submission.csv

991 to 998 of 998 entries Filter

id	label
UnFoucsed	0
UnFoucsed	0
UnFoucsed	1
UnFoucsed	0
UnFoucsed	0
UnFoucsed	0
UnFoucsed	1
UnFoucsed	1

Show 10 per page 1 10 90 99 100

```
import numpy as np
import cv2
import matplotlib.pyplot as plt
from IPython import display
import sys
import os
import pandas as pd
from keras.preprocessing.image import ImageDa
from keras.models import Sequential
from keras.layers import Conv2D, MaxPooling2D
import keras.utils
from keras.callbacks import EarlyStopping, Re
from sklearn.model_selection import train_test_spl
import random
import dlib
import glob
from skimage import io
from skimage.draw import circle
from skimage.io import imread_collection
from tqdm import tqdm
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Dropout, Activation, Flatten, Conv2D,
import matplotlib.image as mpimg
```

```
from google.colab import drive
drive.mount('/content/drive')

    Mounted at /content/drive
```

```
FAST_RUN = False
IMAGE_WIDTH=30
IMAGE_HEIGHT=140
IMAGE_SIZE=(IMAGE_WIDTH, IMAGE_HEIGHT)
IMAGE_CHANNELS=3
```

```
filenames = os.listdir("/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/Trair
categories = []
for filename in filenames:
    category = filename.split(' ')[0]
    if category == 'Foucsed':
        categories.append(1)
    else:
        categories.append(0)

df = pd.DataFrame({
    'filename': filenames,
    'category': categories
})
```

```
df.head()
```

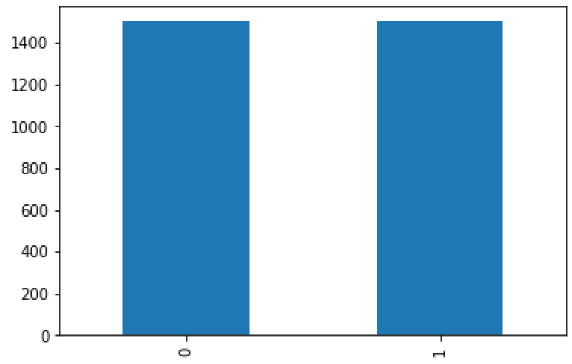
	filename	category
0	UnFoucsed 501.jpg	0
1	UnFoucsed 502.jpg	0
2	UnFoucsed 503.jpg	0
3	UnFoucsed 504.jpg	0
4	UnFoucsed 505.jpg	0

```
df.tail()
```

	filename	category
2994	Foucsed 995.jpg	1
2995	Foucsed 996.jpg	1
2996	Foucsed 997.jpg	1
2997	Foucsed 998.jpg	1
2998	Foucsed 999.jpg	1

