

## **PerLab:-**

### **1.What are the key components of a Convolutional Neural Network (CNN) architecture?**

Key components include convolutional layers, pooling layers, and fully connected layers, which together extract features and perform classification.

### **2.Briefly explain the concept of data augmentation in the context of image classification.**

Data augmentation involves applying transformations like rotation and scaling to the training images, increasing dataset diversity and improving model generalization.

### **3.What is transfer learning in the context of CNNs, and how can pre-trained models be utilized for image classification tasks?**

Transfer learning uses pre-trained models on similar tasks to leverage learned features, allowing fine-tuning on new datasets to accelerate training and improve performance.

### **4.Name a commonly used loss function for binary classification tasks. How does it measure the difference between predicted and actual class labels?**

The binary cross-entropy loss function measures the difference between predicted probabilities and actual class labels using a logarithmic loss function.

## **VIVA:-**

### **1.What are the key components of a Convolutional Neural Network (CNN) architecture, and how do they contribute to image feature extraction?**

Key components are convolutional layers, which detect features through filters; pooling layers, which reduce spatial dimensions; and fully connected layers, which aggregate features for classification. Together, they extract hierarchical features from images, from simple edges to complex patterns.

### **2.Briefly explain the concept of data augmentation in the context of image classification.**

Data augmentation involves generating variations of training images (e.g., rotations, flips) to artificially increase the dataset size, enhancing model robustness and generalization.

### **3.Discuss the role of activation functions, such as ReLU, in CNNs. Why are they commonly used in convolutional layers?**

Activation functions like ReLU introduce non-linearity, allowing the network to learn complex patterns. ReLU is commonly used due to its simplicity and effectiveness in mitigating vanishing gradient issues.

### **4.Name a commonly used loss function for binary classification tasks.**

The commonly used loss function for binary classification tasks is binary cross-entropy loss.