kaviya_R_assignment_kaviyaR

October 6, 2022

```
[ ]: ls
```

```
drive/  sample_data/
```

```
[ ]: cd /content/drive/MyDrive/CNN
```

```
/content/drive/MyDrive/CNN
```

```
[ ]: ls
```

```
 Animal_Dataset.zip   haarcascade_frontalface_alt.xml   Untitled0.ipynb
 dataset/            'Srikanth (1)'@
```

```
[ ]: pwd
```

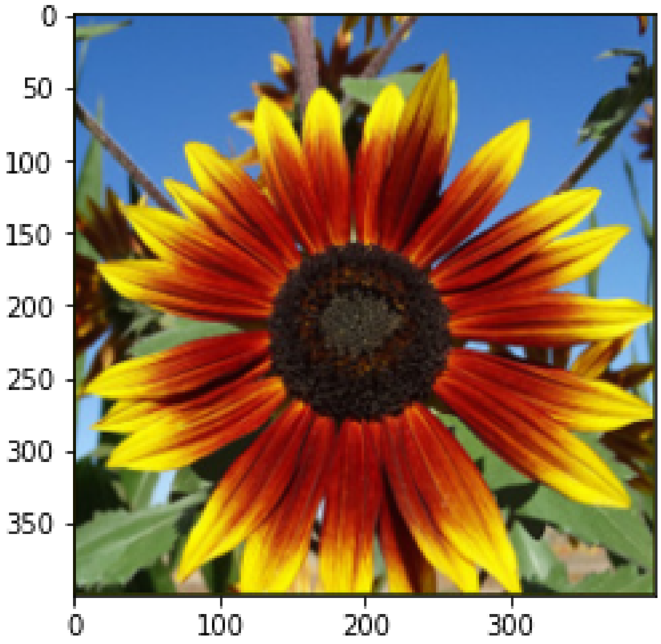
```
[ ]: '/content/drive/MyDrive/CNN'
```

1 Image Augmentation

```
[ ]: import numpy as np
     import matplotlib.pyplot as mpimg
     import matplotlib.pyplot as plt
     import random
     from skimage import exposure
     from skimage .util import random_noise
     from skimage import transform
     from cv2 import resize
```

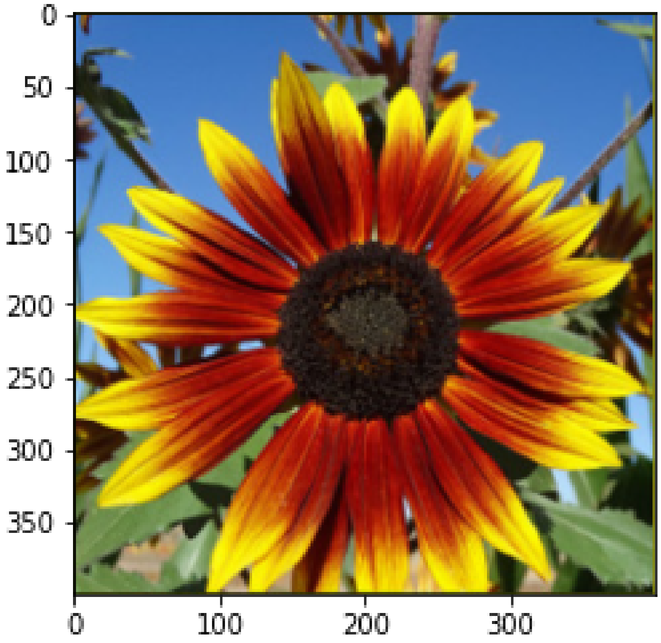
```
[ ]: img=mpimg.imread('/content/drive/MyDrive/day-9-dataset/CNN/flowers/sunflower/
       ↪10386503264_e05387e1f7_m.jpg')
     plt.imshow(img)
     img_rescale=resize(img,(400,400))
     plt.imshow(img_rescale)
```

```
[ ]: <matplotlib.image.AxesImage at 0x7f24c7925e50>
```



