Skin Cancer (Melanoma) Detection using CNN and Transfer Learning

Objective

In this lab, you will build and train convolutional neural networks (CNNs) to classify skin lesion images as *benign* or *malignant*. You will:

- Build a CNN model from scratch.
- Apply Transfer Learning using a pre-trained model.
- Compare their performance.

Dataset

Use the **HAM10000 / ISIC dataset** available on Kaggle: data

You may use a smaller subset for faster training.

Lab Steps

1. **Load and preprocess data:**
   - Resize images (e.g., 128×128 or 224×224).
   - Split into training, validation, and test sets.
   - Apply basic augmentation (flip, rotation, zoom).
   - Add any additional preprocessing steps suitable for this dataset (e.g., handling class imbalance, removing duplicates, or cleaning corrupted images).
2. **CNN from Scratch:**
   - Build a small CNN model using Keras/TensorFlow.
   - Train and evaluate it.
3. **Transfer Learning:**
   - Use a pre-trained model (e.g., ResNet50, VGG16, or MobileNetV2).
   - Fine-tune and compare performance with the CNN from scratch.
4. **Compare Results:**
   - Plot accuracy and loss curves.
   - Report final accuracy for both models.