NAME:SATHYA.M REGISTER NUMBER:611419104072 **DEPARTMENT:IV-CSE ASSIGNMENT-3** import numpy as np import pandas as pd from PIL import ImageFile from tqdm import tqdm import h5py import cv2 import matplotlib.pyplot as plt %matplotlib inline import seaborn as sns from sklearn.model\_selection import train\_test\_split from sklearn.metrics import confusion\_matrix from sklearn.metrics import plot\_confusion\_matrix from tensorflow.keras.utils import to\_categorical from tensorflow.keras.preprocessing import image as keras\_image

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from tensorflow.keras.models import Sequential, load_model
from tensorflow.keras.layers import Dense
from tensorflow.keras.layers import Activation, Dropout
from tensorflow.keras.layers import Conv2D, MaxPooling2D, GlobalMaxPooling2D
from tensorflow.keras.callbacks import ReduceLROnPlateau, ModelCheckpoint
from tensorflow.keras.layers import LeakyReLU
def model():
  model = Sequential()
  model.add(Conv2D(128, (3, 3), input_shape=x_train.shape[1:]))
  model.add(LeakyReLU(alpha=0.02))
  model.add(MaxPooling2D(pool_size=(2, 2)))
  model.add(Dropout(0.25))
  model.add(Conv2D(128, (3, 3)))
  model.add(LeakyReLU(alpha=0.02))
  model.add(MaxPooling2D(pool_size=(2, 2)))
  model.add(Dropout(0.25))
  model.add(GlobalMaxPooling2D())
  model.add(Dense(512))
  model.add(LeakyReLU(alpha=0.02))
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model.add(Dropout(0.5))
  model.add(Dense(10))
  model.add(Activation('softmax'))
  model.compile(loss='categorical_crossentropy', optimizer='adam', metrics=['accuracy'])
  return model
model = model()
# To save the best model
checkpointer = ModelCheckpoint(filepath='weights.best.model.hdf5', verbose=2, save_best_only=True)
# To reduce learning rate dynamically
lr_reduction = ReduceLROnPlateau(monitor='val_loss', patience=5, verbose=2, factor=0.2)
# Train the model
history = model.fit(x_train, y_train, epochs=75, batch_size=32, verbose=2,
          validation_data=(x_valid, y_valid),
          callbacks=[checkpointer,
data_generator = keras_image.ImageDataGenerator(shear_range=0.3,
                         zoom_range=0.3,
                         rotation_range=30,
                         horizontal_flip=True)
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