

1.2 Design a deep learning architecture for a given problem statement.

Problem Statement:

Classify images of different animals (cats, dogs, and elephants) based on their visual features.

Deep Learning Architecture Design:

For image classification tasks, Convolutional Neural Networks (CNNs) are commonly used due to their effectiveness in processing visual data. Designing a CNN architecture for this problem:

Input Layer:

Input Size: The size of the input images (e.g., 224x224 pixels for standard image sizes).

Input Channels: Typically, 3 channels (R, G, B) for color images.

Convolutional Layers:

Applying a series of convolutional layers to extract visual features from the images.

Each layer consists of multiple filters (also called kernels) that slide over the input image and learn different features.

Activation Functions:

Using activation functions like ReLU (Rectified Linear Unit) after each convolutional layer to introduce non-linearity.

Pooling Layers:

Inserting pooling layers (e.g., MaxPooling) to down sample and reduce the dimensions of the feature maps while retaining important information.

Flattening Layer:

Flattening the 2D feature maps into a 1D vector to prepare for fully connected layers

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Fully Connected Layers:

Adding fully connected layers to perform the final classification.

Using the softmax activation function in the output layer for multi-class classification.