WORKSHEET-1

**DEEP LEARNING with Answers**

# 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)?
   1. Boosted Decision Trees B) Neural Networks

C) Kernel SVM D) All of the above

Answer: (A)

1. In which of the following domains we cannot use neural networks?
   1. Image Processing B) Speech Processing

C) Fraud Detection D) None of the above

Answer: (C)

1. Rearrange the following steps of a gradient descent algorithm in correct order of their occurrence?
2. Initialize random weight and bias
3. Repeat the process until you find the best weights of network
4. Change weights and biases for each neuron to reduce the error
5. Calculate error distances between the actual and the predicted value
6. 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

Answer: (B)

1. What is the full form of RNN?
   1. Recurrent Neural Network B) Recursive Neural Network

C) Redundant Neural Network D) Resurrection Neural Network

Answer: ( A)

1. What is plasticity in neural networks?
   1. input pattern keeps on changing B) input pattern has become static

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

Answer: (A)

1. What is stability plasticity dilemma?
   1. system can neither be stable nor plastic
   2. static inputs & categorization can’t be handled
   3. dynamic inputs & categorization can’t be handled
   4. none of the above

Answer: (D)

1. 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?

* 1. Statement 1 is true while Statement 2 is false
  2. Statement 2 is true while statement 1 is false
  3. Both statements are true
  4. Both statements are false

Answer: (C)

1. Which of the following architecture has feedback connections?
   1. Recurrent Neural network B) Convolutional Neural Network

C) Restricted Boltzmann Machine D) simple Artificial Neural Network

Answer: (A)

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

1. In training a neural network, you notice that the loss does not decrease in the few starting epochs. The reason behind it could be
   1. Learning Rate is low B) Regularisation parameter is high

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

Answer: (A) (C)

1. Which of the following function(s) can be used to impart non – linearity in a neural network?
   1. Stochastic Gradient Descent B) Rectified Linear Unit

C) Convolution Function D) Sigmoid Function

Answer : (B) (D)

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

1. What is Deep Learning?

Answer : **Deep learning** is a subset of **machine learning** in artificial intelligence that has networks capable of **learning** unsupervised from data that is unstructured or unlabeled. Also known as **deep** neural **learning** or **deep neural network.**

**Deep Learning** is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called **artificial neural networks**.

If you are just starting out in the field of deep learning or you had some experience with neural networks some time ago, you may be confused. I know I was confused initially and so were many of my colleagues and friends who learned and used neural networks in the 1990s and early 2000s.

**Deep learning** is a **machine learning** technique that teaches computers to do what comes naturally to humans: learn by **example**. ... In **deep learning**, a computer model learns to perform classification tasks directly from images, text, or sound.

1. What is reinforcement learning?

Answer: **Reinforcement learning** (**RL**) is an area of [machine learning](https://en.wikipedia.org/wiki/Machine_learning) concerned with how [software agents](https://en.wikipedia.org/wiki/Software_agent) ought to take [actions](https://en.wikipedia.org/wiki/Action_selection) in an environment in order to maximize the notion of cumulative reward. Reinforcement learning is one of three basic machine learning paradigms, alongside [supervised learning](https://en.wikipedia.org/wiki/Supervised_learning) and [unsupervised learning](https://en.wikipedia.org/wiki/Unsupervised_learning).

Reinforcement learning differs from supervised learning in not needing labelled input/output pairs be presented, and in not needing sub-optimal actions to be explicitly corrected. Instead the focus is on finding a balance between exploration (of uncharted territory) and exploitation (of current knowledge). **Reinforcement learning** (RL) is an area of **machine learning** concerned with how software agents ought to take actions in an environment in order to maximize the notion of cumulative reward. **Reinforcement learning** is one of three basic **machine learning** paradigms, alongside supervised **learning** and unsupervised **learning**.

