NVIDIA RTX 4090 GPU Instructions

This guide will help you verify and utilize your GPU for deep learning tasks in PyTorch and TensorFlow.

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1. Prerequisites (Already done)

- The GPU hardware is already installed.
- GPU drivers and the CUDA toolkit are already set up on your system.

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2. Verify GPU Availability

PyTorch

```
import torch
print(torch.cuda.is_available())  # Returns True if GPU is usable
print(torch.cuda.device_count())  # Number of GPUs available
print(torch.cuda.get_device_name(0))  # Name of the first GPU
```

TensorFlow

```
import tensorflow as tf
print(tf.config.list_physical_devices('GPU'))  # Lists available GPU devices
```

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3. Create and Use GPU Tensors

PyTorch

```
device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
x = torch.tensor([1.0, 2.0, 3.0], device=device)
```

TensorFlow

Tensors are automatically placed on the GPU if available. To ensure a tensor is on the GPU:

```
with tf.device('/GPU:0'):
    x = tf.constant([1.0, 2.0, 3.0])
```

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4. Run Computations on the GPU

All operations performed on tensors located on the GPU will utilize GPU acceleration, resulting in faster computations for large-scale tasks and deep learning models.

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5. Troubleshooting

- Ensure your CUDA and cuDNN versions are compatible with your framework.
- Use `nvidia-smi` in the terminal to check GPU status and usage.
- If your framework does not detect the GPU, verify your driver and