

Tree Tagger ArcGIS Add-In Installation Instructions

Daniel Butt, July, 2022

dbutt7@uwyo.ca

This installation process is rather long and tedious, mostly due to having to jump through many hoops to make ArcGIS and Cuda work. I apologize, the good news is you only have to do this once...

Updating

If you have already installed a previous version of the Tree Tagger software then you can most likely skip steps 0, 2, 3 and 4. However, if a major revision has occurred, you might want to completely reinstall by following all steps below, replacing any old files with the new ones.

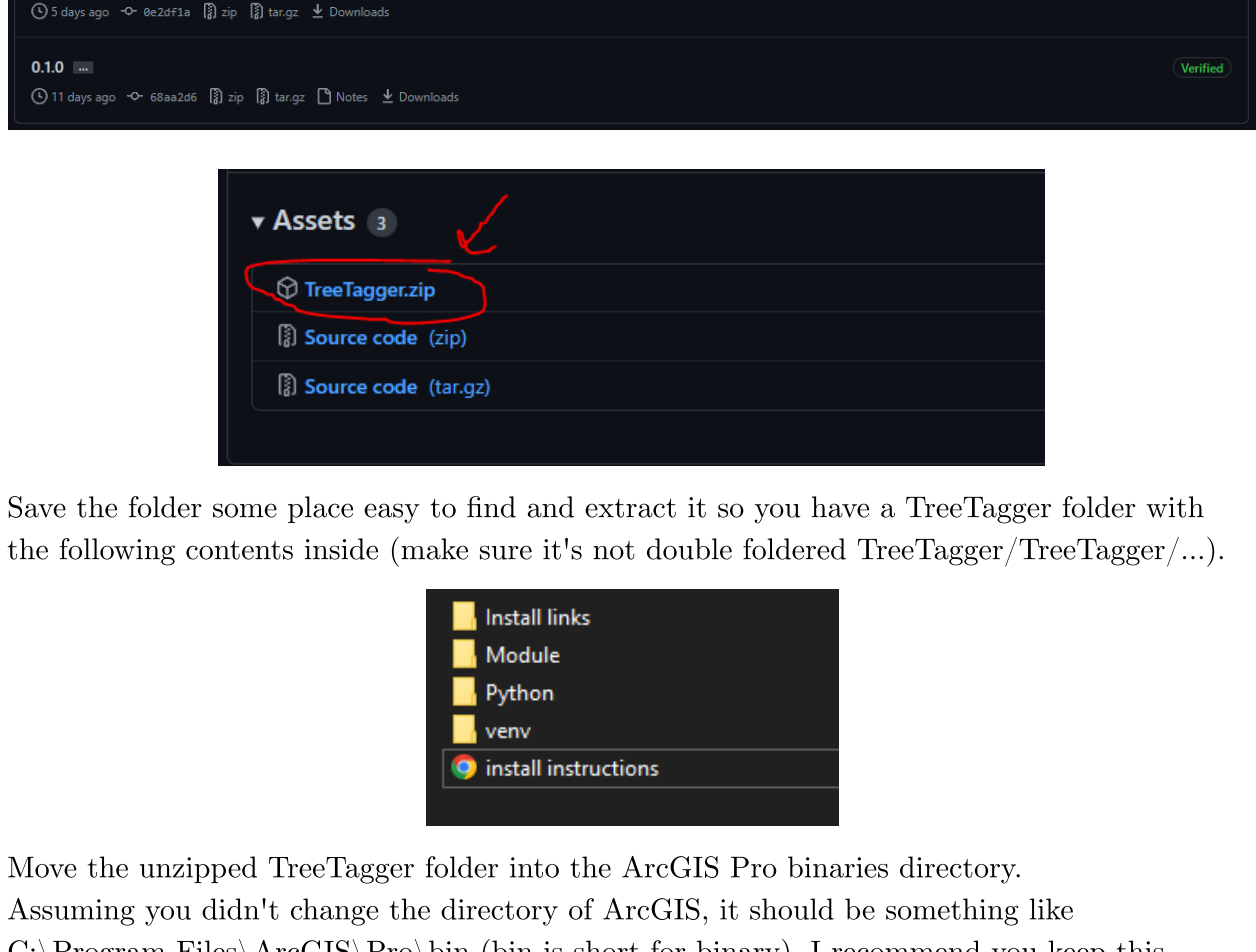
Step 0 ArcGIS Pro

Install ArcGIS Pro if you haven't already and make sure it's updated to the latest version. <https://www.arcgis.com/index.html>

