Team 5
Vehicles classification

Aim of this project is vehicles classification in 5classes: Auto, Bus, TempoTraveller, Tractor, Truck. You will adopt a fine-tuning strategy using the architecture EfficientNetB3 pre-trained on ImageNet. You should do the following steps:

1. **Download and data organization**. Download the dataset at `https://www.kaggle.com/datasets/dataclusterlabs/indian-vehicle-dataset` Divide the dataset in training (70%), validation (15%) and test (15%). Images should be organized in proper directories consistently with the structure of ImageDataGenerator in Keras. Load these images on Google Drive so that you can easily access from Colab.

2. **Data preparation**. For data preparation use `ImageDataGenerator` with the method `flow_from_directory`. Normalize all the images in the range $[0, 1]$ and resize the images using 320×320 pixel. Only during training consider the following data-augmentation operations: random rotatoin from -20 degree to 20 degree, rescaling using a random factor in the range [0.7, 1.3] and horizontal flipping.

3. **Architecture**. Use EfficientNetB3 pre-trained on ImageNet with a dimension of 320×320 pixels and a number of classes equal to 5.

4. **Training**. For training use the NAdam optimizer by means of the function `keras.optimizers.Nadam()` and adopt the Cross-Entropy loss function. Use the performance on the validation set to choose the best parameters for the learning-rate, batch-size, number of epoches and number of layers to be freezed.

5. **Performance evaluation**. Use the test-set to compute the performance in terms of accuracy.