# Image Classification

## Code1: Filename[Model(Sequential).ipynb]

### 1) Dataset

Intel Image Classification dataset ( From Kaggle)
- Classes: 6
( buildings, forest, glacier, mountain, sea, and street)

- **Training Set**: 11,230 images belonging to 6 classes.
- **Validation Set**: 2,804 images (20% of the training data).
- **Test Set**: 3,000 images belonging to 6 classes.

### 2) Input

- All images are resized to 64x64 pixels for uniformity
- **Color Channels**: 3 (RGB)
- 32 images are processed per batch during training, validation, and testing
- All pixel values are scaled by 1/255 to normalize the data
- Small distortions , Random zooms and Random horizontal flips are applied to images.

### 3) Output

**Multiclass Classification**: 6 classes
- The Activation Function used (Softmax) at the final layer to output probabilities for each class.

### 4) Model

- Convolutional Neural Network (CNN)
- 3 convolution layers with kernel size(3*3), activation - Relu, MaxPooling(2*2 pooling), batch normalization and filters (48, 48, 32)
- 3 Fully connected layers : 2 dense layers, output layer

Adam (Adaptive Moment Estimation) is used for efficient and adaptive learning

### 5) Performance

- Validation Accuracy: 81%
- Test Accuracy: 83%

# Code2: Filename[Model2.ipynb]

### 1) Dataset used
CIFAR-10 Dataset (32x32x3) color images
- Classes: 10
  "airplane" "automobile" "bird" "cat" "deer" "dog" "frog" "horse" "ship" "truck"
- Training Set: 50,000 images.
- Test Set: 10,000 images.

### 2) Input
- All pixel values are scaled by 1/255 to normalize the data
- All images are resized to 64x64 pixels for uniformity

### 3) Output
- Multiclass Classification: 10 Classes
- Softmax function is used in output layer to output probabilities for each class

### 4) Model
- Convolutional Neural Network (CNN)
- 2 convolution layers with kernel size(3*3), activation - Relu, MaxPooling(2*2 pooling), batch normalization and filters (32, 48)
- 3 Fully connected layers : 1 flatten layer, 1 dense layer , output layer

### 5) Performance
- Accuracy: 67% on the test set of 10,000 images.
- Macro Average (f1-score): 0.66 (averaged across all classes).
- Weighted Average (f1-score): 0.66 (taking support into account).