Side Note: if you get an error when trying to install ArcGIS pro saying something like "Microsoft .Net Desktop Runtime 6.0 not found", this is because ArcGIS just switched from .Net 4.8 to .Net 6.0 with the release of ArcGIS Pro 3.0 and I guess they forgot to include it... Try installing Microsoft .Net Desktop Runtime 6.0 first, <https://dotnet.microsoft.com/en-us/download/dotnet/6.0>

Step 1 Download Add-In

Install the release zip folder from the following Github repository: https://github.com/Daniel-Butt/Tree_Tagger_ArcGIS_Add_On
Go to the releases section and download the most recent Tree Tagger zip file.



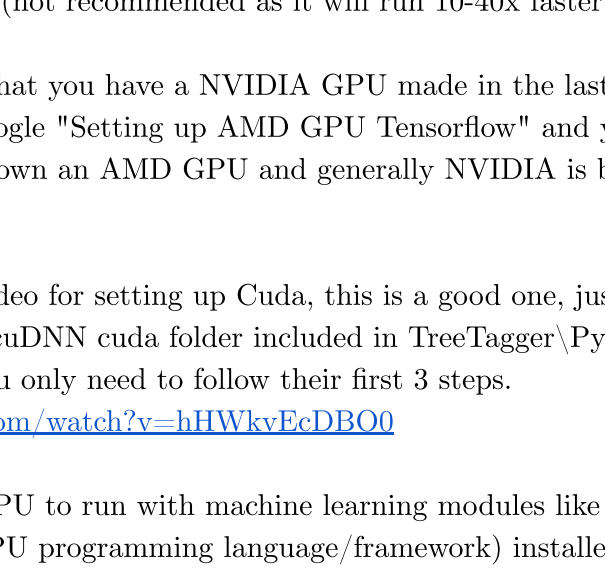
Save the folder some place easy to find and extract it so you have a TreeTagger folder with the following contents inside (make sure it's not double foldered TreeTagger/TreeTagger/...).

- Install links
- Module
- Python
- venv
- install instructions

Move the unzipped TreeTagger folder into the ArcGIS Pro binaries directory.

Assuming you didn't change the directory of ArcGIS, it should be something like C:\Program Files\ArcGIS\Pro\bin (bin is short for binary). I recommend you keep this directory open.

If you can't find it, try the following,



If it brings you to the shortcut's directory instead of the bin directory, open the file location of the ArcGIS shortcut.

Step 2 Setting up Cuda - Install Visual Studio 2019

Steps 2/3 can be skipped if you don't have a GPU (graphics card) or don't want to run the add-in using your GPU (not recommended as it will run 10-40x faster with a GPU)

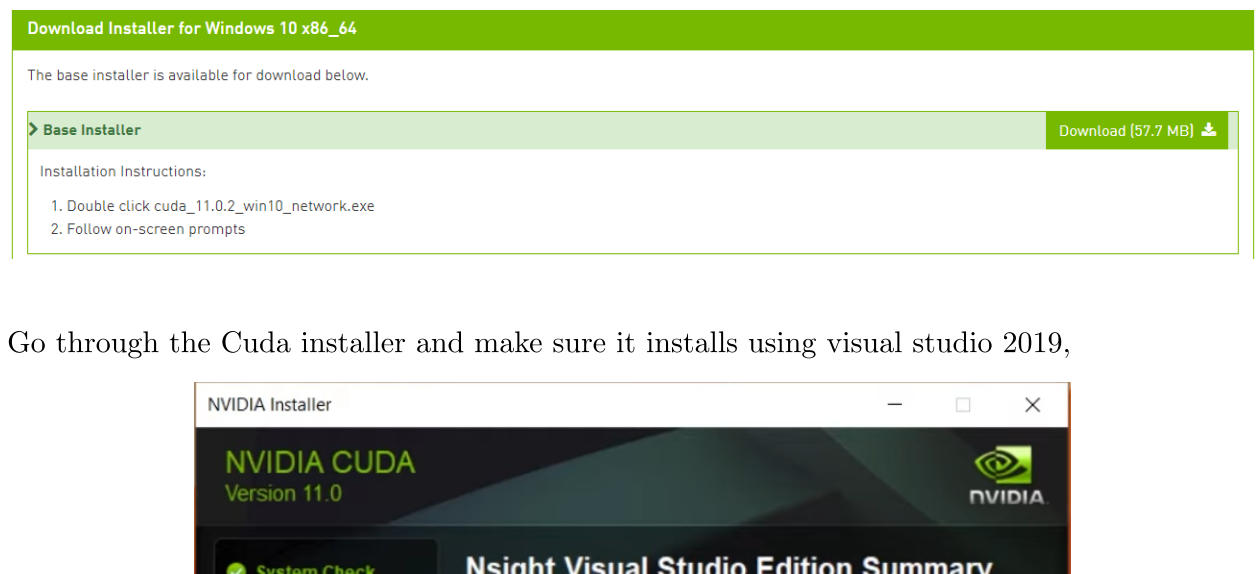
Steps 2/3 also assume that you have a NVIDIA GPU made in the last ~10 years or so. If you have an AMD GPU, google "Setting up AMD GPU Tensorflow" and you should be able to find something. I don't own an AMD GPU and generally NVIDIA is better for machine learning...

