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

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
import os
import cv2
import numpy as np
import tensorflow as tf
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense

left_dir = '/content/drive/MyDrive/CS543/project/left'
right_dir = '/content/drive/MyDrive/CS543/project/right'
not_active_dir = '/content/drive/MyDrive/CS543/project/not_active'


IMAGE_WIDTH, IMAGE_HEIGHT = 128, 128
BATCH_SIZE = 32


train_datagen = ImageDataGenerator(
    rescale=1.0/255,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    validation_split=0.2
)

train_generator = train_datagen.flow_from_directory(
    '/content/drive/MyDrive/CS543/project',
    target_size=(IMAGE_WIDTH, IMAGE_HEIGHT),
    batch_size=BATCH_SIZE,
    class_mode='categorical',
    subset='training'
)

validation_generator = train_datagen.flow_from_directory(
    '/content/drive/MyDrive/CS543/project',
    target_size=(IMAGE_WIDTH, IMAGE_HEIGHT),
    batch_size=BATCH_SIZE,
    class_mode='categorical',
    subset='validation'
)

model = Sequential()
model.add(Conv2D(32, (3, 3), input_shape=(IMAGE_WIDTH, IMAGE_HEIGHT, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Conv2D(64, (3, 3), activation='relu'))
model.add(MaxPooling2D(pool_size=(2, 2)))
model.add(Flatten())
model.add(Dense(64, activation='relu'))
model.add(Dense(3, activation='softmax'))

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


history = model.fit(
    train_generator,
    steps_per_epoch=train_generator.samples // BATCH_SIZE,
```

```
    validation_data=validation_generator,
    validation_steps=validation_generator.samples // BATCH_SIZE,
    epochs=4
)


model.save('/content/drive/MyDrive/CS543/project/image_classifier_new.h5')
```

```
Found 8985 images belonging to 3 classes.
Found 2245 images belonging to 3 classes.
Epoch 1/4
280/280 [==============================] - 239s 849ms/step - loss: 0.4208 - accuracy: 0.7985 - val_loss: 0.1834 - val_accuracy: 0.9496
Epoch 2/4
280/280 [==============================] - 169s 602ms/step - loss: 0.0388 - accuracy: 0.9894 - val_loss: 0.7792 - val_accuracy: 0.8589
Epoch 3/4
280/280 [==============================] - 168s 601ms/step - loss: 0.0255 - accuracy: 0.9924 - val_loss: 0.1654 - val_accuracy: 0.9500
Epoch 4/4
280/280 [==============================] - 167s 597ms/step - loss: 0.0183 - accuracy: 0.9950 - val_loss: 0.3638 - val_accuracy: 0.9277
/usr/local/lib/python3.10/dist-packages/keras/src/engine/training.py:3079: UserWarning: You are saving your model as an HDF5 file via `model.save()`. This file format is considered legacy. We
  saving_api.save_model(
```

```
tf.__version__
```