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# =====
# 1. IMPORT LIBRARIES
# =====
import os
import zipfile
import shutil
import numpy as np
import tensorflow as tf
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras import layers, models
from google.colab import files
from PIL import Image
from sklearn.metrics import classification_report, confusion_matrix
import matplotlib.pyplot as plt
import seaborn as sns

# =====
# 2. UPLOAD DATASET
# =====
print("[INFO] Please upload your raw dataset ZIP file (with folders: Glasses, Earrings, Watch)...")
uploaded = files.upload()

# Get uploaded filename
for fname in uploaded.keys():
    dataset_zip_path = fname

# =====
# 3. EXTRACT DATASET
# =====
raw_dir = "dataset_raw"
if os.path.exists(raw_dir):
    shutil.rmtree(raw_dir)
os.makedirs(raw_dir, exist_ok=True)

with zipfile.ZipFile(dataset_zip_path, 'r') as zip_ref:
    zip_ref.extractall(raw_dir)

print(f"[INFO] Dataset extracted to '{raw_dir}'")

# Handle nested folders (if zip contains extra root folder)
subfolders = [os.path.join(raw_dir, d) for d in os.listdir(raw_dir) if os.path.isdir(os.path.join(raw_dir, d))]
if len(subfolders) == 1:
    raw_dir = subfolders[0]
    print(f"[INFO] Nested folder detected. Using: {raw_dir}")

# =====
# 4. CLEAN FILE NAMES & FILE EXTENSIONS
# =====
valid_ext = ('.jpg', '.jpeg', '.png', '.bmp', '.tiff')
for root, dirs, files_list in os.walk(raw_dir):
    for file in files_list:
        old_path = os.path.join(root, file)
        name, ext = os.path.splitext(file)
        if ext.lower() not in valid_ext:
            os.remove(old_path) # remove non-image files
            continue
        new_name = name.replace(" ", "_").lower() + ext.lower()
        os.rename(old_path, os.path.join(root, new_name))

print("[INFO] Filenames cleaned and extensions normalized.")

# =====
# 5. TRAIN / VALIDATION SPLIT
# =====
train_dir = "dataset_train"
val_dir = "dataset_val"

if os.path.exists(train_dir):
    shutil.rmtree(train_dir)
if os.path.exists(val_dir):
    shutil.rmtree(val_dir)

os.makedirs(train_dir, exist_ok=True)
os.makedirs(val_dir, exist_ok=True)

split_ratio = 0.8 # 80% train, 20% validation

for cls in os.listdir(raw_dir):
    cls_path = os.path.join(raw_dir, cls)
    if not os.path.isdir(cls_path):
        continue

    imgs = os.listdir(cls_path)
    np.random.shuffle(imgs)

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split_point = int(len(imgs) * split_ratio)
train_imgs = imgs[:split_point]
val_imgs = imgs[split_point:]

os.makedirs(os.path.join(train_dir, cls), exist_ok=True)
os.makedirs(os.path.join(val_dir, cls), exist_ok=True)

for img in train_imgs:
    shutil.copy(os.path.join(cls_path, img), os.path.join(train_dir, cls, img))
for img in val_imgs:
    shutil.copy(os.path.join(cls_path, img), os.path.join(val_dir, cls, img))

print(f"[INFO] {cls.upper()}: {len(train_imgs)} train, {len(val_imgs)} val")

# =====
# 6. SAVE AUGMENTED DATASET TO DISK
# =====
aug_train_dir = "dataset_augmented_train"
if os.path.exists(aug_train_dir):
    shutil.rmtree(aug_train_dir)
shutil.copytree(train_dir, aug_train_dir)

datagen_aug = ImageDataGenerator(
    rotation_range=20,
    width_shift_range=0.1,
    height_shift_range=0.1,
    shear_range=0.1,
    zoom_range=0.2,
    horizontal_flip=True,
    fill_mode='nearest'
)

print("[INFO] Generating augmented images...")
for cls in os.listdir(train_dir):
    cls_path = os.path.join(train_dir, cls)
    save_dir_cls = os.path.join(aug_train_dir, cls)

    imgs = os.listdir(cls_path)
    for img in imgs:
        img_path = os.path.join(cls_path, img)
        image = Image.open(img_path).resize((128, 128))
        x = np.array(image)
        x = np.expand_dims(x, axis=0)

        # generate 3 augmented copies per image
        aug_iter = datagen_aug.flow(
            x, batch_size=1, save_to_dir=save_dir_cls,
            save_prefix="aug", save_format="jpeg"
        )
        for _ in range(3):
            next(aug_iter)

print("[INFO] Augmentation completed & saved on disk.")