If you would prefer a video for setting up Cuda, this is a good one, just make sure you install Cuda 11.0 and use the cuDNN cuda folder included in TreeTagger/Python instead of downloading it. Also you only need to follow their first 3 steps. <https://www.youtube.com/watch?v=hHWkvEcDB00>

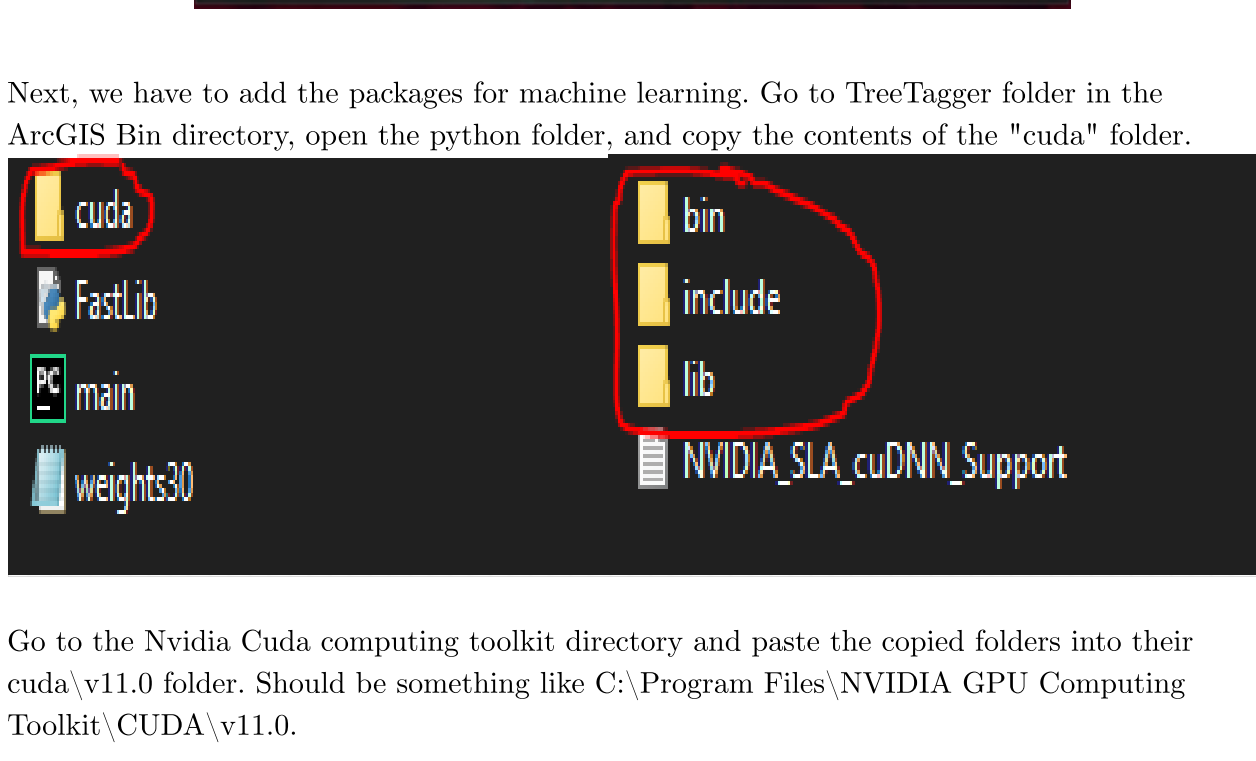
In order to setup the GPU to run with machine learning modules like Tensorflow, you need to have Cuda (Nvidia's GPU programming language/framework) installed along with machine learning Cuda files. However, you need to have Visual Studio 2019 (Microsoft's software development environment) installed for Cuda to setup properly on windows.