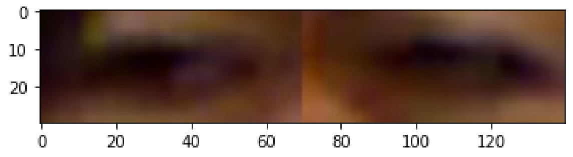
```
df['category'].value_counts().plot.bar()
```

```
<matplotlib.axes._subplots.AxesSubplot
```



```
sample = random.choice(filenames)
image = load_img("/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/TrainingSet
plt.imshow(image)
```

```
<matplotlib.image.AxesImage at 0x7f44t
```



```
model = Sequential()

model.add(Conv2D(32, (3, 3), activation='relu', input_shape=(IMAGE_WIDTH, IMAGE_H
model.add(BatchNormalization())
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))

model.add(Conv2D(64, (3, 3), activation='relu'))
model.add(BatchNormalization())
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))

model.add(Conv2D(128, (3, 3), activation='relu'))
model.add(BatchNormalization())
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Dropout(0.25))

model.add(Flatten())
model.add(Dense(512, activation='relu'))
model.add(BatchNormalization())
model.add(Dropout(0.5))
model.add(Dense(2, activation='softmax'))

model.compile(loss='categorical_crossentropy', optimizer='rmsprop', metrics=['acc

model.summary()
```

```
Model: "sequential"
_____________________________________
Layer (type)                 Output Sh
=====================================
conv2d (Conv2D)              (None, 28
_____________________________________
module_wrapper (ModuleWrappe (None, 28
_____________________________________
max_pooling2d (MaxPooling2D) (None, 14
_____________________________________
dropout (Dropout)            (None, 14
_____________________________________
conv2d_1 (Conv2D)            (None, 12
_____________________________________
module_wrapper_1 (ModuleWrap (None, 12
_____________________________________
max_pooling2d_1 (MaxPooling2 (None, 6,
_____________________________________
dropout_1 (Dropout)          (None, 6,
_____________________________________
conv2d_2 (Conv2D)            (None, 4,
_____________________________________
module_wrapper_2 (ModuleWrap (None, 4,
_____________________________________
max_pooling2d_2 (MaxPooling2 (None, 2,
_____________________________________
dropout_2 (Dropout)          (None, 2,
_____________________________________
flatten (Flatten)            (None, 38
_____________________________________
dense (Dense)                (None, 51
_____________________________________
module_wrapper_3 (ModuleWrap (None, 51
_____________________________________
dropout_3 (Dropout)          (None, 51
_____________________________________
dense_1 (Dense)              (None, 2)
=====================================
Total params: 2,063,810
Trainable params: 2,062,338
Non-trainable params: 1,472
_____________________________________
```

```
earlystop = EarlyStopping(patience=10)
```

```
learning_rate_reduction = ReduceLROnPlateau(monitor='val_acc',
                                            patience=2,
                                            verbose=1,
                                            factor=0.5,
                                            min_lr=0.00001)
```

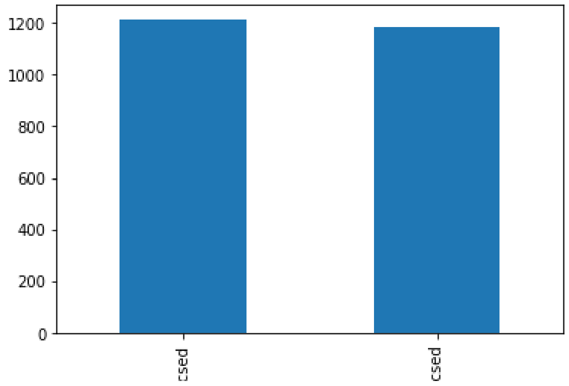
```
callbacks = [earlystop, learning_rate_reduction]
```

```
df["category"] = df["category"].replace({0: 'UnFoucsed', 1: 'Foucsed'})
```

```
train_df, validate_df = train_test_split(df, test_size=0.20, random_state=42)
train_df = train_df.reset_index(drop=True)
validate_df = validate_df.reset_index(drop=True)
```

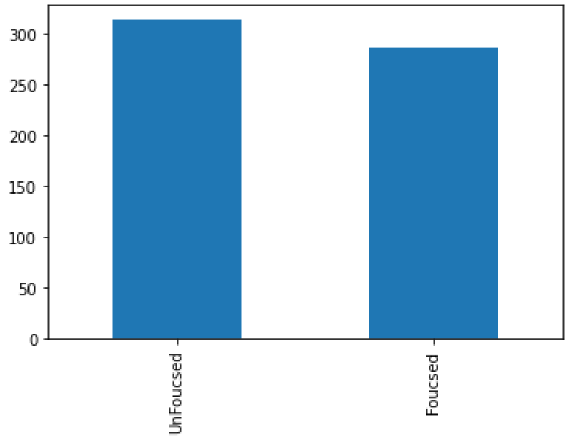
```
train_df['category'].value_counts().plot.bar()
```

```
<matplotlib.axes._subplots.AxesSubplot
```



```
validate_df['category'].value_counts().plot.bar()
```

```
<matplotlib.axes._subplots.AxesSubplot
```



```
total_train = train_df.shape[0]
total_validate = validate_df.shape[0]
batch_size=15


train_datagen = ImageDataGenerator(
    rotation_range=15,
    rescale=1./255,
    shear_range=0.1,
    zoom_range=0.2,
    horizontal_flip=True,
    width_shift_range=0.1,
    height_shift_range=0.1
)

train_generator = train_datagen.flow_from_dataframe(
    train_df,
    "/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/TrainingSet/",
    x_col='filename',
    y_col='category',
    target_size=IMAGE_SIZE,
    class_mode='categorical',
    batch_size=batch_size
)
```

```
Found 2399 validated image filenames b
```