# =====
# 7. LOAD DATA GENERATORS (Normalized)
# =====
train_datagen = ImageDataGenerator(rescale=1.0/255)
val_datagen = ImageDataGenerator(rescale=1.0/255)

train_gen = train_datagen.flow_from_directory(
    aug_train_dir, target_size=(128, 128), batch_size=16, class_mode='categorical', shuffle=True
)
val_gen = val_datagen.flow_from_directory(
    val_dir, target_size=(128, 128), batch_size=16, class_mode='categorical', shuffle=False
)

# =====
# 8. BUILD CNN MODEL
# =====
model = models.Sequential([
    layers.Conv2D(32, (3,3), activation='relu', input_shape=(128, 128, 3)),
    layers.MaxPooling2D((2,2)),

    layers.Conv2D(64, (3,3), activation='elu'),
    layers.MaxPooling2D((2,2)),

    layers.Conv2D(128, (3,3), activation='relu'),
    layers.MaxPooling2D((2,2)),

    layers.Flatten(),
    layers.Dense(128, activation='elu'),

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        layers.Dropout(0.5),
        layers.Dense(train_gen.num_classes, activation='softmax')
    ])

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

# =====
# 9. TRAIN MODEL
# =====
history = model.fit(
    train_gen,
    validation_data=val_gen,
    epochs=25,
    verbose=1
)

# =====
# 10. EVALUATION - CONFUSION MATRIX & REPORT
# =====
print("\n[INFO] Evaluating model on validation set...")
val_gen.reset()
preds = model.predict(val_gen)
y_pred = np.argmax(preds, axis=1)
y_true = val_gen.classes
class_labels = list(val_gen.class_indices.keys())

# Confusion Matrix
cm = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(6,5))
sns.heatmap(cm, annot=True, fmt="d", cmap="Blues", xticklabels=class_labels, yticklabels=class_labels)
plt.xlabel("Predicted")
plt.ylabel("True")
plt.title("Confusion Matrix")
plt.show()


# Classification Report
print("\nClassification Report:")
print(classification_report(y_true, y_pred, target_names=class_labels))

# =====
# 11. SAVE MODEL
# =====
model.save("cnn_model.keras")
print("[INFO] Model saved as cnn_model.keras")

# =====
# 12. ZIP & DOWNLOAD AUGMENTED DATASET
# =====
!zip -r dataset_augmented_train.zip dataset_augmented_train
files.download("dataset_augmented_train.zip")