You can install Visual Studio 2019 Community edition (free version) from the following link, https://my.visualstudio.com/Downloads?qt=visual%20studio%202019&wt.mc_id=vs-msft_vscom_older-downloads

You may have to sign into your Microsoft account first.



When installing you should get a window that looks something like the following, prompting you to select any "workloads" you require. You don't need to select any (since we aren't going to use the software), just press install (without any workloads)

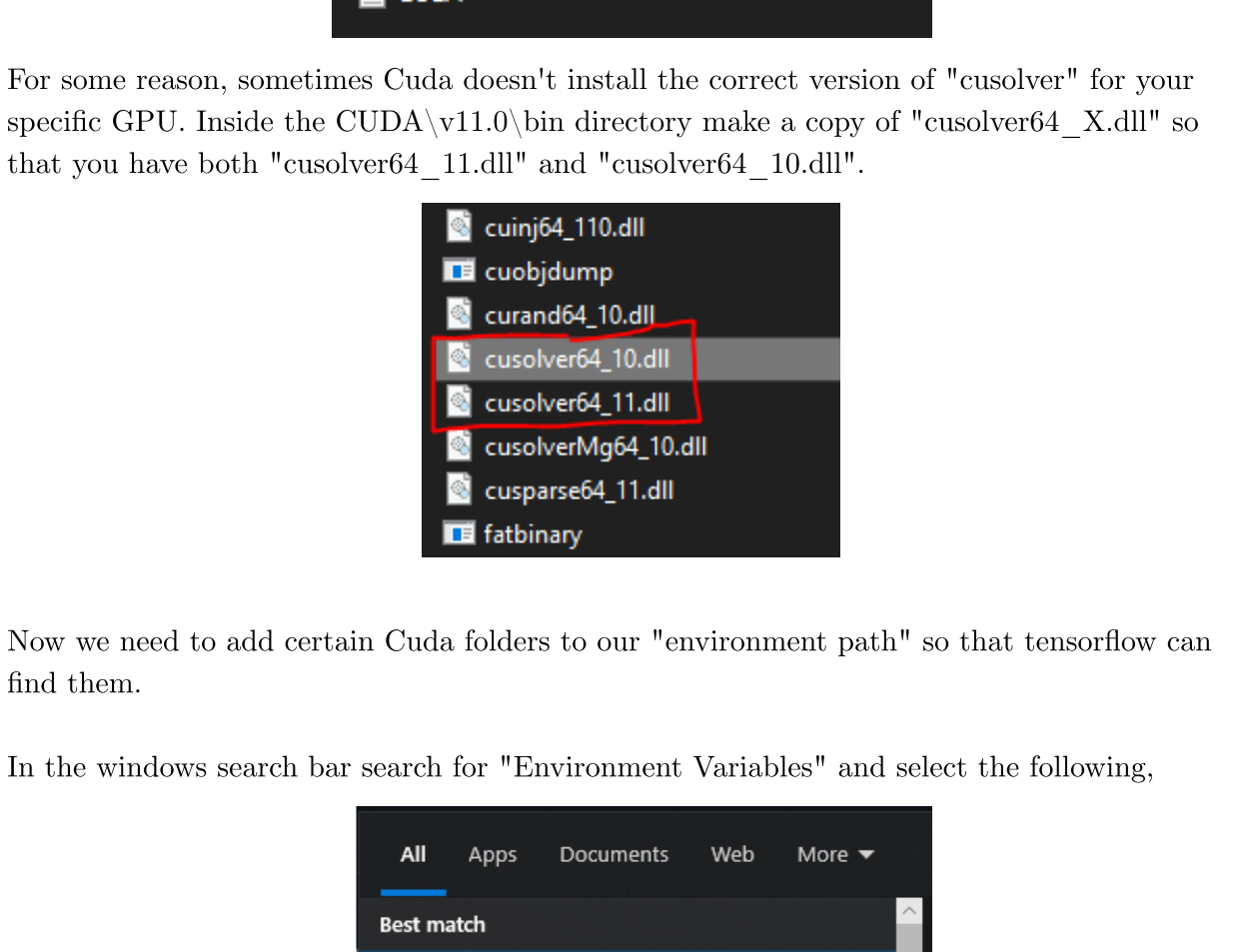


Step 3 Installing Cuda

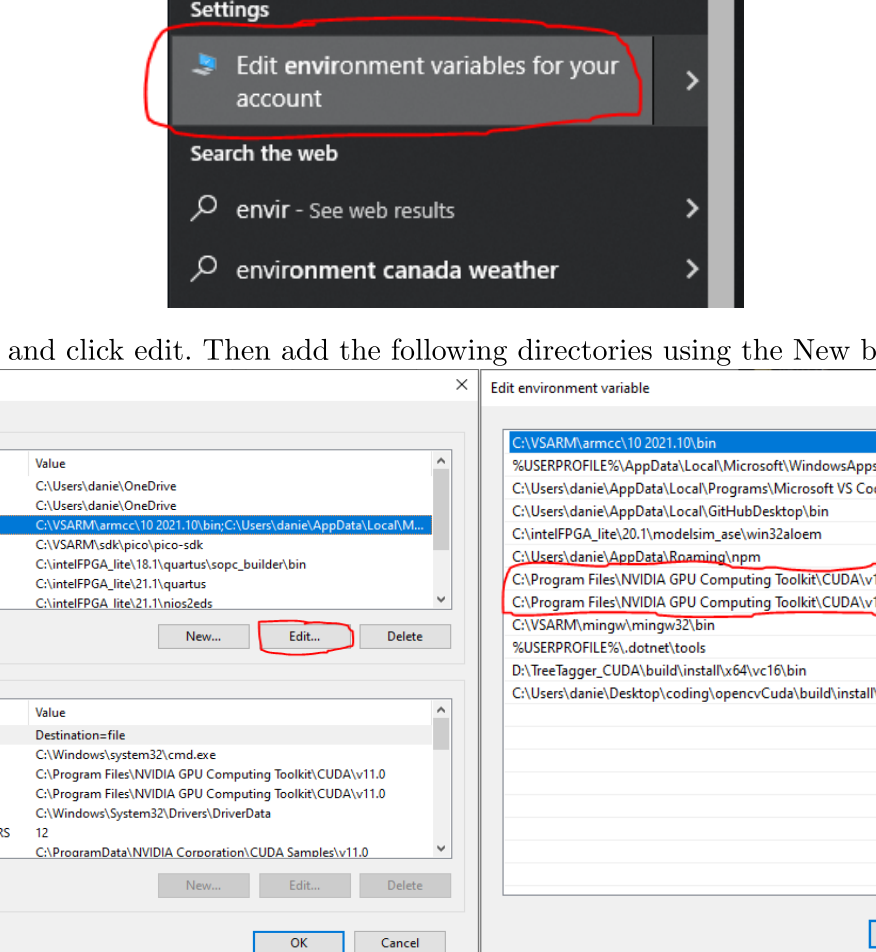
For the version of Tensorflow, we need to install Cuda 11.0 (11.1/11.2 might also work, but don't just install the latest version)