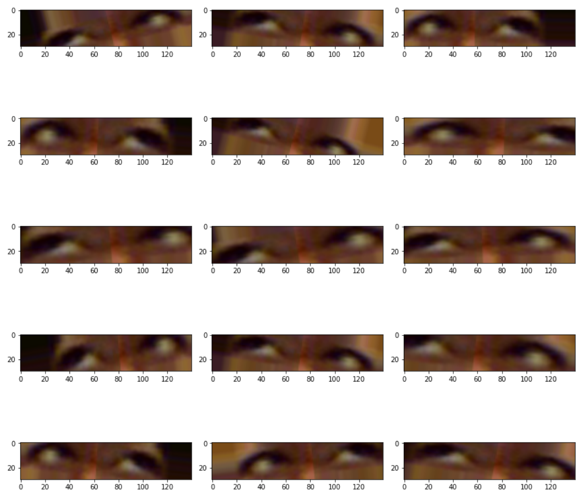
```
validation_datagen = ImageDataGenerator(rescale=1./255)
validation_generator = validation_datagen.flow_from_dataframe(
    validate_df,
    "/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/TrainingSet/",
    x_col='filename',
    y_col='category',
    target_size=IMAGE_SIZE,
    class_mode='categorical',
    batch_size=batch_size
)
```

```
Found 600 validated image filenames be
```

```
example_df = train_df.sample(n=1).reset_index(drop=True)
example_generator = train_datagen.flow_from_dataframe(
    example_df,
    "/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/TrainingSet/",
    x_col='filename',
    y_col='category',
    target_size=IMAGE_SIZE,
    class_mode='categorical'
)
```

```
Found 1 validated image filenames belo
```

```
plt.figure(figsize=(12, 12))
for i in range(0, 15):
    plt.subplot(5, 3, i+1)
    for X_batch, Y_batch in example_generator:
        image = X_batch[0]
        plt.imshow(image)
        break
plt.tight_layout()
plt.show()
```



```
epochs=3 if FAST_RUN else 50
history = model.fit_generator(
    train_generator,
    epochs=epochs,
    validation_data=validation_generator,
    validation_steps=total_validate//batch_size,
    steps_per_epoch=total_train//batch_size,
    callbacks=callbacks
)
```