**Reinforcement Learning** is a **Machine Learning** method. ... Agent, State, Reward, Environment, Value function Model of the environment, Model based methods, are some important terms using in RL **learning** method. The **example** of **reinforcement learning** is your cat is an agent that is exposed to the environment.

1. What Are the Differences Between Machine Learning and Deep Learning?

Answer: With [machine learning](https://www.simplilearn.com/tutorials/machine-learning-tutorial/what-is-machine-learning), computer systems are programmed to learn from data that is input without being continually reprogrammed. In other words, they continuously improve their performance on a task—for example, playing a game—without additional help from a human. Machine learning is being used in a wide range of fields: art, science, finance, healthcare—you name it. And there are different ways of getting machines to learn. Some are simple, such as a basic decision tree, and some are much more complex, involving multiple layers of artificial neural networks. The latter happens in deep learning. We’ll get to that more in a minute.

Machine learning was made possible not just by Arthur Samuel’s breakthrough program in 1959—using a relatively simple (by today’s standards) search tree as its main driver, his IBM computer continually improved at checkers—but by the Internet as well. Thanks to the Internet, a vast amount of data has been created and stored, and that data can be made available to computer systems to help them “learn.”

Machine learning with R and machine learning with Python are two popular methods used today. While we won’t be discussing specific programming languages in this article, it’s helpful to know R or Python if you want to delve more deeply into machine learning with R and machine learning with Python.

## What Is Deep Learning?

Some consider [deep learning](https://www.simplilearn.com/tutorials/deep-learning-tutorial/what-is-deep-learning) to be the next frontier of machine learning, the cutting edge of the cutting edge. You may already have experienced the results of an in-depth deep learning program without even realizing it! If you’ve ever watched Netflix, you’ve probably seen its recommendations for what to watch. And some streaming-music services choose songs based on what you’ve listened to in the past or songs you’ve given the thumbs-up to or hit the “like” button for. Both of those capabilities are based on deep learning. Google’s voice recognition and image recognition algorithms also use deep learning.

Just as machine learning is considered a type of AI, deep learning is often considered to be a type of machine learning—some call it a subset. While machine learning uses simpler concepts like predictive models, deep learning uses artificial neural networks designed to imitate the way humans think and learn. You may remember from high school biology that the primary cellular component and the main computational element of the human brain is the neuron and that each neural connection is like a small computer. The network of neurons in the brain is responsible for processing all kinds of input: visual, sensory, and so on.

With deep learning computer systems, as with machine learning, the input is still fed into them, but the info is often in the form of huge data sets because deep learning systems need a large amount of data to understand it and return accurate results. Then the artificial neural networks ask a series of binary true/false questions based on the data, involving highly complex mathematical calculations, and classify that data based on the answers received.

So although both machine and deep learning fall under the general classification of artificial intelligence, and both “learn” from data input, there are some key differences between the two.

If you’d like to learn more specifically about deep learning, by the way, you can check out this Introduction to [Deep Learning tutorial](https://www.simplilearn.com/tutorials/deep-learning-tutorial). It’s also worth learning separately about deep learning with TensorFlow, as TensorFlow is one of the most popular libraries for implementing deep learning.

## 5 Key Differences Between Machine Learning and Deep Learning

### 1. Human Intervention

Whereas with machine learning systems, a human needs to identify and hand-code the applied features based on the data type (for example, pixel value, shape, orientation), a deep learning system tries to learn those features without additional human intervention. Take the case of a facial recognition program. The program first learns to detect and recognize edges and lines of faces, then more significant parts of the faces, and then finally the overall representations of faces. The amount of data involved in doing this is enormous, and as time goes on and the program trains itself, the probability of correct answers (that is, accurately identifying faces) increases. And that training happens through the use of neural networks, similar to the way the human brain works, without the need for a human to recode the program.

### 2. Hardware

Due to the amount of data being processed and the complexity of the mathematical calculations involved in the algorithms used, deep learning systems require much more powerful hardware than simpler machine learning systems. One type of hardware used for deep learning is graphical processing units (GPUs). Machine learning programs can run on lower-end machines without as much computing power.