# =====
# 13. FINAL STATS
# =====
print("\n[SUMMARY]")
print(f"Classes found: {train_gen.class_indices}")
print(f"Total training samples (augmented): {train_gen.samples}")
print(f"Total validation samples: {val_gen.samples}")

```

 [INFO] Please upload your raw dataset ZIP file (with folders: Glasses, Earrings, Watch)...
 Choose Files RAW IMAG...ATASET.zip
 • **RAW IMAGE DATASET.zip**(application/x-zip-compressed) - 8481954 bytes, last modified: 8/20/2025 - 100% done
 Saving RAW IMAGE DATASET.zip to RAW IMAGE DATASET.zip
 [INFO] Dataset extracted to 'dataset_raw'
 [INFO] Nested folder detected. Using: dataset_raw/RAW IMAGE DATASET
 [INFO] Filenames cleaned and extensions normalized.
 [INFO] EARRINGS: 28 train, 7 val
 [INFO] GLASSES: 28 train, 7 val
 [INFO] WATCH: 28 train, 7 val
 [INFO] Generating augmented images...
 [INFO] Augmentation completed & saved on disk.
 Found 336 images belonging to 3 classes.
 Found 21 images belonging to 3 classes.
 /usr/local/lib/python3.12/dist-packages/keras/src/layers/convolutional/base_conv.py:113: UserWarning: Do not pass an `input_shape`/
 super().__init__(activity_regularizer=activity_regularizer, **kwargs)
 Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 126, 126, 32)	896
max_pooling2d (MaxPooling2D)	(None, 63, 63, 32)	0
conv2d_1 (Conv2D)	(None, 61, 61, 64)	18,496
max_pooling2d_1 (MaxPooling2D)	(None, 30, 30, 64)	0
conv2d_2 (Conv2D)	(None, 28, 28, 128)	73,856
max_pooling2d_2 (MaxPooling2D)	(None, 14, 14, 128)	0
flatten (Flatten)	(None, 25088)	0
dense (Dense)	(None, 128)	3,211,392
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 3)	387


Total params: 3,305,027 (12.61 MB)

Trainable params: 3,305,027 (12.61 MB)


Non-trainable params: 0 (0.00 B)

/usr/local/lib/python3.12/dist-packages/keras/src/trainers/data_adapters/py_dataset_adapter.py:121: UserWarning: Your `PyDataset` c
 self._warn_if_super_not_called()


Epoch 1/25

21/21  17s 690ms/step - accuracy: 0.4150 - loss: 1.3872 - val_accuracy: 0.7143 - val_loss: 0.8173


Epoch 2/25

21/21  12s 564ms/step - accuracy: 0.6179 - loss: 0.8277 - val_accuracy: 0.6190 - val_loss: 0.6520


Epoch 3/25

21/21  12s 563ms/step - accuracy: 0.7079 - loss: 0.6761 - val_accuracy: 0.7143 - val_loss: 0.9181


Epoch 4/25

21/21  12s 542ms/step - accuracy: 0.7287 - loss: 0.5763 - val_accuracy: 0.8095 - val_loss: 0.7307

Epoch 5/25

21/21  11s 520ms/step - accuracy: 0.8763 - loss: 0.3634 - val_accuracy: 0.7619 - val_loss: 0.6590

Epoch 6/25

21/21  12s 555ms/step - accuracy: 0.9055 - loss: 0.2876 - val_accuracy: 0.7619 - val_loss: 0.8136


Epoch 7/25

21/21  12s 557ms/step - accuracy: 0.9408 - loss: 0.2062 - val_accuracy: 0.7143 - val_loss: 0.8089


Epoch 8/25

21/21  12s 568ms/step - accuracy: 0.9545 - loss: 0.1242 - val_accuracy: 0.7143 - val_loss: 0.6522


Epoch 9/25

21/21  12s 559ms/step - accuracy: 0.9570 - loss: 0.1326 - val_accuracy: 0.7619 - val_loss: 0.9348


Epoch 10/25

21/21  12s 559ms/step - accuracy: 0.9740 - loss: 0.0712 - val_accuracy: 0.7619 - val_loss: 0.7940


Epoch 11/25

21/21  12s 560ms/step - accuracy: 0.9875 - loss: 0.0451 - val_accuracy: 0.8571 - val_loss: 0.8924


Epoch 12/25

21/21  12s 560ms/step - accuracy: 0.9834 - loss: 0.0595 - val_accuracy: 0.8095 - val_loss: 0.7155

Epoch 13/25

21/21  21s 562ms/step - accuracy: 0.9874 - loss: 0.0499 - val_accuracy: 0.7143 - val_loss: 1.3927


Epoch 14/25

21/21  12s 558ms/step - accuracy: 0.9928 - loss: 0.0503 - val_accuracy: 0.7143 - val_loss: 1.3524


Epoch 15/25