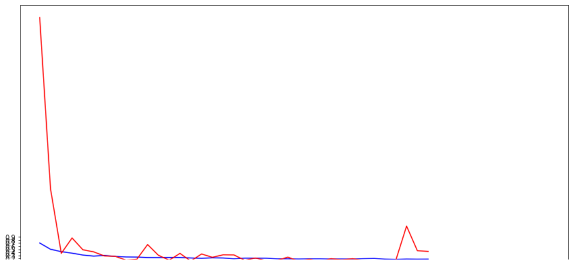
```
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 19/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 20/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
```

```
Epoch 21/50
159/159 [==========================

WARNING:tensorflow:Learning rate re
Epoch 22/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 23/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 24/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 25/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 26/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 27/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 28/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 29/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 30/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 31/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 32/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 33/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 34/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 35/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 36/50
159/159 [==========================
WARNING:tensorflow:Learning rate re
Epoch 37/50
159/159 [==========================
```

```
model.save_weights("model.h5")
```

```
fig, (ax1, ax2) = plt.subplots(2, 1, figsize=(12, 12))
```

```
    ax1.plot(history.history['loss'], color='b', label="Training loss")
    ax1.plot(history.history['val_loss'], color='r', label="validation loss")
    ax1.set_xticks(np.arange(1, epochs, 1))
    ax1.set_yticks(np.arange(0, 1, 0.1))

    ax2.plot(history.history['accuracy'], color='b', label="Training accuracy")
    ax2.plot(history.history['val_accuracy'], color='r',label="Validation accuracy")
    ax2.set_xticks(np.arange(1, epochs, 1))

    legend = plt.legend(loc='best', shadow=True)
    plt.tight_layout()
    plt.show()
```



```
test_filenames = os.listdir("/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/
test_df = pd.DataFrame({
    'filename': test_filenames
})
nb_samples = test_df.shape[0]
```

```
test_gen = ImageDataGenerator(rescale=1./255)
test_generator = test_gen.flow_from_dataframe(
    test_df,
    "/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/Test_imgs",
    x_col='filename',
    y_col=None,
    class_mode=None,
    target_size=IMAGE_SIZE,
    batch_size=batch_size,
    shuffle=False
)
```

```
     Found 998 validated image filenames.
```

```
predict = model.predict_generator(test_generator, steps=np.ceil(nb_samples/batch_
```

```
     /usr/local/lib/python3.7/dist-packages
       warnings.warn('`Model.predict_genera
```

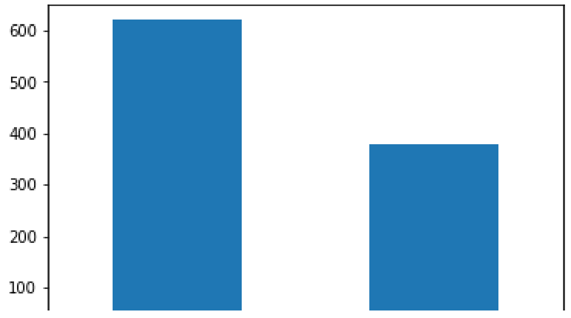
```
test_df['category'] = np.argmax(predict, axis=-1)
```

```
label_map = dict((v,k) for k,v in train_generator.class_indices.items())
test_df['category'] = test_df['category'].replace(label_map)
```

