dbutt7@uwo.ca

Addon for ArcGIS add-on which leverages

Install ArcGIS Pro if you haven't already and make sure it's updated to the latest version.

do this once...

Step 0 ArcGIS Pro

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...

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

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 TreeTagger.zip file.

Go to file Code → p main_2 →
p² 2 branches
S 3 tags Daniel-Butt Add files via upload 0e2df1a 5 days ago 🕚 11 commits

Try installing Microsoft .Net Desktop Runtime 6.0 first,

machine learning to automatically detect and fit lines to trees from large scale ■ TreeTaggerModule aerial photos ☐ Readme python README.md ☐ TreeTaggerModule.sIn

README.md **♦ 3** tags Tree_Tagger_ArcGIS_Add_On **Packages** Addon for ArcGIS which leverages machine learning to automatically detect and fit lines to trees from large scale Using https://github.com/divamgupta/image-segmentation-keras as well as Keras and Tensorflow, for machine Languages Python 69.7%
 C++ 12.1%
 CMake 0.2% ③ 5 days ago → 0e2df1a 🖟 zip 🖟 tar.gz 🖰 Notes 👲 Downloads

▼ Assets ③ 🕅 TreeTagger.zip Source code (zip)

Install links Module Python 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

Run as administrator

Steps 2/3 can be skipped if you don't have a GPU (graphics card) or don't want to run the

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

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.

add-in using your GPU (not recommended as it will run 10-40x faster with a GPU)

C:\Program Files\ArcGIS\Pro\bin (bin is short for binary). I recommend you keep this

Open file location Pin to taskbar Websites (1) If it brings you to the shortcut's directory instead of the bin directory, open the file location

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,

 $\underline{q} = \underline{visual\%20studio\%202019\&wt.mc} \quad \underline{id} = \underline{o} \\ \underline{msft} \\ \underline{vscom} \\ \underline{older-downloads}$

Visual Studio Professional 2019 (version 16.11) x64 V Multiple Lang... ∨ Download $\underline{\downarrow}$ Get Key 1 Info Release date: 12/Jul/2022 Visual Studio Community 2019 (Version 16.11) Release date: 12/Jul/2022 1 Info Download $\underline{\downarrow}$

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

English

Multiple Lang...

Download <u>↓</u>

Installation details

 Visual Studio core editor Desktop development with C++ .NET cross-platform development

Individual components

✓ .NET Framework 4.6.1 targeting pa .NET Framework 4.8 SDK .NET Framework 4.8 targeti C++/CLI support for v142 build tools (Latest) Other Toolsets (6)

For the version of Tensorflow, we need to install Cuda 11.0 (11.1/11.2 might also work, but

Click on the green buttons that describe your target platform. Only supported platforms will be shown. By downloading and using the software, you agree to fully comply with the

10 Server 2019 Download Installer for Windows 10 x86_64 The base installer is available for download below. > Base Installer Installation Instructions: 1. Double click cuda_11.0.2_win10_network.exe 2. Follow on-screen prompts Go through the Cuda installer and make sure it installs using visual studio 2019, **NVIDIA** Installer **NVIDIA CUDA** Nsight Visual Studio Edition Summary System Check ne following information only pertains to Nsight Visual Studio features of describe CUDA toolkit install status. Please continue unless Nsight V License Agreement

src CUDA_Toolkit_Release_Notes

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

Search the web envir - See web results environment canada weather Select "Path" and click edit. Then add the following directories using the New button. Edit environment variable User variables for danie New %USERPROFILE%\AppData\Local\Microsoft\WindowsApps C:\Users\danie\AppData\Local\Programs\Microsoft VS Code\bin Edit C:\Users\danie\OneDrive C:\Users\danie\AppData\Local\GitHubDesktop\bin C:\intelFPGA_lite\20.1\modelsim_ase\win32aloem C:\VSARM\sdk\pico\pico-sdk C:\Users\danie\AppData\Roaming\npm C:\intelFPGA_lite\18.1\quartus\sopc_builder\bin C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v11.0\bin Delete C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v11.0\libnvvp C:\intelFPGA lite\21.1\nios2eds C:\VSARM\mingw\mingw32\bin %USERPROFILE%\.dotnet\tools Move Up D:\TreeTagger_CUDA\build\install\x64\vc16\bin $\label{lem:coding_coding_coding} C:\Users\danie\Desktop\coding\percvCuda\build\install\x64\vc16\label{lem:coding_coding}.$ Move Down C:\Windows\system32\cmd.exe Edit text... C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v11.0 C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v11.0 C:\Windows\System32\Drivers\DriverData C:\ProgramData\NVIDIA Corporation\CUDA Samples\v11.0

_ipyw_jlab_nb_ex... **Learning** arcgispro-py3-clone **Community** tf2.7

0

Documents Pictures lacFloconTest Python

testProject TreeTagger

OneDrive - Personal

This PC

🧊 3D Objects

Documents Downloads

Date modified

2022-07-17 12:01 PM

2022-07-13 5:14 PM

2022-07-13 12:46 PM

2022-07-13 12:42 PM 2022-07-17 12:43 PM 2022-07-17 12:01 PM

🚼 Esri ArcGIS Add-In Installation Utility X Please confirm Add-In file installation. Active content, such as Macros and Add-In TreeTaggerModule.deps files, can contain viruses or other security hazards. Do not install this content unless you trust the source of this file. TreeTaggerModule.dll TreeTaggerModule Version: 1.0 Author: Daniel Butt Tree tagger module for automated tree Description: tagging in ArcGIS This Add-In file is not digitally signed. Install Add-In Cancel

Search for additional Add-Ins in these folders: C:\Program Files\ArcGIS\Pro\bin\TreeTagger\Module

Add-Ins Options My Add-Ins TreeTago Daniel Butt 6/14/2022 2:28:03 PM Created by Date: 1.0 Digital Signature **Testing**

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.

the Tree Tagger Add-In correctly.

