simple Artificial Neural Network

**ANS: A) Recurrent Neural network**

**Q9 and Q10 are MCQs with one or more correct answers. Choose all the correct options.**

**9**. In training a neural network, you notice that the loss does not decrease in the few starting epochs. The reason behind it could be

A) Learning Rate is low B) Regularisation parameter is high

C) Regularisation parameter is low D) Stuck at local minima

**ANS: A) Learning Rate is low B) Regularisation parameter is high D) Stuck at local minima**

**10.** Which of the following function(s) can be used to impart non – linearity in a neural network?

A) Stochastic Gradient Descent B) Rectified Linear Unit

C) Convolution Function D) Sigmoid Function

**ANS: B) Rectified Linear Unit**

**Q11 to Q15 are subjective answer type question. Answer them briefly.**

**11.** What is Deep Learning?

Deep learning is a subset of machine learning. It is a technique which develops on its own by examining the data given to it. It is a part of AI the concept of deep learning revolves around the idea of human brain. As human brain is consisting of a number of neurons and nodes and processes the data and takes action like this deep learning is also consist of a number of layers. It processes the data given and split them into number of nodes with some weights and solve them.

The deep learning uses neural network architecture and the deep in deep learning represents the number of hidden layers in the network. Deep learning found its uses in various fields like disease detection, facial detection, speech recognition etc.

The layers also known as hidden layers plays an important role in processing the input. They filter the data vividly to generate the required output. This deep learning or the ANN help us to do task that are not possible by Machine learning. The main reason behind deep learning to come into existence is that machine learning algorithms can only process numerical data and small dataset and become irresponsive to huge dataset with different kind of input data like pictures, voice, symbols etc.

As the data is increasing day by day and also new patterns re coming into existence Machine Learning alone cant handle them so deep learning plays well in handling the larger dataset with voice, image etc. It simply converts all input into a numpy array/ a matrix from and process them.

**12.** What is reinforcement learning?

The reinforcement learning can also be termed as learning by trial and error. Here in this system there is an error or award is set and basing on that the machine is trained. The aim of this kind is always about taking a proper and suitable action to maximize reward.

This learning is entirely different from supervised learning as in the later the machine is first trained on some known dataset which contain action and response (input/output) but there is no such thing in reinforcement learning. Here the agent decides the best path to achieve the goal. It performs the task again and again until the best achieved.

So, the machine learns from the experience.

For example; in a house there is a burning candle and a soft toy is lying in front of a child. If the child touches the candle, he will get a painful burning sensation and will never ever touched that again. Here touching the candle is the error and after the burn the child will never touch that again as he knows the outcome of touching the burning candle.

This kind of learning is helpful in designing the self-driven car where the algorithm decides which path to select to avoid collision.

**13.** What Are the Differences Between Machine Learning and Deep Learning?

**Learning:** The main difference between Machine Learning and Deep Learning lies in their learning pattern. ML algorithms learn from the pattern of data given while Deep Learning algorithms learn from data processing as it mimic human brain.

**Power:** Machine learning works well if the dataset is small but deep learning works efficiently with larger datasets. As deep learning learns from the data by analysing them so it required high computational power of GPUs. In traditional machine learning algorithm, there is not much need of GPUs.

**Domain:** We can only process numbers in the Machine learning while deep learning has the ability to process text, pictures, speech, music anything.

**14.** What is a perceptron?

The perceptron may be defined as a unit of the Artificial Neural Network. It is an algorithm for supervised binary classification. A perceptron consists of 4 part such as;

* Input layer
* Weight and bias
* Sum of the weight, bias
* Activation Function

It is used only for data acquisition it has a fixed weight connection with the input layer. This fixed weight layer is followed by at least one trainable weight layer. Perceptron are of 2 kind such as Single layer perceptron and multilayer perceptron. The single layer only works on linearly separable pattern. It was introduced by Frank Rosenblatt in the year 1957.

**15.** What’s the difference between AI and ML?

Artificial Intelligence (AI) is a field which is responsible for creating intelligent and smart machines or tech. AI enables the system to work efficiently with minimal error. It mimics the human intelligence, behaviour and solve the task given efficiently. AI enables the machines to learn from data and give the result with being explicitly coded. AI has different part basing their use and efficiency. It has a wide range of scope.

Machine learning is a part of AI. It enables the system to learn from previously saved data and predict the outcome for a new set of data. It has various parts like supervised Machine learning, Unsupervised machine learning, reinforcement learning. The main drawback of machine learning is that it can works only on numerical data. The scope is limited