21/21  12s 564ms/step - accuracy: 0.9969 - loss: 0.0218 - val_accuracy: 0.7143 - val_loss: 1.5206


Epoch 16/25

21/21  12s 565ms/step - accuracy: 0.9885 - loss: 0.0223 - val_accuracy: 0.6667 - val_loss: 1.3658


Epoch 17/25

21/21  21s 583ms/step - accuracy: 1.0000 - loss: 0.0095 - val_accuracy: 0.8095 - val_loss: 0.9833


Epoch 18/25

21/21  12s 572ms/step - accuracy: 1.0000 - loss: 0.0073 - val_accuracy: 0.8571 - val_loss: 1.1120


Epoch 19/25

21/21  11s 543ms/step - accuracy: 1.0000 - loss: 0.0022 - val_accuracy: 0.8571 - val_loss: 1.1840


Epoch 20/25

21/21  11s 523ms/step - accuracy: 1.0000 - loss: 0.0033 - val_accuracy: 0.8095 - val_loss: 1.1405


Epoch 21/25

21/21  12s 545ms/step - accuracy: 1.0000 - loss: 0.0045 - val_accuracy: 0.8571 - val_loss: 1.1366

Epoch 22/25

21/21  12s 564ms/step - accuracy: 1.0000 - loss: 0.0029 - val_accuracy: 0.8095 - val_loss: 1.3881

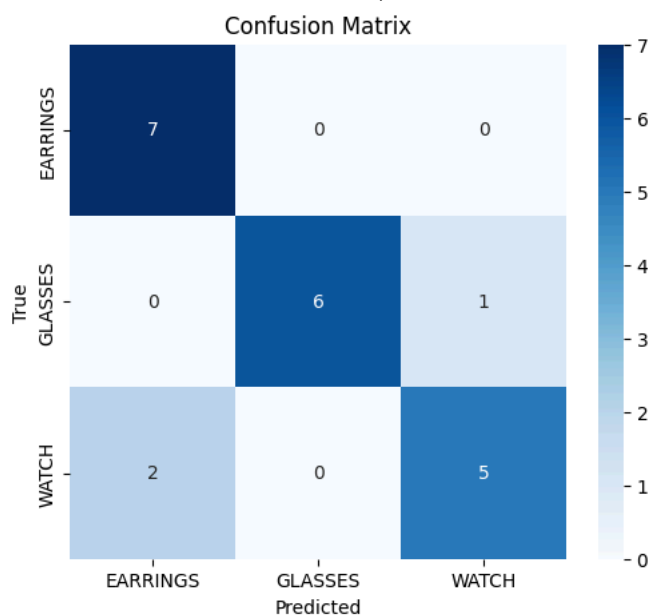
Epoch 23/25

21/21  12s 554ms/step - accuracy: 1.0000 - loss: 0.0017 - val_accuracy: 0.8571 - val_loss: 1.1016

24/21 12s 554ms/step - accuracy: 1.0000 - loss: 0.0017 - val_accuracy: 0.8571 - val_loss: 1.1910
 Epoch 24/25
 21/21 12s 564ms/step - accuracy: 1.0000 - loss: 0.0023 - val_accuracy: 0.8571 - val_loss: 1.1823
 Epoch 25/25
 21/21 12s 567ms/step - accuracy: 1.0000 - loss: 5.6554e-04 - val_accuracy: 0.8571 - val_loss: 1.2800

[INFO] Evaluating model on validation set...

2/2 1s 136ms/step



Classification Report:

	precision	recall	f1-score	support
EARRINGS	0.78	1.00	0.88	7
GLASSES	1.00	0.86	0.92	7
WATCH	0.83	0.71	0.77	7
accuracy			0.86	21
macro avg	0.87	0.86	0.86	21
weighted avg	0.87	0.86	0.86	21

[INFO] Model saved as cnn_model.keras

adding: dataset_augmented_train/ (stored 0%)
 adding: dataset_augmented_train/EARRINGS/ (stored 0%)
 adding: dataset_augmented_train/EARRINGS/aug_0_6301.jpeg (deflated 8%)
 adding: dataset_augmented_train/EARRINGS/aug_0_3295.jpeg (deflated 10%)
 adding: dataset_augmented_train/EARRINGS/aug_0_2937.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_8730.jpeg (deflated 13%)
 adding: dataset_augmented_train/EARRINGS/aug_0_7938.jpeg (deflated 10%)
 adding: dataset_augmented_train/EARRINGS/earrings34.jpeg (deflated 9%)
 adding: dataset_augmented_train/EARRINGS/aug_0_4755.jpeg (deflated 9%)
 adding: dataset_augmented_train/EARRINGS/aug_0_119.jpeg (deflated 13%)
 adding: dataset_augmented_train/EARRINGS/aug_0_3315.jpeg (deflated 9%)
 adding: dataset_augmented_train/EARRINGS/aug_0_8377.jpeg (deflated 8%)
 adding: dataset_augmented_train/EARRINGS/aug_0_9703.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/earrings6.jpeg (deflated 2%)
 adding: dataset_augmented_train/EARRINGS/aug_0_1065.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/aug_0_5148.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_1444.jpeg (deflated 12%)
 adding: dataset_augmented_train/EARRINGS/aug_0_4327.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/earrings32.jpeg (deflated 2%)
 adding: dataset_augmented_train/EARRINGS/aug_0_9647.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_6934.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/aug_0_8825.jpeg (deflated 12%)
 adding: dataset_augmented_train/EARRINGS/aug_0_4002.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_1077.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_387.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_2119.jpeg (deflated 8%)
 adding: dataset_augmented_train/EARRINGS/aug_0_2775.jpeg (deflated 4%)
