UNIT V

NEURAL NETWORKS AND DEEP LEARNING

INTRODUCTION NEURAL NETWORKS AND DEEP LEARNING

Neural Networks:

- Neural networks are artificial systems that were inspired by biological neural networks. These systems learn to perform tasks by being exposed to various datasets and examples without any task-specific rules.
- The idea is that the system generates identifying characteristics from the data they have been passed without being programmed with a pre-programmed understanding of these datasets. Neural networks are based on computational models for threshold logic.
- Threshold logic is a combination of algorithms and mathematics.
- Neural networks are based either on the study of the brain or on the application of neural networks to artificial intelligence.
- The work has led to improvements in finite automata theory. Components of a typical neural network involve neurons, connections which are known as synapses, weights, biases, propagation function, and a learning rule.
- Neurons will receive an input from predecessor neurons that have an activation , threshold , an activation function f, and an output function .
- Connections consist of connections, weights and biases which rules how neuron transfers output to neuron .
- Propagation computes the input and outputs the output and sums the predecessor neurons function with the weight.
- The learning of neural network basically refers to the adjustment in the free parameters i.e. weights and bias.
- There are basically three sequence of events of learning process.

These includes:

1. The neural network is simulated by an new environment.

1

2. Then the free parameters of the neural network is changed as a result of this simulation.
3. The neural network then responds in a new way to the environment because of the changes in its free parameters.

Supervised vs Unsupervised Learning:

- Neural networks learn via supervised learning; Supervised machine learning involves an input variable x and corresponding desired output variable y.
- Here we introduce the concept of teacher who has knowledge about the environment.
- Thus we can say that the teacher has both input-output set.
- The neural network is unaware of the environment. The input is exposed to both teacher and neural network, the neural network generates an output based on the input.