<https://developer.nvidia.com/cuda-11.0-download-archive>

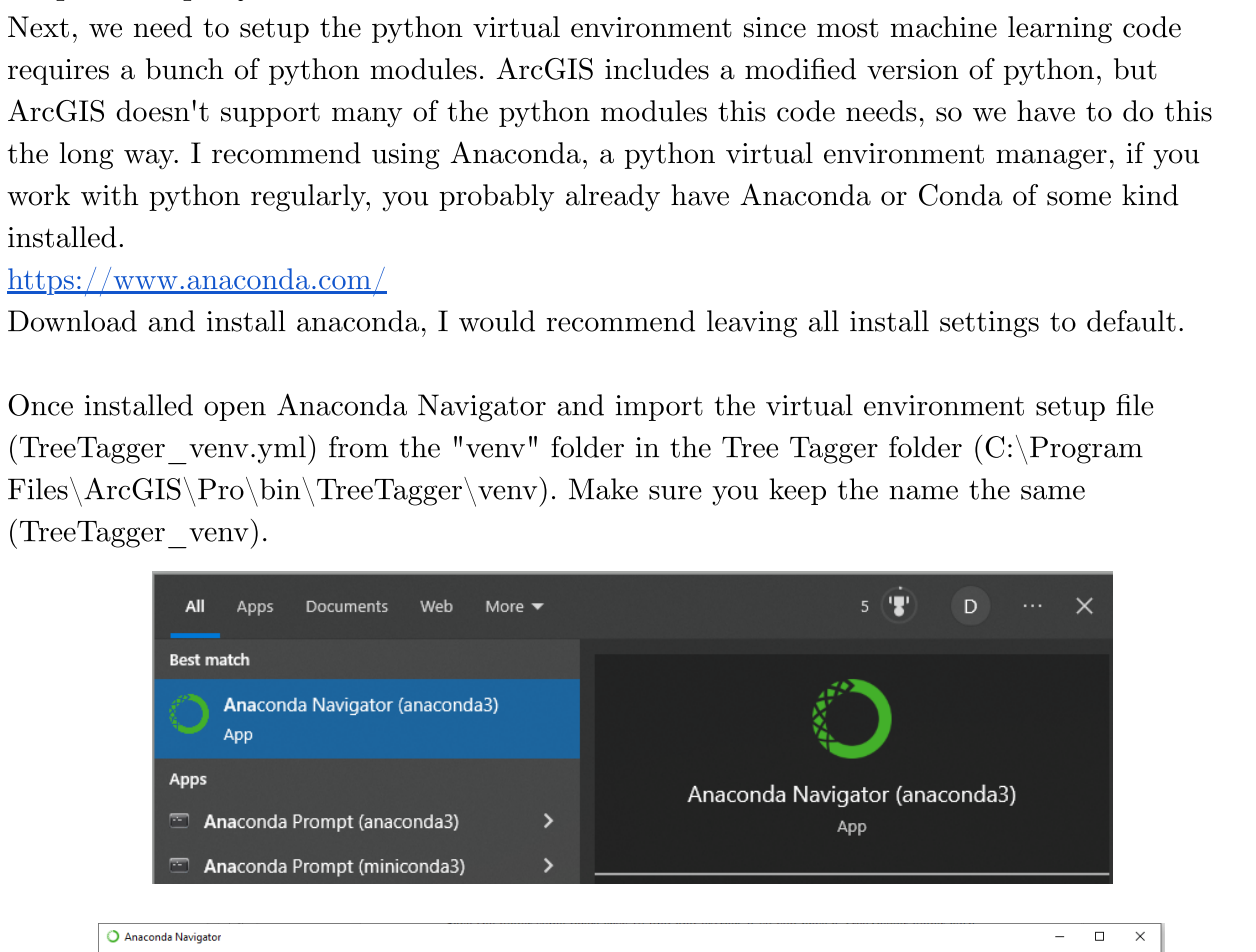
Select Windows, x86_64, 10, exe (network), download.



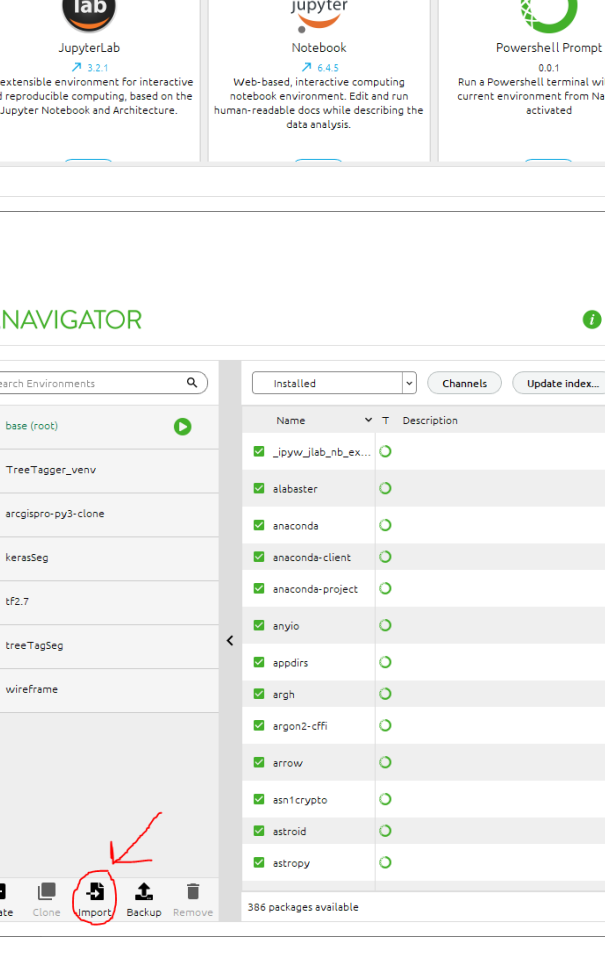
Go through the Cuda installer and make sure it installs using visual studio 2019,



Next, we have to add the packages for machine learning. Go to TreeTagger folder in the ArcGIS Bin directory, open the python folder, and copy the contents of the "cuda" folder.



