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import tensorflow as tf
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.applications import InceptionV3
from tensorflow.keras import layers, models

# Define paths to your dataset
train_dir = 'dataset/train'
validation_dir = 'dataset/validation'

# Define image size and batch size
img_size = (299, 299)
batch_size = 32

# Create data generators with augmentation for training set
train_datagen = ImageDataGenerator(
    rescale=1./255,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True
)

train_generator = train_datagen.flow_from_directory(
    train_dir,
    target_size=img_size,
    batch_size=batch_size,
    class_mode='binary'
)

# Create data generator without augmentation for validation set
validation_datagen = ImageDataGenerator(rescale=1./255)

validation_generator = validation_datagen.flow_from_directory(
    validation_dir,
    target_size=img_size,
    batch_size=batch_size,
    class_mode='binary'
)

# Load InceptionV3 model without the top (fully connected) layers
base_model = InceptionV3(weights='imagenet', include_top=False, input_shape=(299, 299, 3))

# Freeze the convolutional layers
for layer in base_model.layers:
    layer.trainable = False

# Build a custom model on top of the InceptionV3 base
model = models.Sequential()
model.add(base_model)
model.add(layers.GlobalAveragePooling2D())
model.add(layers.Dense(128, activation='relu'))
model.add(layers.Dropout(0.5))
model.add(layers.Dense(1, activation='sigmoid'))

# Compile the model
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])

# Train the model
history = model.fit(
    train_generator,
    steps_per_epoch=train_generator.samples // batch_size,
    epochs=10,
    validation_data=validation_generator,
    validation_steps=validation_generator.samples // batch_size
)

