Forest Fire Detection

**Ques1: What is deep learning?**

* **Deep learning is a type of machine learning that uses neural networks to learn from data.**
* **It works like a simple version of how the human brain learns.**
* **It is very good at finding patterns in images, speech, and text.**
* **Deep learning needs a lot of data and computing power to work well.**
* **It is used in real-life tools like voice assistants, self-driving cars, and face recognition.**

**Ques2: What is Neural Network and types?**

* Neural Network is a computer system inspired by the human brain.
* It has layers made of nodes (neurons) that process information.
* It learns from data to recognize patterns and make decisions.
* Used in face recognition, speech detection, and medical predictions.
* More data helps it learn and improve accuracy.

**Types:**

1. **Feedforward Neural Network (FNN)** – Simple type, used for image classification.
2. **Convolutional Neural Network (CNN)** – Best for image and video recognition (e.g., facial recognition).
3. **Recurrent Neural Network (RNN)** – Good for time-based data like speech or text (e.g., language translation).
4. **Generative Adversarial Network (GAN)** – Used to create new images, videos, or art (e.g., AI-generated faces).
5. **Radial Basis Function Network (RBFN)** – Used in pattern recognition and forecasting.

**Ques3: What is CNN?**

* **CNN (Convolutional Neural Network)** is a type of neural network made for working with images.
* It looks at small parts of an image to find patterns like edges, shapes, or colors.
* It has special layers (like convolution and pooling) to understand images better.
* CNNs are very good at recognizing objects, faces, and scenes.
* **Example**: Used in photo tagging on Facebook or face unlock on phones.

**: Pipelining**

* **Data Collection**
* **Get images from sources like** [**Kaggle.com**](https://www.kaggle.com/)**.**
* **Download datasets related to your task (e.g., cats vs. dogs, digit recognition).**
* **Data Loading**
* **Use Python tools (like pandas, os, tensorflow, or ImageDataGenerator) to load and manage image files.**
* **Split data into training, validation, and test sets.**
* **Image Processing**
* **Resize images to a fixed size (e.g., 224x224).**
* **Normalize pixel values (e.g., scale 0–255 to 0–1) for better learning.**
* **Image Augmentation**
* **Apply random changes like rotation, flipping, zooming, etc.**
* **Helps the model learn better and generalize by seeing varied versions of images.**
* **Build CNN (TensorFlow/Keras)**
* **Create layers: Convolution ➝ Pooling ➝ Flatten ➝ Dense ➝ Output.**
* **Use tensorflow.keras to define and compile the model.**
* **Train the Model**
* **Fit the model on training data using model.fit().**
* **Monitor accuracy and loss on validation data.**
* **Test and Evaluate**
* **Use model.evaluate() on test data to check performance.**
* **Use metrics like accuracy, confusion matrix, or classification report.**

**Submitted By:Akshit Dhiman**