```
#GPU


import tensorflow as tf
from tensorflow.keras import layers, models
from tensorflow.keras.preprocessing.image import ImageDat
from sklearn.model_selection import train_test_split




# Set up parameters
AUTO = tf.data.AUTOTUNE
IMAGE_SIZE = [224, 224]  # adjust size as needed
batch_size = 32
gcs_pattern_train = 'gs://grad_proj/train/*/*.jpg'
gcs_pattern_test = 'gs://grad_proj/test/*/*.jpg'
num_images_per_class = 100
num_images_per_class = 100


# Define data loading functions
def parse_image(filename, label):
    img = tf.io.read_file(filename)
    img = tf.image.decode_jpeg(img, channels=3)
    img = tf.image.resize(img, IMAGE_SIZE)
    img = tf.cast(img, tf.float32) / 255.0
    return img, label

# Define data loading functions
def load_dataset(gcs_pattern, num_images):
    filenames = tf.io.gfile.glob(gcs_pattern)
    random.shuffle(filenames)  # Shuffle the filenames fo
    filenames = filenames[:num_images]  # Select a subset
    labels = [1 if 'dog' in filename else 0 for filename
    dataset = tf.data.Dataset.from_tensor_slices((filenam
    dataset = dataset.map(parse_image, num_parallel_calls
    return dataset



import random
# Load datasets
train_dataset = load_dataset(gcs_pattern_train, num_imag
test_dataset = load_dataset(gcs_pattern_test, num_images

# Assuming your train dataset is named 'train_dataset'
train_dataset_length = tf.data.experimental.cardinality(

print(f"Train dataset length: {train_dataset_length}")
```

```
Train dataset length: 100
```

Resources ✕

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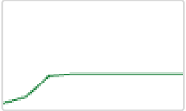
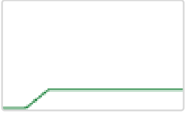
Python 3 Google Compute Engine backend (GPU)

Showing resources from 03:17 to 03:34

System RAM
4.2 / 12.7 GB



GPU RAM
2.8 / 15.0 GB



Disk
26.9 / 78.2 GB

```
# Define and compile the model
model = models.Sequential()
model.add(layers.Conv2D(32, kernel_size=(3, 3), padding=
model.add(layers.BatchNormalization())
model.add(layers.MaxPooling2D(pool_size=(2, 2), strides=
model.add(layers.Conv2D(64, kernel_size=(3, 3), padding=
model.add(layers.BatchNormalization())
model.add(layers.MaxPooling2D(pool_size=(2, 2), strides=
model.add(layers.Conv2D(128, kernel_size=(3, 3), padding
model.add(layers.BatchNormalization())
model.add(layers.MaxPooling2D(pool_size=(2, 2), strides=
model.add(layers.Flatten())
model.add(layers.Dense(128, activation='relu'))
model.add(layers.Dropout(0.1))
model.add(layers.Dense(64, activation='relu'))
model.add(layers.Dropout(0.1))
model.add(layers.Dense(1, activation='sigmoid'))

model.compile(optimizer='adam', loss='binary_crossentrop
```

```
import time

start_time = time.time()

history = model.fit(
    train_dataset.shuffle(1000).batch(batch_size).prefet
    epochs=10,
    validation_data=test_dataset.batch(batch_size).prefe
)

end_time = time.time()
elapsed_time = end_time - start_time

print(f"Training took {elapsed_time} seconds.")
```

```
Epoch 1/10
4/4 [==============================] - 29s 3s/step -
Epoch 2/10
4/4 [==============================] - 12s 2s/step -
Epoch 3/10
4/4 [==============================] - 16s 3s/step -
Epoch 4/10
4/4 [==============================] - 11s 2s/step -
Epoch 5/10
4/4 [==============================] - 16s 3s/step -
Epoch 6/10
4/4 [==============================] - 16s 3s/step -
Epoch 7/10
4/4 [==============================] - 10s 2s/step -
Epoch 8/10
4/4 [==============================] - 15s 3s/step -
Epoch 9/10
4/4 [==============================] - 15s 3s/step -
Epoch 10/10
4/4 [==============================] - 10s 2s/step -
Training took 161.66323280334473 seconds.
```

Change runtime type