 adding: dataset_augmented_train/EARRINGS/aug_0_1932.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_9335.jpeg (deflated 8%)
 adding: dataset_augmented_train/EARRINGS/aug_0_8798.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_2376.jpeg (deflated 8%)
 adding: dataset_augmented_train/EARRINGS/aug_0_4635.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/aug_0_9203.jpeg (deflated 10%)
 adding: dataset_augmented_train/EARRINGS/aug_0_186.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/earrings11.jpeg (deflated 5%)
 adding: dataset_augmented_train/EARRINGS/earrings2.jpeg (deflated 5%)
 adding: dataset_augmented_train/EARRINGS/aug_0_7150.jpeg (deflated 5%)
 adding: dataset_augmented_train/EARRINGS/earrings35.jpeg (deflated 5%)
 adding: dataset_augmented_train/EARRINGS/aug_0_4334.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/earrings12.jpeg (deflated 6%)
 adding: dataset_augmented_train/EARRINGS/aug_0_5623.jpeg (deflated 7%)
 adding: dataset_augmented_train/EARRINGS/aug_0_1013.jpeg (deflated 6%)
 adding: dataset augmented train/EARRINGS/aug_0_1288.jpeg (deflated 7%)

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adding: dataset_augmented_train/EARRINGS/aug_0_6990.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/aug_0_1743.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_1914.jpeg (deflated 12%)
adding: dataset_augmented_train/EARRINGS/aug_0_7176.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_4008.jpeg (deflated 4%)
adding: dataset_augmented_train/EARRINGS/aug_0_1247.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_255.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_8008.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/earrings19.jpeg (deflated 4%)
adding: dataset_augmented_train/EARRINGS/earrings15.jpeg (deflated 4%)
adding: dataset_augmented_train/EARRINGS/aug_0_1229.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_1785.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_2365.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_9273.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_180.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/aug_0_840.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/aug_0_3617.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_8215.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_795.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_9612.jpeg (deflated 11%)
adding: dataset_augmented_train/EARRINGS/earrings21.jpeg (deflated 0%)
adding: dataset_augmented_train/EARRINGS/earrings13.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_7612.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_713.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/earrings31.jpeg (deflated 3%)
adding: dataset_augmented_train/EARRINGS/aug_0_6312.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/aug_0_399.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_747.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/earrings30.jpeg (deflated 1%)
adding: dataset_augmented_train/EARRINGS/aug_0_9502.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/earrings22.jpeg (deflated 0%)
adding: dataset_augmented_train/EARRINGS/aug_0_4463.jpeg (deflated 12%)
