

TEAM ID : PNT2022TMID52124

PROJECT NAME : DIGITAL NATURALIST-AI ENABLED TOOLS FOR BIODIVERSITY RESEARCHERS

DATA AUGMENTED STRUCTURE

```
"Archive: /content/Digital Naturalist
Dataset.zip\n", "creating: Digital Naturalist
Dataset/\n",
" creating: Digital Naturalist Dataset/Bird/\n",
" creating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/\n",
" inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/download (1).jpg
\n", " inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/download
(10).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard
Bird/download (11).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian
Bustard Bird/download (2).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great
Indian Bustard Bird/download (3).jpg \n", " inflating: Digital Naturalist
Dataset/Bird/Great Indian Bustard Bird/download (4).jpg \n", " inflating: Digital
Naturalist Dataset/Bird/Great Indian Bustard Bird/download (5).jpg \n", " inflating:
Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/download (6).jpg \n", "
inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/download (7).jpg
\n", " inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/download
(8).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard
Bird/download (9).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian
Bustard Bird/download.jpg \n",
" extracting: Digital Naturalist Dataset/Bird/Great Indian
Bustard Bird/greatindianbustardkRDC--621x414@LiveMint.webp
\n",
" inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/images
(1).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard
Bird/images (2).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great Indian
Bustard Bird/images (3).jpg \n", " inflating: Digital Naturalist Dataset/Bird/Great
Indian Bustard Bird/images (4).jpg \n", " inflating: Digital Naturalist
Dataset/Bird/Great Indian Bustard Bird/images (5).jpg \n", " inflating: Digital
Naturalist Dataset/Bird/Great Indian Bustard Bird/images (6).jpg \n", " inflating:
Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/images (7).jpg \n", "
```

inflating: Digital Naturalist Dataset/Bird/Great Indian Bustard Bird/images (8).jpg
\\n", " inflating:

" Digital Naturalist Dataset/Flower/Corpse Flower/download (5).jpg \\n
" inflating: Digital Naturalist Dataset/Flower/Corpse Flower/download.jpg
\\n", " inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images
(1).jpg \\n",
" inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images (10).jpg
\\n", " inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images
(11).jpg \\n", " inflating: Digital Naturalist Dataset/Flower/Corpse
Flower/images (12).jpg \\n", " inflating: Digital Naturalist
Dataset/Flower/Corpse Flower/images (13).jpg \\n", " inflating: Digital
Naturalist Dataset/Flower/Corpse Flower/images (14).jpg \\n", " inflating:
Digital Naturalist Dataset/Flower/Corpse Flower/images (15).jpg \\n", "
inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images (16).jpg
\\n", " extracting: Digital Naturalist Dataset/Flower/Corpse Flower/images
(17).jpg \\n", " inflating: Digital Naturalist Dataset/Flower/Corpse
Flower/images (2).jpg \\n",
" inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images
(3).jpg \\n", " inflating: Digital Naturalist Dataset/Flower/Corpse
Flower/images (4).jpg \\n", " inflating: Digital Naturalist
Dataset/Flower/Corpse Flower/images (5).jpg \\n", " inflating: Digital
Naturalist Dataset/Flower/Corpse Flower/images (6).jpg \\n", " inflating:
Digital Naturalist Dataset/Flower/Corpse Flower/images (7).jpg \\n", "
inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images (8).jpg
\\n", " inflating: Digital Naturalist Dataset/Flower/Corpse Flower/images
(9).jpg \\n", " extracting: Digital Naturalist Dataset/Flower/Corpse
Flower/images.jpg \\n",
" creating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/\\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(1).jpg
\\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(10).jpg
\\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(2).jpg
\\n",

```

" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(3).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(4).jpg

\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(5).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(6).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(7).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(8).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/download
(9).jpg
\n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid
Flower/download.jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper
Orchid Flower/images (1).jpg \n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/images
(10).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid
Flower/images (11).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper
Orchid Flower/images (12).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady
Slipper Orchid Flower/images (2).jpg \n",
"inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/images
(3).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid
Flower/images (4).jpg \n",
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/images (5).jpg
\n".
" inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid Flower/images
(6).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper Orchid
Flower/images (7).jpg\n", " inflating: Digital Naturalist Dataset/Flower/Lady Slipper
Orchid Flower/images (8).jpg \n", " inflating: Digital Naturalist Dataset/Flower/Lady
Slipper Orchid Flower/images (9).jpg \n", " inflating: Digital Naturalist

