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Setup and Examples

Running Jetson-Inference in Quanser NVIDIA products

Setup

To be able to run jetson-inference examples in Quanser products that have an NVIDIA processor, you will have to first set up your device to install these libraries. The following steps will explain the setup process:

1. Make sure the Quanser resources have already been moved to the device you are using so you can use the Python libraries from our research resources. Make sure the **libraries** and the **examples** folders are moved as well as the environment variables are set correctly.

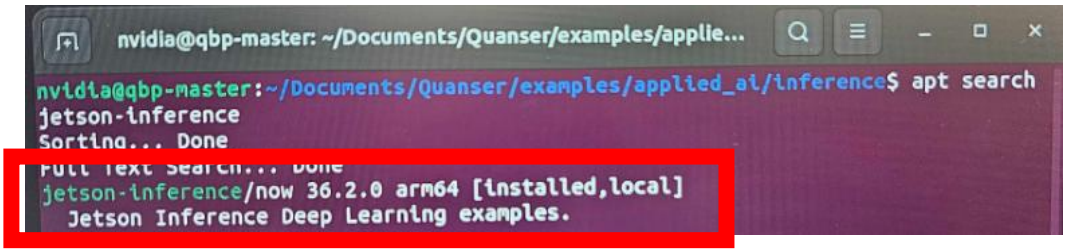
2. Connect the device to the internet. This could be through an ethernet cable using the ports on the device or by connecting a monitor, keyboard and mouse and using the Wi-Fi settings. Do not connect the Quanser provided router (broadcasting Quanser_UVS) to the internet.

3. Connect to the device through Windows Remote Desktop or direct connection to a monitor, keyboard and mouse.

4. Certain products released in late 2024 already have the Jetson Inference libraries installed. To verify, open a terminal in the Quanser Product you are using and run the following command

   ```
   apt search jetson-inference
   ```

   If the library is pre-installed, the terminal will return something as follows:

5. If the jetson-inference library is already installed, **skip to step 11.** If your device does not have the jetson-inference library, continue through the next steps to build the jetson-inference library from source.

6. The following instructions based on the guide for Jetson-Inference. Feel free to use the guide to see different examples and inference models. However, **PLEASE FOLLOW STEP 7-9 CAREFULLY TO AVOID FATAL DEPENDENCY CONFLICTS THAT MIGHT MAKE THE PRODUCT UNUSABLE.**

7. From your Quanser device's desktop, open a terminal and use the following commands including the ones from step 6 and 7:

```
git clone --recursive --depth=1 https://github.com/dusty-nv/jetson-inference
cd jetson-inference
mkdir build
cd build
```

8. The commands in step 9 will prompt PyTorch Installer. **PLEASE CLICK QUIT/SKIP WHEN ASKED TO INSTALL PYTORCH. DO NOT UPDATE PYTORCH AS IT WILL RESULT IN FATAL DEPENDENCY CONFLITS.**

9. Finish the set-up process with the following commands. It can take up to 10 minutes.

```
cmake ../
make -j$(nproc)
sudo make install
sudo ldconfig
```

10. This should have replicated the necessary steps from the Jetson-Inference guide.

11. We have provided a script, *installModules.py,* that download all neural network models provided by Jeston Inference Library and convert these models to TensorRT engines. If files were properly transferred to the device as per step 1, the script should be located in `/home/nvidia/Documents/Quanser/examples/applied_ai/inference`

12. This Python script installs all available models for the following applications:
    1. ImageNet
    2. ActionNet
    3. DetectNet
    4. PoseNet
    5. DepthNet
    6. SegNet

13. There are two ways in which you can run this file:

    1. Directly on the terminal. Additional argument can be provided to specify which net to download. This additional argument is the index of the application as stated in step 12. For example, to download only ActionNet, the following command can be used:

       `python3 installModules.py 2`

       If you run the file without arguments, all models will be downloaded. However, if one fails, the script will terminate, and you will have to run it again. The file has comments in case you want to select specific models to download.

    2. Using the bash script we provided that will download the 6 nets, the benefit of using this against running the python file directly without arguments is

that if one of the models fail for one net, it will download all the other nets without stopping the code. In the folder where RunModules.sh exists, open a terminal.

a. Try running `bash RunModules.sh` if that doesn't work, use the following two steps.

b. Run the following command to make the script executable:

```
chmod +x RunModules.sh
```

c. Run the script with:

```
./RunModules.sh
```

14. We have provided examples on how to utilize Quanser's library to simplify the usage of Jetson Inference Library with video stream from the hardware. Specifically, 2 examples for each of the 6 applications in step 12 are provided, one for using the RealSense Camera and the other for the CSI cameras.