# Week 1 Milestone – Forest Fire Detection

**1. What is DL (Deep Learning)?**

Deep Learning is a subset of Machine Learning that uses algorithms called neural networks. These networks are designed to mimic the way the human brain works. They automatically learn patterns and features from large amounts of data, making them useful for tasks like image recognition, natural language processing, and autonomous driving.

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

A Neural Network is a series of algorithms that attempts to recognize relationships in data by mimicking how the human brain operates. It consists of layers of nodes (neurons), including:

* **Input Layer**: Takes in the data.
* **Hidden Layers**: Perform computations and extract features.
* **Output Layer**: Provides the final result.

**Types of Neural Networks**:

* **Convolutional Neural Network (CNN)**: A particular type of Neural Network we are going to work with and it is used mainly for image data processing, and learning.
* **Recurrent Neural Network (RNN)**: Ideal for sequential data like time series, and text and helps us to work with Chatbot from the beginner level understanding of Neural Network Designing in the field of Artificial Intelligence.
* **Generative Adversarial Network (GAN)**: Used to generate new data similar to training data then conversion of the model into beginner-level understanding of Neural Network Designing in the field of Artificial Intelligence.

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

A Convolutional Neural Network (CNN) is a special neural network that works well with images. It automatically detects features like edges, textures, and shapes from images using convolutional layers. In another words, these networks are very good at tasks like recognizing faces, identifying objects, or classifying images.

**4. Short Notes on the Pipeline Discussed in the Lecture**

The pipeline for the forest fire detection project includes:

1. **Data Collection & Data Loading**: We will be Gathering satellite or drone images of forests or will be using an already existing dataset to configure the Preliminary Required Data to work with the Model.
2. **Image Preprocessing & Image Augmentation**: We will be resizing images, trying to configure all the images into the same dimensions as others so that Our model can Understand the Data Feeding without getting hallucinated, normalizing pixel values, and labeling.  
     
   In the Augmentation Process, we will be making copies of the same images by applying little changes like rotating the images, flipping the images, and zooming also these types of extra images create orientation from one image is called Image Augmentation.
3. **CNN Model Building**: Creating a CNN model to detect fire in images by using Libraries like TensorFlow & PyTorch and so on.
4. **Training & Testing**: We will be feeding the model with labeled data to learn patterns that we have prepared through Steps 1 to 3 of the Pipeline of the Model that are mentioned above.
5. **Evaluation**: We’ll be measuring performance using metrics like accuracy and precision to work and check if the model is ready for deployment or not in the System.
6. **Deployment**: Integrating the model into an application or alert system whenever the causes like potential images occur or come to us to define the Alert System.