```

Dataset/Flower/Lady Slipper Orchid Flower/images.jpg \n",
 " creating: Digital Naturalist Dataset/Mammal/,pangolin
 Mammal\n", " creating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal\n",
 " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/download (1).jpg
 \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/download
 (2).jpg \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin
 Mammal/download (3).jpg\n", " inflating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal/download (4).jpg \n",
 " extracting: Digital Naturalist Dataset/Mammal/Pangolin Mammal/download
 (5).jpg \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin
 Mammal/download (6).jpg \n", " inflating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal/download (8).jpg \n", " inflating: Digital
 Naturalist Dataset/Mammal/Pangolin Mammal/download.jpg \n",
 "
 "
 " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images (1).jpg
 \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images
 (10).jpg \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin
 Mammal/images (11).jpg \n", " inflating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal/images (12).jpg \n", " inflating: Digital
 Naturalist Dataset/Mammal/Pangolin Mammal/images (13).jpg \n", " inflating:
 Digital Naturalist Dataset/Mammal/Pangolin Mammal/images (14).jpg \n", "
 inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images (15).jpg
 \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images
 (16).jpg \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin
 Mammal/images (2).jpg \n", " inflating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal/images (3).jpg \n", " inflating: Digital
 Naturalist Dataset/Mammal/Pangolin Mammal/images (4).jpg \n", " inflating:
 Digital Naturalist Dataset/Mammal/Pangolin Mammal/images (5).jpg \n", "
 inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images (6).jpg
 \n"
 " inflating: Digital Naturalist Dataset/Mammal/Pangolin Mammal/images
 (7).jpg \n", " inflating: Digital Naturalist Dataset/Mammal/Pangolin
 Mammal/images (8).jpg \n", " inflating: Digital Naturalist
 Dataset/Mammal/Pangolin Mammal/images (9).jpg \n", " inflating: Digital

```
Naturalist Dataset/Mammal/Pangolin Mammal/images.jpg \n",
" creating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal\n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/download (1).jpg \n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/download (2).jpg \n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/download (3).jpg \n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/download (7).jpg \n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/download.jpg
\n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
(1).jpg
\n",
" inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
(10).jpg
\n",
```

```

    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (11).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (12).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (13).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (14).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (15).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (16).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (2).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (3).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (4).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (5).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (6).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (7).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images (8).jpg\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer Mammal/images
      (9).jpg
\n",
    " inflating: Digital Naturalist Dataset/Mammal/Senenca White Deer
Mammal/images\n", IMPORTING REQUIRED LIBRARIES:
    From keras.preprocessing.image import
    ImageDataGenerator\n", import cv2\n",
    from os import listdir\n",
import time \n",

```

DATA AUGMENT FUNCTION:

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

    for filename in listdir(file_dir):\n",
    image =
    cv2.imread(file_dir+'/'+filename)\n",
    image =
    cv2.cvtColor(image,cv2.COLOR_BGR2RGB)\n",
    image = image.reshape((1,)+image.shape)\n",
    save_prefix = 'aug_' + filename[:-4] \n",

    i=0\n",

        for batch in data_gen.flow(x=image, batch_size=1,
                                   save_to_dir=save_to_dir,
                                   save_prefix=save_prefix, save_format='jpg') \n",

    i += 1\n", \n",

        if i >
            n_generated_samples
            :\n", break\n",

    "augmented_data_path = '/content/Augument Dataset'\n",

    "augment_data(file_dir='/content/Digital Naturalist Dataset/Bird/Great Indian Bustard
    Bird', n_generated_samples=20, save_to_dir=augmented_data_path+'/GIB_AUG')\n",

    "augment_data(file_dir='/content/Digital Naturalist Dataset/Bird/Spoon Billed Sandpiper
```

```
Bird', n_generated_samples=20, save_to_dir=augmented_data_path+'/SPS_AUG')\n",  
    "augment_data(file_dir='/content/Digital Naturalist Dataset/Flower/Corpse  
Flower', n_generated_samples=20,  
save_to_dir=augmented_data_path+'/Corpse_AUG')\n",  
    "augment_data(file_dir='/content/Digital Naturalist Dataset/Flower/Lady Slipper  
Orchid Flower', n_generated_samples=20,  
save_to_dir=augmented_data_path+'/LS_Orchid_AUG')\n",  
    "augment_data(file_dir='/content/Digital Naturalist Dataset/Mammal/Pangolin  
Mammal', n_generated_samples=20,  
save_to_dir=augmented_data_path+'/LS_Pangolin_AUG')\n",  
    "augment_data(file_dir='/content/Digital Naturalist Dataset/Mammal/Senenca White  
Deer Mammal', n_generated_samples=20,  
save_to_dir=augmented_data_path+'/SW_Deer_AUG')"\n
```


