

Report

By Allen Lu

Installing Pytorch and Torchvision on the Jetson Nano

1. Follow the first setup instructions here: <https://developer.nvidia.com/embedded/learn/get-started-jetson-nano-devkit>
 - a. Follow the setup with either microusb or the barrel power supply. The Jetson requires a network adapter to access internet.
 - b. When writing the disk image to the microSD card, you may run into errors when using a later version of Etcher (1.5.33). For the setup of my Jetson, I used 1.2.1 and it worked perfectly. Make sure your SD card is 2 GB or greater.
 - c. When first booting up, make sure that all of your devices are plugged into the Jetson AFTER the flashed SD card is inserted.
 - d. Try to use a USB hub if possible. I found that disconnecting usb adapters directly inserted in the Jetson would cause it to shut down regardless of how carefully they were disconnected.
 - e. Upon first setup, no Bluetooth keyboards can be used, so there has to be a wireless or wired connection directly to the usb port. Though trivial, it was cumbersome pairing a Bluetooth keyboard to the Jetson after every reflash (this was from difficulty installing Pytorch).

Getting Pytorch with the Jetson Nano

1. The tutorial here gives a rough blueprint as to how to download Pytorch and Torchvision on the Jetson Nano: <https://forums.developer.nvidia.com/t/pytorch-for-jetson-nano-version-1-5-0-now-available/72048>
2. Things to note:
 - a. The Jetson Nano automatically had a Jetpack 4.4 memory flash on the SD card. If you wish to use a Jetpack 4.2/3 configuration, flash the memory card with Jetpack 4.2 or 4.3 and restart the setup process
 - i. Note that accidentally downloading incompatible Jetpack versions results in this error -> <https://forums.developer.nvidia.com/t/difficulty-installing-pytorch-on-jetson-nano/123653>
 - ii. Additionally, there is no difference in names for Pytorch versions that are installed with different Jetpack versions. So it is very important to make sure that the right one is installed. There have been some issues with Pytorch 1.5 from people in the past, so I picked Pytorch version 1.4.
3. When following the version-specific python instructions for pip and Pytorch, it is important to note that the following command may give you the wrong version of Pytorch to be extracted. Once downloaded, delete this one and use the version that you downloaded as it is compatible with your Jetson version.
 - a. Note that the torch that is installed is with the blue text. Make sure that the torch installed has the same name as the compatible Jetpack torch version.
 - b. Make sure to move the torch whl file to the same directory as the installation command.

- c. For some reason, I needed to use the `wget` command in order to call the command below. This is why I downloaded the `torch` file and deleted it right away and replaced it with my own.
 - i. `sudo apt-get install python3-pip libopenblas-base libopenmpi-dev`
- 4. The instructions from here on are ambiguous. There are two things to immediately note:
 - a. The Torchvision setup guide is for python 2 rather than 3, so we need to run the setup with python 3 or else we will face unfound module errors. Easy fix, but easy to miss.
 - i. `sudo python3 setup.py install`
 - b. Secondly, the Torchvision setup (even when done with python3) may give you some missing module errors (`setuptools` and `builtins` specifically). If so, download these modules -> <https://stackoverflow.com/questions/14426491/python-3-importerror-no-module-named-setuptools>
 - c. When doing the following command, make sure you note the version of Torchvision that you are using in the command where the bolding is. Also make sure it is the version that is compatible with your Pytorch. No angled brackets included.
 - i. `git clone --branch <version>`
`https://github.com/pytorch/vision torchvision`
 - d. IF YOU COME ACROSS THIS ERROR
<https://forums.developer.nvidia.com/t/difficulty-installing-pytorch-on-jetson-nano/123653>, IT MEANS THAT YOU HAVE SETUP THE WRONG PYTORCH JETPACK VERSION. You can either reflash your memory card and start over, or try again with a compatible Pytorch.
- 5. Run the verification steps in the desired python version of your choosing. I used Python 3 because of my own preference

Working with a USB Camera

1. If your USB powered camera is not yet connected to the Jetson, shut down the Jetson Nano, plug in the camera, and reboot.
2. Ease of use steps
 - a. If you are using a wifi adapter, there are some steps that can make developing on the Jetson Nano a bit easier (especially when wifi is involved).
 - b. Disable wifi slow-downs by disabling power-saving mode
 - i. `sudo iw dev wlan0 set power_save off`
 - c. Next, we need to modify the following blacklist.conf configuration file
 - i. `sudo vi /etc/modprobe.d/blacklist.conf`
 - ii. Once in vi, press O for insert mode. Scroll down to the bottom of the file and add the following blacklist command. Then press escape and type :wq (this is the save and exit command for vim).
 1. `blacklist rtl8192cu`
 - iii. Reboot the machine with the following command
 1. `sudo reboot`
3. First setup
 - a. First, we will retrieve any needed updates with the following command
 - i. `sudo apt update`
 - b. Second, we will need to install xrdp
 - i. `sudo apt install -y xrdp`
 - c. Reboot the Jetson Nano
 - i. `sudo reboot`
4. Camera detection setup
 - a. First, we need to install the makefile for python 3 development
 - i. `sudo apt install -y git cmake libpython3-dev python3-numpy`
 - b. Clone the Jetson-inference library for access to all of the needed scripts to run camera detection
 - i. `sgmstudio@jetson:~$ git clone --recursive https://github.com/dusty-nv/jetson-inference`
 - c. Navigate to the Jetson inference directory
 - i. `cd jetson-inference`
 - d. Make a build folder and navigate to it
 - i. `mkdir build`
 - ii. `cd build`
 - e. Build in the directory above the current one
 - f. `~/jetson-inference/build$ cmake ../`
 - i. You will likely be asked for your user password for root access multiple times
 - ii. You will likely be asked to download certain image recognition models, leave the following checked and press OK

- e. The desired output will be as such



- i.