Go to the Nvidia Cuda computing toolkit directory and paste the copied folders into their cuda\v11.0 folder. Should be something like C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v11.0.

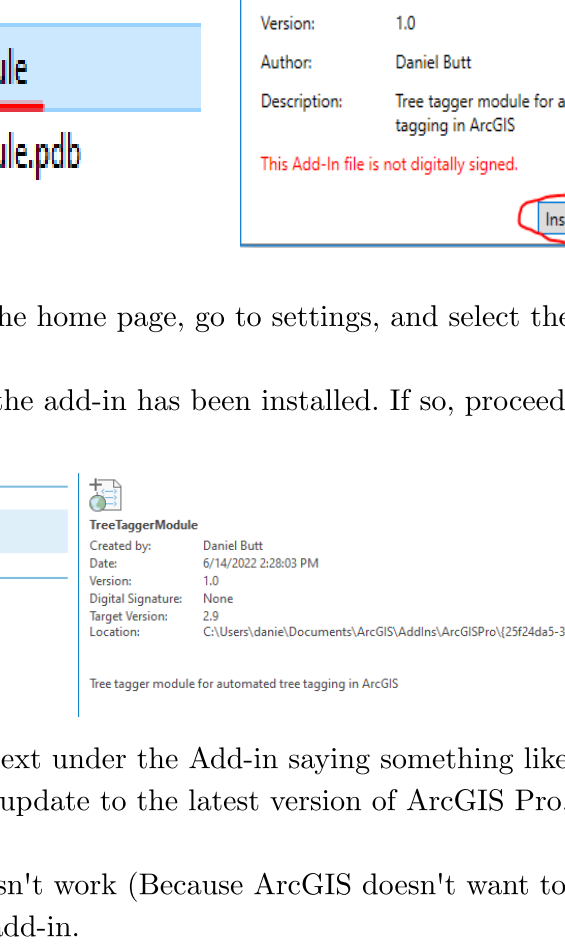


For some reason, sometimes Cuda doesn't install the correct version of "cusolver" for your specific GPU. Inside the CUDA\v11.0\bin directory make a copy of "cusolver64_X.dll" so that you have both "cusolver64_11.dll" and "cusolver64_10.dll".

