Name :- Jayesh Dharmik

AICTE Internship Registration ID : STU6792647f857c11737647231

Week 1 Assignment – Forest Fire Detection

1) What is DL ?

⇨ Deep learning is a type of artificial intelligence that teaches computers to learn from large amounts of data by mimicking how the human brain works. It uses special programs called neural networks that can recognize patterns—like identifying faces in photos, understanding speech, or translating languages—without needing to be told the rules each time.

2) What is Neural Network and its types ?

⇨ A Neural Network is a computer system inspired by the human brain. It's made up of layers of nodes also called neurons, where each node connects to others and passes information. Neural networks are the foundation of deep learning and are used to recognize patterns, make decisions, and solve complex problems.

Types of Neural Networks:

1. **Feedforward Neural Network (FNN)**
    - Information moves in one direction: input → hidden layer(s) → output
2. **Convolutional Neural Network (CNN)**
    - Best for image and video processing.

- Automatically detects patterns like edges, shapes, and objects in pictures.

3. **Recurrent Neural Network (RNN)**
    - Designed for sequential data (like time series, language, or music).
    - Remembers previous inputs using loops in the network.
4. **Long Short-Term Memory (LSTM)**
    - A special kind of RNN that remembers information for a longer time.
    - Great for tasks like text generation or predicting stock prices.
5. **Generative Adversarial Network (GAN)**
    - Made of two networks: one creates fake data, the other checks if it's real.
    - Used to generate realistic images, deepfakes, or art.

3) What is CNN in simple words ?

⇨ A Convolutional Neural Network is a type of deep learning model that's especially good at understanding images.
CNNs are like smart eyes for computers. They can look at a picture and figure out what's in it—like detecting a face, a dog, or a stop sign without needing to be told all the details.

4) Create a short note about the pipeline we have discussed in the Lecture ?

A deep learning pipeline is the step-by-step process used to build and train a model. It usually includes the following stages:

1. **Data Collection**
    - Gather raw data (images, text, etc.) from various sources.
2. **Data Preprocessing**
    - Clean, resize, normalize, or label the data.
    - Split into training, validation, and test sets.
3. **Model Selection**
    - Choose the right neural network e.g., CNN for images, RNN for sequences.
4. **Model Training**
    - Feed the training data into the model.
    - Adjust model weights using techniques like backpropagation and optimization e.g., using gradient descent.
5. **Model Evaluation**
    - Test model on validation/test data.
    - Use metrics like accuracy, loss, precision, or recall.
6. **Model Tuning**
    - Improve performance by changing parameters (learning rate, number of layers, etc.).
7. **Deployment**
    - Use the trained model in real-world applications (apps, websites, systems).