**WEEK-1 ASSIGNMENT**

**Q.1. What is DL?**

**Ans:-** Deep Learning is a part of Machine Learning where computers learn from large amounts of data using something called neural networks. These networks are designed to mimic how our brains work. Deep Learning is used in things like facial recognition, self-driving cars, and language translation — basically, tasks where it's hard to write rules manually.

**Q.2. What is a Neural Network and its Types?**

A **Neural Network** is a type of computer program designed to think a bit like the human brain. It has layers made up of small units called **neurons**, which work together to understand patterns in data — like recognizing a face in a photo or predicting the next word in a sentence.

The data moves through the network layer by layer, and the model learns by adjusting how much importance (called weights) it gives to different parts of the input.

**Types of Neural Networks:**

1. **Feedforward Neural Network (FNN):**
   * The most basic type.
   * Data flows in one direction — from input to output.
   * Used for simple tasks like classifying numbers or objects.
2. **Convolutional Neural Network (CNN):**
   * Designed for working with images and videos.
   * It automatically finds important patterns like edges, colors, and shapes.
   * Used in face recognition, fire detection, medical imaging, etc.
3. **Recurrent Neural Network (RNN):**
   * Designed for handling sequences of data.
   * It remembers past information, which helps in tasks like language translation, text prediction, or speech recognition.
   * Used when order or timing matters.
4. **Generative Adversarial Network (GAN):**
   * Made up of two networks — one creates fake data, and the other tries to detect if it’s fake.
   * Together, they improve until the fake data looks real.
   * Used to generate realistic images, art, or even videos.

**Q.3. What is CNN in Simple Words?**

A CNN, or Convolutional Neural Network, is a special kind of neural network that's great at understanding images. Imagine looking at a picture and trying to find patterns — like edges or colors. CNNs do that automatically. They’re used in things like detecting forest fires from satellite images or finding cats in photos.

**Q.4. Short Notes on the Forest Fire Detection Pipeline**

This is a step-by-step process used to build a system that can detect forest fires from images using Deep Learning:

1. **Data Collection:**
   * First, we gather a dataset of images — some with forest fires and some without.
   * These can come from satellites, drones, or camera footage.
2. **Preprocessing:**
   * Before using the images, we clean and prepare them.
   * This usually means resizing them to a standard size and normalizing pixel values so the model can understand them better.
3. **Model Design:**
   * We build a **CNN (Convolutional Neural Network)** because it works well with images.
   * The model learns to recognize patterns that might indicate a fire — like smoke, flames, or bright orange areas.
4. **Training the Model:**
   * We show the model lots of labeled images (with and without fire).
   * The model learns by adjusting its internal settings based on how well it predicts the correct labels.
5. **Evaluation:**
   * After training, we test the model with new images it hasn't seen before.
   * This helps us check how accurately it can detect fire in real situations.