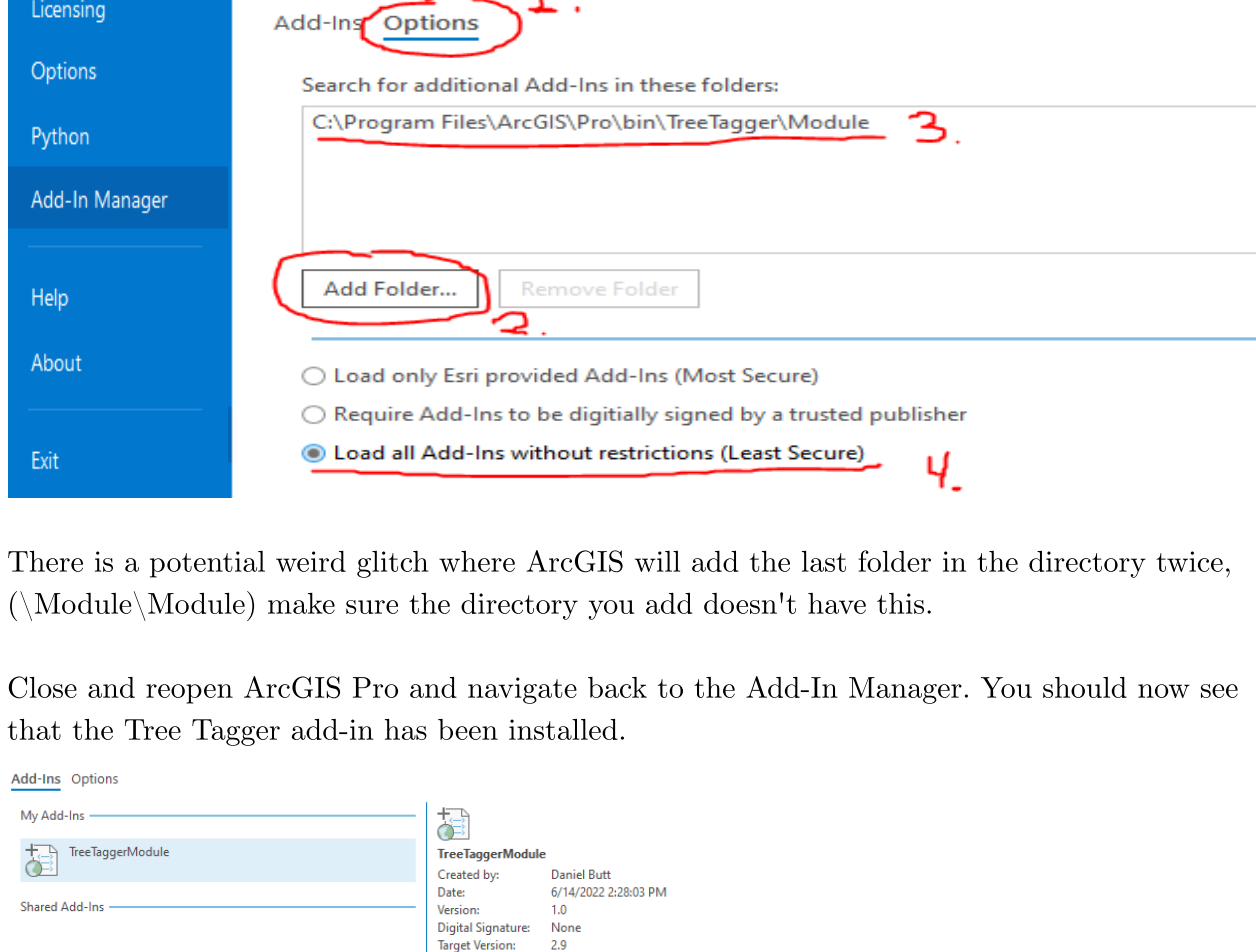


Now we need to add certain Cuda folders to our "environment path" so that tensorflow can find them.

In the windows search bar search for "Environment Variables" and select the following,



Select "Path" and click edit. Then add the following directories using the New button.



If the "libnvvp" directory doesn't exist, then Cuda didn't install for visual studio properly.

Click ok and close the environment variables window.

Step 4 Setup Python Virtual Environment

Next, we need to setup the python virtual environment since most machine learning code requires a bunch of python modules. ArcGIS includes a modified version of python, but ArcGIS doesn't support many of the python modules this code needs, so we have to do this the long way. I recommend using Anaconda, a python virtual environment manager, if you work with python regularly, you probably already have Anaconda or Conda of some kind installed.

<https://www.anaconda.com/>
Download and install anaconda, I would recommend all install settings to default.

Once installed open Anaconda Navigator and import the virtual environment setup file (TreeTagger_venv.yml) from the "venv" folder in the Tree Tagger folder (C:\Program Files\ArcGIS\Pro\bin\TreeTagger\venv). Make sure you keep the name the same (TreeTagger_venv).

After you click import, Anaconda will automatically install all the required modules, wait until this process has finished.

Locate the virtual environment install directory (should be something like C:\Users\your_account\anaconda3\envs\TreeTagger_venv and copy/paste the TreeTagger_venv folder into the TreeTagger folder in the ArcGIS install bin directory. (C:\Program Files\ArcGIS\Pro\bin\TreeTagger\Module)

Step 5 Install Add-On

Open the Module folder located in the TreeTagger folder, (C:\Program Files\ArcGIS\Pro\bin\TreeTagger\Module)

Double click to run the TreeTaggerModule.esriAddinX file to open an installer. Click the install button.

Open ArcGIS Pro, from the home page, go to settings, and select the add-in Manager section.

You should now see that the add-in has been installed. If so, proceed to the Testing section.

There is a potential weird glitch where ArcGIS will add the last folder in the directory twice, (Module\Module) make sure the directory you add doesn't have this.

Close and reopen ArcGIS Pro and navigate back to the Add-In Manager. You should now see that the Tree Tagger add-in has been installed.

Testing

For more detailed utilization instructions, refer to the user manual on the GitHub.

If you followed the above steps correctly, the Tree Tagger add-in should now be installed. There should be a test image for you to run the software on located in the downloaded Tree Tagger folder. Create a new ArcGIS Pro project and import the test image. Follow the instructions provided in the user manual to run the program on the test image.