[ ]:
```
#horizontal flip
horiz = np.fliplr(img_rescale)
plt.imshow(horiz)
```

[ ]:
```
<matplotlib.image.AxesImage at 0x7f24c6097510>
```

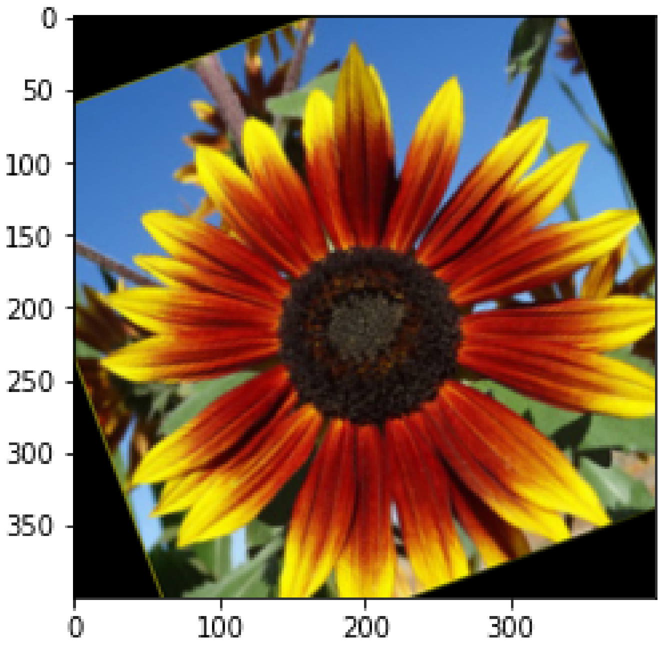


[ ]:

```
# rotate
from skimage import transform
trans = transform.rotate(img_rescale , random.uniform(-30,30))
plt.imshow(trans)
```

[ ]:

```
<matplotlib.image.AxesImage at 0x7f24c5fd7b90>
```



[ ]:

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

[ ]:

```
train_datagen = ImageDataGenerator(rescale= 1/255,horizontal_flip =␣
 ↪True,vertical_flip = True,zoom_range= 0.2)
```

[ ]:

```
test_datagen = ImageDataGenerator(rescale= 1./255)
```

[ ]:

```
x_train = train_datagen.flow_from_directory(r'/content/drive/MyDrive/CNN/
 ↪dataset/Training' ,target_size = (62,62),
                                            class_mode =␣
 ↪'categorical',batch_size = 24)
```

```
Found 1238 images belonging to 4 classes.
```

[ ]:

```
x_train = train_datagen.flow_from_directory(r'/content/drive/MyDrive/CNN/
 ↪dataset/Testing' ,target_size = (62,62),
                                                     class_mode =␣
 ↪'categorical',batch_size = 24)
```

```
Found 326 images belonging to 4 classes.
```

# Model Building

```
[ ]: from tensorflow.keras.models import Sequential
     from tensorflow.keras.layers import Convolution2D, MaxPooling2D, Flatten, Dense
```

```
[ ]: model = Sequential()
```

```
[ ]: model.add(Convolution2D(32,(3,3),activation = 'relu',input_shape = (62,62,3)))
```

```
[ ]: model.add(MaxPooling2D(pool_size = (2,2)))
```

```
[ ]: model.add(Flatten())
```

```
[ ]: model.add(Dense(300, activation = 'relu'))
```

```
[ ]: model.add(Dense(4, activation = 'softmax'))
```

```
[ ]: model.summary()
```

```
Model: "sequential_4"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d_7 (Conv2D)           (None, 60, 60, 32)        896

 max_pooling2d_1 (MaxPooling  (None, 30, 30, 32)       0
 2D)

 flatten_5 (Flatten)         (None, 28800)             0

 dense_7 (Dense)             (None, 300)               8640300

 dense_8 (Dense)             (None, 4)                 1204

=================================================================
Total params: 8,642,400
Trainable params: 8,642,400
Non-trainable params: 0
_________________________________________________________________
```

```
[ ]: len(x_train)
```

```
[ ]: 14
```

2 Compile the model

[ ]:

```
model.compile(loss="categorical_crossentropy", metrics =["accuracy"],␣
 ↪optimizer= 'adam')
```

3 Fit the model

[ ]:

```
model.fit_generator(x_train,validation_data=x_train,epochs=5,␣
 ↪steps_per_epoch=len(x_train), validation_steps=len(x_train))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning:
`Model.fit_generator` is deprecated and will be removed in a future version.
Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
```

```
Epoch 1/5
14/14 [==============================] - 53s 4s/step - loss: 5.6963 - accuracy:
0.2239 - val_loss: 1.9208 - val_accuracy: 0.2301
Epoch 2/5
14/14 [==============================] - 7s 510ms/step - loss: 1.4907 -
accuracy: 0.2822 - val_loss: 1.3885 - val_accuracy: 0.3620
Epoch 3/5
14/14 [==============================] - 9s 639ms/step - loss: 1.3146 -
accuracy: 0.3712 - val_loss: 1.2357 - val_accuracy: 0.4601
Epoch 4/5
14/14 [==============================] - 7s 497ms/step - loss: 1.2136 -
accuracy: 0.4724 - val_loss: 1.1224 - val_accuracy: 0.5675
Epoch 5/5
14/14 [==============================] - 7s 481ms/step - loss: 1.1045 -
accuracy: 0.5399 - val_loss: 1.0043 - val_accuracy: 0.6012
```

[ ]:

```
<keras.callbacks.History at 0x7f68d98fdf50>
```

4 Save the model

[ ]:

```
model.save('Animal_dataset')
```

5 Testing the model

[ ]:

```
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
import numpy as np
```

[ ]:

```
score = model.evaluate(x_train, verbose=1)
print('\n', 'Test accuracy:', score[1])
```

```
14/14 [=============================] - 5s 322ms/step - loss: 0.9902 -
accuracy: 0.6104

 Test accuracy: 0.6104294657707214
```