adding: dataset_augmented_train/EARRINGS/aug_0_4810.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/aug_0_9211.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_8578.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/aug_0_3165.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_5193.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/aug_0_9326.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_307.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/aug_0_1927.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_2168.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_3132.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/earrings29.jpeg (deflated 2%)
adding: dataset_augmented_train/EARRINGS/aug_0_8145.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_7584.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/earrings33.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/earrings17.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/earrings4.jpeg (deflated 2%)
adding: dataset_augmented_train/EARRINGS/aug_0_185.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_6513.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/earrings16.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_9735.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/aug_0_1120.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/aug_0_2616.jpeg (deflated 8%)
adding: dataset_augmented_train/EARRINGS/earrings26.jpeg (deflated 3%)
adding: dataset_augmented_train/EARRINGS/aug_0_7629.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_7007.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/earrings9.jpeg (deflated 4%)
adding: dataset_augmented_train/EARRINGS/earrings1.jpeg (deflated 5%)
adding: dataset_augmented_train/EARRINGS/aug_0_8505.jpeg (deflated 9%)
adding: dataset_augmented_train/EARRINGS/aug_0_1595.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/aug_0_1616.jpeg (deflated 12%)
adding: dataset_augmented_train/EARRINGS/aug_0_6971.jpeg (deflated 7%)
adding: dataset_augmented_train/EARRINGS/earrings23.jpeg (deflated 3%)
adding: dataset_augmented_train/EARRINGS/earrings10.jpeg (deflated 2%)
adding: dataset_augmented_train/EARRINGS/earrings3.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/earrings27.jpeg (deflated 2%)
adding: dataset_augmented_train/EARRINGS/earrings18.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/aug_0_4304.jpeg (deflated 10%)
adding: dataset_augmented_train/EARRINGS/aug_0_447.jpeg (deflated 6%)
adding: dataset_augmented_train/EARRINGS/earrings20.jpeg (deflated 0%)
adding: dataset_augmented_train/GLASSES/ (stored 0%)
adding: dataset_augmented_train/GLASSES/aug_0_6301.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_1381.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_4259.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_1068.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/specs15.jpeg (deflated 23%)
adding: dataset_augmented_train/GLASSES/aug_0_8593.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_9435.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_140.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_1949.jpeg (deflated 10%)
adding: dataset_augmented_train/GLASSES/aug_0_9014.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs6.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/specs10.jpeg (deflated 3%)
adding: dataset_augmented_train/GLASSES/aug_0_6429.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_9059.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_4471.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_7668.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_8411.jpeg (deflated 12%)
adding: dataset_augmented_train/GLASSES/aug_0_1810.jpeg (deflated 6%)
```

