DATE: 07/11/2022
TEAM ID: PNT2022TMID50366
PROJECT NAME: DIGITAL NATURALIST-AI ENABLED TOOL FOR BIODIVERSITY RESEARCHERS

```
from keras.preprocessing.image import ImageDataGenerator
import  cv2
from os import listdir
import time


def hms_string(sec_elapsed):
    h = int(sec_elapsed / (60 * 60))
    m = int((sec_elapsed % (60 * 60)) / 60)
    s = sec_elapsed % 60
    return f"{h}:{m}:{round(s,1)}"


def augment_data(file_dir, n_generated_samples, save_to_dir):
    data_gen = ImageDataGenerator(rotation_range=30,
                                  width_shift_range=0.1,
                                  height_shift_range=0.15,
                                  shear_range=0.25,
                                  zoom_range = 0.2,
                                  horizontal_flip=True,
                                  vertical_flip=False,
                                  fill_mode='nearest',
                                  brightness_range=(0.5,1.2)
                                 )


    for filename in listdir(file_dir):
        image = cv2.imread(file_dir + '/' + filename)
        image = image.reshape((1,)+image.shape)
        save_prefix = 'aug_' + filename[:-4]
        i=0
        for batch in data_gen.flow(x=image, batch_size=1, save_to_dir=save_to_dir,
```

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```
                    save_prefix=save_prefix, save_format='jpg'):
        i += 1
        if i > n_generated_samples:
            break


start_time = time.time()


augmented_data_path ='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset'

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Bird\Great Indian Bustard Bird', n_generated_samples=8, save_to_dir=augmented_data_path+'/Bird/GIB_AUG')

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Bird\Spoon Billed Sandpiper Bird', n_generated_samples=8, save_to_dir=augmented_data_path+'/Bird/SPS_AUG')

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Flower\Corpse Flower', n_generated_samples=8, save_to_dir=augmented_data_path+'/Flower/Corpse_AUG')

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Flower\Lady Slipper Orchid Flower', n_generated_samples=8, save_to_dir=augmented_data_path+'/Flower/LS_Orchid_AUG')

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Mammal\Pangolin Mammal', n_generated_samples=8, save_to_dir=augmented_data_path+'/Mammal/LS_Pangolin_AUG')

augment_data(file_dir='C:\Users\josna\Downloads\Digital Naturalist Dataset(1)\Digital Naturalist Dataset\Mammal\Senenca White Deer Mammal', n_generated_samples=8, save_to_dir=augmented_data_path+'/Mammal/SW_Deer_AUG')



end_time = time.time()

execution_time = (end_time - start_time)

print("Elapsed Time : "+str(execution_time))
```