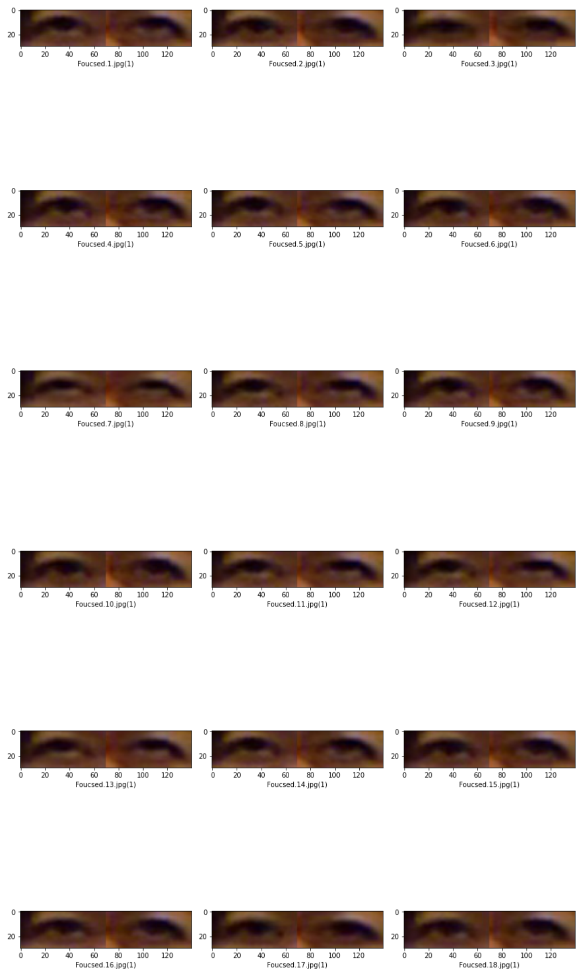
```
test_df['category'] = test_df['category'].replace({ 'Foucsed': 1, 'UnFoucsed': 0
```

```
test_df['category'].value_counts().plot.bar()
```

```
<matplotlib.axes._subplots.AxesSubplot
```



```
sample_test = test_df.head(18)
sample_test.head()
plt.figure(figsize=(12, 24))
for index, row in sample_test.iterrows():
    filename = row['filename']
    category = row['category']
    img = load_img("/content/drive/MyDrive/Colab_Notebooks/DataSet/Eyes/Test_imgs
    plt.subplot(6, 3, index+1)
    plt.imshow(img)
    plt.xlabel(filename + '(' + "{}".format(category) + ')' )
plt.tight_layout()
plt.show()
```



```
submission_df = test_df.copy()
submission_df['id'] = submission_df['filename'].str.split('.').str[0]
submission_df['label'] = submission_df['category']
submission_df.drop(['filename', 'category'], axis=1, inplace=True)
submission_df.to_csv('submission.csv', index=False)


# dlib face landmarks detection
detector = dlib.get_frontal_face_detector()
predictor = dlib.shape_predictor('/content/drive/MyDrive/Colab_Notebooks/shape_pr

class TooManyFaces(Exception):
    pass

class NoFaces(Exception):
    pass

# extract land marks
def get_landmarks(im):
    rects = detector(im, 1)

    if len(rects) > 1:
        #raise TooManyFaces
        return np.matrix([0,0])
    if len(rects) == 0:
        #raise NoFaces
        return np.matrix([0,0])

    return np.matrix([[p.x, p.y] for p in predictor(im, rects[0]).parts()])


class GetEyes():
    def __init__(self, img):
        self.img = img.copy()
        landmarks = self.get_landmarks(frame)
        self.left_eye_lms = landmarks[42:47]
        self.right_eye_lms = landmarks[36:41]
        self.left_eye_rect = self.get_rect(self.left_eye_lms)
        self.right_eye_rect = self.get_rect(self.right_eye_lms)

    @staticmethod
    def get_landmarks(im):
        # extract land marks representing the eyes
        rects = detector(im, 1)

        if len(rects) > 1:
          raise TooManyFaces
        if len(rects) == 0:
          raise NoFaces

        return np.matrix([[p.x, p.y] for p in predictor(im, rects[0]).parts()])

    @classmethod
    def get_rect(self, landmarks):
        # get rect from eye landmarks
        border = 5
        l_ul_x = min(landmarks[:,0])
        l_ul_y = min(landmarks[:,1])
        l_lr_x = max(landmarks[:,0])
        l_lr_y = max(landmarks[:,1])
        pt1 = (np.sum(l_ul_x)-border, np.sum(l_ul_y)-border)
        pt2 = (np.sum(l_lr_x)+border, np.sum(l_lr_y)+border)
        return [pt1, pt2]

    def draw(self):
        # draw rect
        eimg = self.img
        eimg = cv2.rectangle(img, self.right_eye_rect[0], self.right_eye_rect[1],
        eimg = cv2.rectangle(img, self.left_eye_rect[0], self.left_eye_rect[1], (
        plt.imshow(eimg)
        return eimg

    def crop_right_eye(self):
        # crop out right eye
        return self.img[self.right_eye_rect[0][1]:self.right_eye_rect[1][1], sel
    def crop_left_eye(self):
        # crop out left eye
        return self.img[self.left_eye_rect[0][1]:self.left_eye_rect[1][1], self.l
```