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adding: dataset_augmented_train/GLASSES/aug_0_3860.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_8150.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_5499.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/specs1.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_8180.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_714.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_4448.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_2688.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_3040.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_6001.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_1979.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_991.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_883.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs21.jpeg (deflated 1%)
adding: dataset_augmented_train/GLASSES/specs35.jpeg (deflated 3%)
adding: dataset_augmented_train/GLASSES/aug_0_4102.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_1187.jpeg (deflated 10%)
adding: dataset_augmented_train/GLASSES/aug_0_8512.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/specs3.jpeg (deflated 3%)
adding: dataset_augmented_train/GLASSES/aug_0_562.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/specs19.jpeg (deflated 1%)
adding: dataset_augmented_train/GLASSES/aug_0_6952.jpeg (deflated 13%)
adding: dataset_augmented_train/GLASSES/aug_0_2121.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_5666.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_1072.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_4574.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_1273.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_163.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_7777.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_2877.jpeg (deflated 11%)
adding: dataset_augmented_train/GLASSES/aug_0_4545.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs12.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_2850.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs17.jpeg (deflated 32%)
adding: dataset_augmented_train/GLASSES/aug_0_2340.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_6304.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_7898.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_4044.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_7208.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/specs2.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_2538.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs30.jpeg (deflated 9%)
adding: dataset_augmented_train/GLASSES/specs33.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_537.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_3043.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/specs34.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_7536.jpeg (deflated 12%)
adding: dataset_augmented_train/GLASSES/aug_0_1941.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_3958.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_2154.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_7008.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_6200.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/specs14.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_8005.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs25.jpeg (deflated 1%)
adding: dataset_augmented_train/GLASSES/aug_0_4505.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_9793.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs7.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_2162.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs22.jpeg (deflated 4%)
adding: dataset_augmented_train/GLASSES/aug_0_6788.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/specs13.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_235.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_7028.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_532.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_3960.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_4235.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/specs29.jpeg (deflated 9%)
adding: dataset_augmented_train/GLASSES/specs27.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_8328.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_5846.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs18.jpeg (deflated 2%)
adding: dataset_augmented_train/GLASSES/aug_0_6533.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_5129.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_9445.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs23.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_4780.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_8158.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs26.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_6919.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs8.jpeg (deflated 3%)
adding: dataset_augmented_train/GLASSES/aug_0_6261.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_7698.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_3200.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_2078.jpeg (deflated 7%)
adding: dataset_augmented_train/GLASSES/aug_0_8326.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/aug_0_9510.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/aug_0_8960.jpeg (deflated 8%)
adding: dataset_augmented_train/GLASSES/aug_0_1085.jpeg (deflated 6%)
adding: dataset_augmented_train/GLASSES/specs31.jpeg (deflated 8%)
adding: dataset_augmented_train/GLASSES/specs11.jpeg (deflated 4%)
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adding: dataset_augmented_train/GLASSES/aug_0_9234.jpeg (deflated 5%)
adding: dataset_augmented_train/GLASSES/specs20.jpeg (deflated 0%)
adding: dataset_augmented_train/GLASSES/aug_0_3851.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/ (stored 0%)
adding: dataset_augmented_train/WATCH/aug_0_8501.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_9495.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/aug_0_1074.jpeg (deflated 14%)
adding: dataset_augmented_train/WATCH/aug_0_8538.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_2642.jpeg (deflated 17%)
adding: dataset_augmented_train/WATCH/aug_0_2006.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_6723.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_5879.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch31.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_7057.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_5806.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_3326.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_7117.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_6632.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_6097.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_5999.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch34.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_6118.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_1150.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_7789.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch6.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_8798.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch16.jpeg (deflated 2%)
adding: dataset_augmented_train/WATCH/aug_0_7198.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch15.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/watch7.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_5319.jpeg (deflated 17%)
adding: dataset_augmented_train/WATCH/aug_0_597.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_4269.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_313.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch3.jpeg (deflated 2%)
adding: dataset_augmented_train/WATCH/watch26.jpeg (deflated 4%)
adding: dataset_augmented_train/WATCH/aug_0_6207.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/watch33.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_7990.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_380.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_5938.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/watch11.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_8102.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_4835.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_2539.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_7561.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_7428.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/watch14.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/aug_0_5900.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_6194.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/watch13.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/watch28.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_8874.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_6643.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_2097.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3247.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch5.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/aug_0_6196.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch30.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_1844.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch25.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_526.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_543.jpeg (deflated 14%)
adding: dataset_augmented_train/WATCH/watch20.jpeg (deflated 2%)
adding: dataset_augmented_train/WATCH/aug_0_8776.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3846.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_2239.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch29.jpeg (deflated 4%)
adding: dataset_augmented_train/WATCH/watch18.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/aug_0_4693.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_6705.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3625.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_4604.jpeg (deflated 15%)
adding: dataset_augmented_train/WATCH/aug_0_9706.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_5346.jpeg (deflated 10%)
adding: dataset_augmented_train/WATCH/aug_0_6420.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_8184.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch9.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_5212.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/watch22.jpeg (deflated 18%)
adding: dataset_augmented_train/WATCH/aug_0_2828.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_21.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3383.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_3865.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_116.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_7070.jpeg (deflated 20%)
adding: dataset_augmented_train/WATCH/aug_0_3762.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/aug_0_7881.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch24.jpeg (deflated 2%)
adding: dataset_augmented_train/WATCH/aug_0_8946.jpeg (deflated 6%)
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adding: dataset_augmented_train/WATCH/aug_0_8125.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/aug_0_273.jpeg (deflated 9%)
adding: dataset_augmented_train/WATCH/aug_0_9922.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_6090.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_3071.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3332.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/watch23.jpeg (deflated 22%)
adding: dataset_augmented_train/WATCH/aug_0_4073.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch17.jpeg (deflated 1%)
adding: dataset_augmented_train/WATCH/aug_0_4313.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch27.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_5315.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/aug_0_1327.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/watch12.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_7711.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_3101.jpeg (deflated 8%)
adding: dataset_augmented_train/WATCH/watch2.jpeg (deflated 3%)
adding: dataset_augmented_train/WATCH/aug_0_434.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_5328.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_2167.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_9233.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/aug_0_3468.jpeg (deflated 7%)
adding: dataset_augmented_train/WATCH/aug_0_7779.jpeg (deflated 5%)
adding: dataset_augmented_train/WATCH/aug_0_6619.jpeg (deflated 6%)
adding: dataset_augmented_train/WATCH/watch10.jpeg (deflated 2%)
adding: dataset_augmented_train/WATCH/aug_0_9244.jpeg (deflated 5%)
```

[SUMMARY]

Classes found: {'EARRINGS': 0, 'GLASSES': 1, 'WATCH': 2}

Total training samples (augmented): 336

Total validation samples: 21