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/...).

of the ArcGIS shortcut. Step 2 Setting up Cuda - Install Visual Studio 2019

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

directory open.

https://www.youtube.com/watch?v=hHWkvEcDBO0 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

https://my.visualstudio.com/Downloads?

Agents for Visual Studio 2019 (version 16.11)

Visual Studio Enterprise 2019 (version 16.11)

Individual components Language packs

Build cross-platform applications for iOS, Android or

am Files (x86)\Microsoft Visual Studio\2019\Comm

Step 3 Installing Cuda

Select Target Platform

Operating System

terms and conditions of the CUDA EULA

don't just install the latest version)

ng, you agree to the <u>license</u> for the Visual Studio edition you selected. We also offer the ability to downl software is licensed separately, as set out in the <u>3rd Party Notices</u> or in its accompanying license. By co

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

Select Windows, x86 64, 10, exe (network), download.

1 Info

learning...

No key required

You may have to sign into your Microsoft account first.

Gaming (2)

going to use the software), just press install (without any workloads)

Installation locations

Studio features will be used. Options Install **Finish** Nsight for Visual Studio 2017 Integrated Graphics Frame Debugger and Profiler Reason: see https://developer.nvidia.com/nsight-vstools

that you have both "cusolver64_11.dll" and "cusolver64_10.dll". cuinj64_110.dll cuobjdump curand64_10.dll

fatbinary

Αll

Best match

Settings

account

variables Control panel

find them.

installed.

https://www.anaconda.com/

Anaconda Navigator (anaconda3)

Anaconda Prompt (anaconda3)

(TreeTagger venv).

Anaconda Navigator

Learning

Community

Anaconda Blog

Local drive

Sign in to save your environment

Overwrite existing environment

until this process has finished.

 $(C:\Pr Gram Files \land CGIS \land Pro \land Din \land TreeTagger)$

Name

Install links

TreeTagger_venv

install instructions

Module

Python

New environment name:

cusolver64_10.dll cusolver64_11.dll cusolverMg64_10.dll cusparse64_11.dll

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

Documents

Edit the system environment

Edit environment variables for your

Web

More ▼

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

asl.log CUDA_PATH CUDA_PATH_V11_0 NUMBER_OF_PROCESSORS NVCUDASAMPLES ROOT 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

Download and install anaconda, I would recommend leaving 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

Anaconda Navigator (anaconda3)

App

-5 386 packages available Quick access keras_segmentation Import from: TreeTagger_venv.yml

After you click import, Anaconda will automatically install all the required modules, wait

Loading packages of C:\Users\danie\anaconda3\envs\TreeTagger_venv...

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.

This PC > Local Disk (C:) > Program Files > ArcGIS > Pro > bin > TreeTagger

🖟 TreeTaggerModule.pdb 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.

Add Folder. Load only Esri provided Add-Ins (Most Secure)

If you followed the above steps correctly, the Tree Tagger add-in should now be installed. For more detailed utilization instructions, refer to the user manual.

more information, please click 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. cuda FastLib include NVIDIA_SLA_cuDNN_Support weights30 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. doc extras

include

libnvvp nvml nvvm Sanitizer

lib

OneDrive PICO_SDK_PATH **QSYS ROOTDIR** SOPC KIT NIOS2

Anaconda Prompt (miniconda3) ANACONDA.NAVIGATOR Applications on base (root) CMD.exe Prompt (Launch ANACONDA.NAVIGATOR Channels Update index...

message should give you an indication of the issue. If ArcGIS crashes immediately or the

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. ೈ Tree Tagger Module Add-Ins Options **+** TreeTaggerModule TreeTagg Shared Add-Ins Digital Signature C:\Users\danie\Documents\ArcGIS\AddIns\ArcGISPro\{25f24da5-3654-4d5d-9eb8-62667eea86cc}\TreeTaggerModule.esriAddinX Tree tagger module for automated tree tagging in ArcGIS Side Note: if you see red text under the Add-in saying something like "Add-in version not compatible", you need to update to the latest version of ArcGIS Pro. If the add-in installer doesn't work (Because ArcGIS doesn't want to cooperate...), you can try manually adding the add-in. Click the Add-in Manager options and add the TreeTagger\Module folder using the add folder button. Make sure "Load all Add-Ins without restriction" is selected. Add-In Manager **Portals** Licensing Options

Add-In Manager O Require Add-Ins to be digitially signed by a trusted publisher Load all Add-Ins without restrictions (Least Secure) 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.

Python

Help

About

Exit

To test it out, open an ArcGIS Pro project and navigate to the Tree Tagger tab. Select Tree Tag Images and using the pop-up windows select an image for the software to run on. You should see a command prompt window appear giving you feed back as the what the software is doing (And that it's utilizing the GPU if you set that up). If you get an error message, the

beginning of the error message is not really human readable, odds are you have not installed