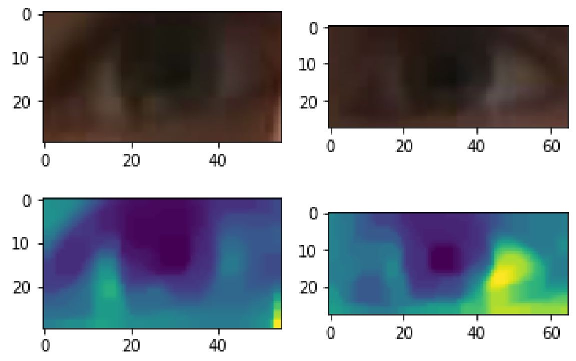
```
img = frame.copy()
eyes = GetEyes(img)
plt.imshow(eyes.draw())
```

```
    -------------------------------------
    -------------------------------------
    -
    NameError
    Traceback (most recent call last)
    <ipython-input-38-6a578f4d4ca8> in
    <module>()
    ----> 1 img = frame.copy()
          2 eyes = GetEyes(img)
          3 plt.imshow(eyes.draw())
```

```
def preprocess(img):
    # preprocess eye images
    if len(img.shape)==3:
        img = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)
    #img = cv2.GaussianBlur(img,(3, 3),0);
    img = cv2.medianBlur(img, 5)
    windowClose = np.ones((5,5),np.uint8)
    windowOpen = np.ones((3,3),np.uint8)
    windowErode = np.ones((3,3),np.uint8)
    img = cv2.morphologyEx(img, cv2.MORPH_CLOSE, windowClose)
    #img = cv2.morphologyEx(img, cv2.MORPH_ERODE, windowErode)
    img = cv2.morphologyEx(img, cv2.MORPH_OPEN, windowOpen)
    #plt.imshow(img)
    return img

def detect_pupil(img):
    output = img.copy()
    if len(img.shape)==3:
        # use red channel because of human comlexion
        img = preprocess(img[:,:,0])
    # detect circles in the image
    circles = cv2.HoughCircles(img, cv2.HOUGH_GRADIENT, 1, int(img.shape[1]/3),2

    # ensure at least some circles were found
    if circles is not None:
        # convert the (x, y) coordinates and radius of the circles to integers
        circles = np.round(circles[0, :]).astype("int")
        # loop over the (x, y) coordinates and radius of the circles
        for (x, y, r) in circles:
            # draw the circle in the output image, then draw a rectangle
            # corresponding to the center of the circle
            cv2.circle(output, (x, y), r, (255, 255, 255), 1)
            cv2.rectangle(output, (x - 2, y - 2), (x + 2, y + 2), (255, 0, 0), 1)
    return circles, output
```

```
eye_img_r = eyes.crop_right_eye()
eye_img_l = eyes.crop_left_eye()
proc_r = preprocess(eye_img_r)
proc_l = preprocess(eye_img_l)

# display right and left eye image
fig = plt.figure()
ax1 = fig.add_subplot(2,2,1)
ax1.imshow(eye_img_r)
ax2 = fig.add_subplot(2,2,2)
ax2.imshow(eye_img_l)
ax1 = fig.add_subplot(2,2,3)
ax1.imshow(proc_r)
ax2 = fig.add_subplot(2,2,4)
ax2.imshow(proc_l)
```

```
<matplotlib.image.AxesImage at 0x7f7f2
```



```
from google.colab import files
files.download('/content/drive/MyDrive/Colab_Notebooks/Graduation_Project.ipynb')
```

```
from google.colab import files
files.upload(<filename>)
```

```
  File "<ipython-input-39-
62d29a79a6a5>", line 2
    files.upload(<filename>)
                 ^
SyntaxError: invalid syntax
```

SEARCH STACK OVERFLOW

✓ 3s completed at 4:09 AM