## Assignment 1

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

* Deep Learning (DL) is a subset of Machine Learning.
* It uses algorithms called neural networks to learn from data—just like our brain.
* DL is used in speech recognition, image classification, chatbots, recommendation systems, etc.
* It automatically finds patterns in large amounts of data without manual feature selection.

## 2. What is a Neural Network?

* A neural network is a system of algorithms inspired by the human brain.
* It is made up of layers of nodes (neurons) that process input and give output.
* The basic structure includes:
* - Input layer (takes data)
* - Hidden layers (do the processing)
* - Output layer (gives the result)

## 3. Types of Neural Networks

* a) Convolutional Neural Network (CNN):
* - Mainly used for image and video data.
* - It can automatically detect patterns like edges, shapes, textures in images.
* - Works great for tasks like face recognition, object detection, and medical image analysis.
* b) Recurrent Neural Network (RNN):
* - Designed for sequential data (like time series, speech, or text).
* - It remembers previous inputs using memory loops.
* - Used in language translation, chatbots, voice assistants
* c) Artificial Neural Network (ANN)
* - An Artificial Neural Network (ANN) is the foundation of Deep Learning.
* - It is inspired by how the human brain works and is made of artificial neurons (also called nodes).

## 4. What is CNN in Simple Words?

* CNN (Convolutional Neural Network) is a special type of neural network mainly used to analyze images.
* Imagine it as a smart eye—it scans parts of the image (like filters) to understand what’s in it.
* It automatically detects things like edges, colors, shapes, and eventually learns to recognize objects, faces, digits, etc.
* CNNs reduce the need for manual feature extraction, making them powerful for computer vision tasks.

## 5. What is the project pipeline?

1. Data Collection & Data Loading: We can collect the datasets from the open source such as kaggle, and in the dataset we have, has three folders in total, each having two directories, where one contains fire images and another contains non-fire images, i.e, binary classification. The folders we hane in our dataset are, train, test and val.

Train- we train our model on this data

Test- then we test our model on this data

Val- on this data, we will validate and evaluate the mode.

1. Image Processing & Image Augmentation: The process of creating multi images of the same object in multiple angles(vertical, horizontal, etc) is considered as image processing or image augmentation. The images in the data set must be in same dimensions.
2. Build CNN: We need to build a CNN model using the library tensorflow, which is one the powerful tool to build CNN.
3. Test, Evaluate: Testing and evaluating our model accuracy and work would be last step in the project flow. We do this step using the val data from the dataset.