WEEK-1 ASSESMENT
FOREST FIRE DETECTION USING DEEP LEARNING

1.What is Deep Learning ?

Deep learning is a subset of machine learning that uses multilayered neural networks, called deep neural networks, to simulate the complex decision-making power of the human brain. Some form of deep learning powers most of the artificial intelligence(AI) applications in our lives today.

2. What is Neural Networks and its Types ?

A neural network is a series of algorithms designed to recognize patterns and relationships in data through a process that mimics the way human operates

Neural Networks consists of three layers:

- Input Layer
- Output Layer
- Hidden Layer

Types of Neural Network :

- **Feedforward Neural Networks.** The most straightforward type where information moves in only one direction.
- **Recurrent Neural Networks (RNN)**. They have loops to allow information persistence.
- **Convolutional Neural Networks (CNN)**. Primarily used for image recognition tasks.
- **Radial Basis Fucntion Neural Network** .Used for function approximation problems

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3.What is Convolutional Neural network (CNN)

Convolutional Neural Networks (CNNs) are a specialized class of neural networks designed to process grid-like data, such as images. They are particularly well-suited for image recognition and processing tasks.

Key Components of a Convolutional Neural Network

1. **Convolutional Layers:** These layers apply convolutional operations to input images, using filters (also known as kernels) to detect features such as edges, textures, and more complex patterns. Convolutional operations help preserve the spatial relationships between pixels.
2. **Pooling Layers:** They down sample the spatial dimensions of the input, the network. Max pooling is a common pooling operation, selecting the maximum value from a group of neighboring pixels.
3. **Activation Functions:** They introduce non-linearity to the model, allowing it to learn more complex relationships in the data.
4. **Fully Connected Layers:** These layers are responsible for making predictions based on the high-level features learned by the previous layers. They connect every neuron in one layer to every neuron in the next layer.

4.Project Pipelines

- **Data collection and Data loading**
    - A data collection pipeline is a series of processes that automate the flow of data from its source to a destination for analysis or storage. It involves collecting, transforming, and delivering data, often from multiple sources, in a structured and reliable manner.
    - A data pipeline is a method in which raw data is ingested from various data sources, transformed and then ported to a data store, such as a data lake and others for analysis.
    - this is the link where we will we getting and accessing our dataset for this Project

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- **Image Processing and Image Augmentation**
- An image processing pipeline is a sequence of operations performed on an image, from its capture or creation to its final display or use This pipeline typically involves multiple stages, including image acquisition, preprocessing, enhancement, restoration, and compression, all culminating in the desired output
- Image Segmentation divides an image into segments where each pixel in the image is mapped to an object. This task has multiple variants such as instance segmentation, panoptic segmentation and semantic segmentation.