DA312 Advanced Machine Learning Lab
Assignment 3

19 February, 2024

- You can write the code in Google Colab platform.
- Submit .ipynb or .py file to the Teams assignment. The code should be well commented.

Task

Develop deep learning models that can accurately classify facial expressions into predefined categories. Dataset consists of images categorized into five facial expressions: angry, fear, happy, sad, and surprise. Dataset is available at this link.

- Load the facial expressions dataset and apply appropriate transformations and augmentations to prepare your data for training. Consider resizing, normalization, random rotations, flipping and noise addition.
- Split the dataset into training (90%) and testing (10%) sets.
- Implement five different convolutional neural network (CNN) models for this classification task, specifically LeNet, AlexNet, ResNet, VGGNet and Inception v3
  For each model, modify the final classification layer to output five classes corresponding to the facial expressions in your dataset.
- Train each model on the training dataset. Ensure you're using a suitable loss function and optimizer.
- Evaluate each trained model on the test dataset. Record the accuracy and loss.
  Generate and plot a confusion matrix for each model to analyze its performance across the different expressions.
- Display 10 test images (at least 2 from each class), their predicted class, and their actual class for each model.
- Compare the performance of the all the models based on their accuracy and loss.