# Save the trained model
model.save('nude_safe_classifier.h5')

```

 Found 19999 images belonging to 2 classes.  
 Found 4000 images belonging to 2 classes.  
 Epoch 1/10  
 39/624 [>.....] - ETA: 3:29 - loss: 0.4198 - accuracy: 0.8077/usr/lib/python3/dist-packages/PIL.  
 warnings.warn(  
 624/624 [=====] - 268s 426ms/step - loss: 0.2704 - accuracy: 0.8915 - val\_loss: 0.2040 - val\_ac  
 Epoch 2/10  
 624/624 [=====] - 254s 407ms/step - loss: 0.2205 - accuracy: 0.9140 - val\_loss: 0.1901 - val\_ac  
 Epoch 3/10  
 624/624 [=====] - 252s 404ms/step - loss: 0.2137 - accuracy: 0.9166 - val\_loss: 0.1873 - val\_ac  
 Epoch 4/10  
 624/624 [=====] - 253s 405ms/step - loss: 0.2062 - accuracy: 0.9206 - val\_loss: 0.1867 - val\_ac  
 Epoch 5/10  
 624/624 [=====] - 252s 404ms/step - loss: 0.1967 - accuracy: 0.9219 - val\_loss: 0.2019 - val\_ac

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Epoch 6/10
624/624 [=====] - 254s 407ms/step - loss: 0.1952 - accuracy: 0.9216 - val_loss: 0.1792 - val_acc
Epoch 7/10
624/624 [=====] - 253s 405ms/step - loss: 0.1890 - accuracy: 0.9278 - val_loss: 0.1774 - val_acc
Epoch 8/10
624/624 [=====] - 253s 406ms/step - loss: 0.1824 - accuracy: 0.9293 - val_loss: 0.1765 - val_acc
Epoch 9/10
624/624 [=====] - 253s 406ms/step - loss: 0.1836 - accuracy: 0.9289 - val_loss: 0.1769 - val_acc
Epoch 10/10
624/624 [=====] - 253s 406ms/step - loss: 0.1777 - accuracy: 0.9292 - val_loss: 0.1795 - val_acc
/home/tinkerspace/.local/lib/python3.10/site-packages/keras/src/engine/training.py:3103: UserWarning: You are saving you
    saving_api.save_model(

lls

dataset dataset.zip model.ipynb new-model.ipynb nude_safe_classifier.h5

!unzip '/content/drive/MyDrive/mini project/reduced_dataset.zip'

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

Mounted at /content/drive

from tensorflow.keras.models import load_model

model = load_model('/content/drive/MyDrive/mini project/nude_safe_classifier.h5')

from tensorflow.keras.preprocessing.image import ImageDataGenerator
test_dir = 'dataset/test'
img_size = (299, 299)
test_datagen = ImageDataGenerator(rescale=1./255)

test_generator = test_datagen.flow_from_directory(
    test_dir,
    target_size=img_size,
    batch_size=1, # Set batch_size to 1 to process images one by one
    class_mode='binary',
    shuffle=False # Ensure images are processed in order
)

Found 4000 images belonging to 2 classes.

# Evaluate the model on the test set
results = model.evaluate(test_generator)

# Print the evaluation results
print("Test Loss:", results[0])
print("Test Accuracy:", results[1])

4000/4000 [=====] - 73s 16ms/step - loss: 0.1744 - accuracy: 0.9345
Test Loss: 0.17443981766700745
Test Accuracy: 0.934499979019165

import numpy as np

# Reset the test generator to start from the beginning
test_generator.reset()

# Get predictions for each image in the test set
predictions = model.predict(test_generator)

# Convert predictions to binary labels (0 or 1)
binary_predictions = np.round(predictions)

# Print the predictions for each image
for i in range(len(test_generator_filenames)):
    filename = test_generator_filenames[i]
    true_label = test_generator.classes[i]
    predicted_label = int(binary_predictions[i])

    print(f"Filename: {filename}, True Label: {true_label}, Predicted Label: {predicted_label}")

4000/4000 [=====] - 54s 14ms/step
Filename: nude/prefix_GantMan_0006B35A-6AC5-4EB0-87F4-16D2F2FE37CC.jpg.jpeg, True Label: 0, Predicted Label: 0

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Filename: nude/prefix_GantMan_003DB635-B080-46A9-A457-2EF7D4EF213B.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_009266FC-4B45-4396-9207-B9D1991ED3E6.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_00AB0587-5110-44C1-9A1D-229487595140.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_00E8D797-C189-49F8-9D92-4B2EED4E59E2.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_013A2343-A459-4B2A-8FBE-382D41E2EEE0.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_02189FA7-D82D-4DF7-B664-9DB7D066127E.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_046FF6B3-2EB8-4BF7-A360-07C30A57A9B0.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_04B6E037-48E5-4310-8CA0-A23FF733AB7.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_04ED595B-7804-45E0-B034-774402C83C31.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0568BFE9-9734-46F2-B185-371A82938ED8.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_05D9B03D-1FC7-4FD1-90CC-85EDAA02F525.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0673D142-4DDC-4E9A-A6C1-9997903E52A3.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_0706BCEF-A441-4401-BA8F-65A22010BAE6.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0798C25C-33C0-451D-AE6C-3636412B9389.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_08E33EDF-14A0-4FB0-9D0F-E8BF7A7AC5CB.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_093DA111-EE3A-4858-99E2-3B21160EA2A1.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_09670714-A367-4E37-8AEF-41BD90583B19.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_09DAB44C-C585-4AE7-B6E8-F81CEF417D99.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0AB464A1-095F-49FE-AB47-7B7A8E47ED298.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0BC6E63F-0C3F-4326-B8C5-2DB6BF690457.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_0BF9C6CA-2320-4C78-B246-3BBF05DFE9B6.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0C868755-049B-4BD1-AE0C-0FCF05D34986.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0D6EE4E5-8A24-41EA-97C8-8F88598827F4.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0E21B939-1D45-4C50-A730-2763F30BEC14.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_0E62C036-E6A5-4A3F-BF96-01B02EDD16C9.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1014043A-1A89-4754-AADE-9BC8F4A2DF38.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_1024428F-ADC0-4270-8414-46B7B7E0B513.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1045494D-3D49-4AD1-80A9-7BD0AD2FDF87.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_105CE369-8EDA-4226-9A77-4874B3513BC9.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_10943C15-A44B-48BC-83BE-C75C5931923E.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_10ACA85F-358C-4F1F-A60E-207018C66A40.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_10CFE22C-D7E9-4402-AC02-DFE54F4ED190.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_10DF3787-50AD-4C72-9027-5C908BC51A56.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_10EE16F9-A9BE-4490-ADC5-FFBBCE549AB8.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1145D16F-9883-4B16-914A-10BE8DB0D48C.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1157C150-D006-4EA5-AB2A-1CD9E8A2C487.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_118E5B79-159D-4F77-8A4D-84E5883FEACA.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_144DCC56-AFE5-4EE9-AC37-0BF6D6C25F5F5.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1458362F-3924-4F96-9873-EF389E280157.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1477099F-0116-44AB-A97E-1D1CFBD5C6E0.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_149960B9-78AC-4FBD-AE74-D05BB4A0EF73.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_14D44868-36E6-4706-9C41-2AE50B4311BC.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_151F2FC9-CAB7-4142-BBF6-56ADAB57196B.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_15BE3405-9475-4BB9-9739-11D24AEDF702.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_169BD6D1-8A62-458D-976F-E70BD6F0691E.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_16A20C61-4108-4BDD-B213-2C3F59973B1E.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_16C09BC0-E9D8-47F8-AB0F-73B144C82E44.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_174DA873-A286-4BCB-9620-75D9308EFD01.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_178A04D3-369F-42E5-BB4D-81DD53E321C8.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_188612D2-E1C6-4D23-B82C-D34E7F5D7311.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_196EC4D2-2F74-427D-A071-BFA5F764ACED.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_19B2B925-A489-4317-A6E7-056CFB875011.jpg.jpeg, True Label: 0, Predicted Label: 1
Filename: nude/prefix_GantMan_1AFA277A-E8C9-42D7-A5A9-4750755428EC.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1B72EA02-627B-4F52-AEEB-1467739A6A6B.jpg.jpeg, True Label: 0, Predicted Label: 0
Filename: nude/prefix_GantMan_1BCC9B23-16A9-46DD-B1A0-F7281EA73072.jpg.jpeg, True Label: 0, Predicted Label: 0

```

```

import numpy as np

# Reset the test generator to start from the beginning
test_generator.reset()

# Get predictions for each image in the test set
predictions = model.predict(test_generator)

# Convert predictions to binary labels (0 or 1)
binary_predictions = np.round(predictions)

# Get true labels from the test generator
true_labels = test_generator.classes

# Calculate accuracy
accuracy = np.mean(binary_predictions == true_labels)

# Print the overall accuracy
print("Test Accuracy:", accuracy)

4000/4000 [=====] - 54s 14ms/step
Test Accuracy: 0.5

```