### 3. Time

As you might expect, due to the huge data sets a deep learning system requires, and because there are so many parameters and complicated mathematical formulas involved, a deep learning system can take a lot of time to train. Machine learning can take as little time as a few seconds to a few hours, whereas deep learning can take a few hours to a few weeks!

### 4. Approach

Algorithms used in machine learning tend to parse data in parts, then those parts are combined to come up with a result or solution. Deep learning systems look at an entire problem or scenario in one fell swoop. For instance, if you wanted a program to identify particular objects in an image (what they are and where they are located—license plates on cars in a parking lot, for example), you would have to go through two steps with machine learning: first object detection and then object recognition. With the deep learning program, on the other hand, you would input the image, and with training, the program would return both the identified objects and their location in the image in one result.

### 5. Applications

Given all the other differences mentioned above, you probably have already figured out that machine learning and deep learning systems are used for different applications. Where they are used: Basic machine learning applications include predictive programs (such as for forecasting prices in the stock market or where and when the next hurricane will hit), email spam identifiers, and programs that design evidence-based treatment plans for medical patients. In addition to the examples mentioned above of Netflix, music-streaming services and facial recognition, one highly publicized application of deep learning is self-driving cars—the programs use many layers of neural networks to do things like determine objects to avoid, recognize traffic lights and know when to speed up or slow down. To learn more about machine learning applications, check out this [article](https://www.simplilearn.com/tutorials/machine-learning-tutorial/machine-learning-applications).

The possibilities for machine learning and deep learning in the future are nearly endless! The increased use of robots is a given, not just in manufacturing but in ways that can improve our everyday lives in both major and minor ways. The healthcare industry also will likely change, as deep learning helps doctors do things like to predict or detect cancer earlier, which can save lives. On the financial front, machine learning and deep learning are poised to help companies and even individuals save money, invest more wisely, and allocate resources more efficiently. And these three areas are only the beginning of future trends for machine learning and deep learning. Many areas that will be improved are still only a spark in developers’ imaginations right now.

1. What is a perceptron?

Answer: In **machine learning**, the **perceptron** is an algorithm for supervised **learning** of binary classifiers. A binary classifier is a function which can decide whether or not an input, represented by a vector of numbers, belongs to some specific class.

A **perceptron** is a neural **network** unit (an artificial neuron) that does certain computations to detect features or business intelligence in the input data. **Perceptron** was introduced by Frank Rosenblatt in 1957. He proposed a **Perceptron** learning rule based on the original MCP neuron.

1. What’s the difference between AI and ML?

Answer: AI is a bigger concept to create intelligent machines that can simulate human thinking capability and behavior, whereas, machine learning is an application or subset of AI that allows machines to learn from data without being programmed explicitly.

Artificial intelligence is a technology using which we can create intelligent systems that can simulate human intelligence.

Machine learning is a subfield of artificial intelligence, which enables machines to learn from past data or experiences without being explicitly programmed.

Artificial intelligence is a technology which enables a machine to simulate human behavior.

The goal of AI is to make a smart computer system like humans to solve complex problems.

In AI, we make intelligent systems to perform any task like a human.

Machine learning and deep learning are the two main subsets of AI.

AI has a very wide range of scope.

AI is working to create an intelligent system which can perform various complex tasks.

AI system is concerned about maximizing the chances of success.

ML:

Machine learning is a subset of AI which allows a machine to automatically learn from past data without programming explicitly.

The goal of ML is to allow machines to learn from data so that they can give accurate output.

In ML, we teach machines with data to perform a particular task and give an accurate result.

Deep learning is a main subset of machine learning.

Machine learning has a limited scope.

Machine learning is working to create machines that can perform only those specific tasks for which they are trained.

Machine learning is mainly concerned about accuracy and patterns.