Tree Tagger ArcGIS Add-In Installation Instructions

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

## ones.

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

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...

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. About 🗜 main\_2 🕶 🔭 2 branches 🔝 3 tags Go to file Code →

0e2df1a 5 days ago 🐧 11 commits

Addon for ArcGIS add-on which leverages

machine learning to automatically detect and fit lines to trees from large scale

aerial photos

■ TreeTaggerModule keras\_segmentation

Daniel-Butt Add files via upload

☆ 0 stars README.md 앟 0 forks TreeTaggerModule.sln README.md

Try installing Microsoft .Net Desktop Runtime 6.0 first,

Releases **♦ 3** tags Tree\_Tagger\_ArcGIS\_Add\_On Packages  $Add on \ for \ Arc GIS \ which \ leverages \ machine \ learning \ to \ automatically \ detect \ and \ fit \ lines \ to \ trees \ from \ large \ scale$ aerial photos 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 1.0.0 ...

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

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 install instructions

**ArcGIS Pro** Run as administrator

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

Steps 2/3 also assume that you have a NVIDIA GPU made in the last ~10 years or so. If you

Uninstall

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)

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?

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

🔦 Get Key 1 Info Multiple Lang... Download <u>↓</u> Visual Studio Community 2019 (version 16.11) No key required 1 Info Release date: 12/Jul/2022 x64 Multiple Lang... Download  $\underline{\downarrow}$ Visual Studio Enterprise 2019 (version 16.11)

х64

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

Multiple Lang...

Download <u>↓</u>

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

Individual components

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

Architecture Installer Type Download Installer for Windows 10 x86\_64 The base installer is available for download below. 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 License Agreement not describe CUDA toolkit install Studio features will be used.

CUDA\_Toolkit\_Release\_Notes **EULA** For some reason, sometimes Cuda doesn't install the correct version of "cusolver" for your

envir - See web results environment canada weather Select "Path" and click edit. Then add the following directories using the New button. New %USERPROFILE%\AppData\Local\Microsoft\WindowsApps Value C:\Users\danie\OneDrive C:\Users\danie\AppData\Local\Programs\Microsoft VS Code\bin Edit C:\Users\danie\OneDriv C:\Users\danie\AppData\Local\GitHubDesktop\bin C:\intelFPGA\_lite\20.1\modelsim\_ase\win32aloem Browse... 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 C:\intelEPGA lite\21.1\quartus 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 C:\Users\danie\Desktop\coding\opencvCuda\build\install\x64\vc16\.. Destination=file ws\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 NUMBER OF PROCESSORS NVCUDASAMPLES ROOT C:\ProgramData\NVIDIA Corporation\CUDA Samples\v11.0 Cancel Cancel If the "libnvvp" directory doesn't exist, then Cuda didn't install for visual studio properly.

0 **7** 2021.11 0 **₹** 1.9.0 kerasSeg **才** 0.10.1 treeTagSeg 0 1.4.4 0 0.26.2 0 **才** 20.1.0 0 ↗ 2.6.6 **7** 4.3.1 Quick access keras\_segmentation Import from: Desktop TreeTagger\_venv.yml Local drive Anaconda Nucleus Sign in to save your environment Python New environment name: OneDrive - Personal This PC Overwrite existing environment 3D Objects

Q)

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

Description:

Add Folder.. O Load only Esri provided Add-Ins (Most Secure) Require Add-Ins to be digitially signed by a trusted publisher

Close and reopen ArcGIS Pro and navigate back to the Add-In Manager. You should now see Created by Digital Signa C:\Users\danie\Documents\ArcGIS\AddIns\ArcGISPro\{25f24da5-3654-4d5d-9eb8-62667eea86cc}\TreeTaggerModule.esriAddinX

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,

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=hHWkvEcDBO0

of the ArcGIS shortcut.

Get Key

Gaming (2)

1 Info

Individual components Language packs

n Files (x86)\Microsoft Visual Studio\2019\Com

Step 3 Installing Cuda

Select Target Platform

Operating System

terms and conditions of the CUDA EULA

don't just install the latest version)

**Finish** 

cuda

FastLib

main

weights30

Toolkit\CUDA\v11.0.

find them.

Environment Variables User variables for danie

Variable

OneDrive

TO SDK PATH

QUARTUS ROOTDIR

SOPC KIT NIOS2

Variable asl.log

CUDA\_PATH

installed.

https://www.anaconda.com/

All

Anaconda Navigator

**Learning** 

Best match

(TreeTagger\_venv).

CUDA\_PATH\_V11\_0 DriverData

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

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

You may have to sign into your Microsoft account first. Agents for Visual Studio 2019 (version 16.11) No key required 1 Info Release date: 12/Jul/2022 x64 English Download  $\underline{\downarrow}$ Visual Studio Professional 2019 (version 16.11)

q=visual%20studio%202019&wt.mc\_id=o~msft~vscom~older-downloads

Release date: 12/Jul/2022

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

Installation locations

.NET Framework 4.8 targeting pack

🕏 Install

Nsight for Visual Studio 2017 Nsight for Visual Studio 2015

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

> bin doc extras include

lib

src tools

libnvvp nvml nvvm Sanitizer

Reason: see https://developer.nvidia.com/nsight-vstools Integrated CUDA Profilers

include

NVIDIA\_SLA\_cuDNN\_Support

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". cuinj64\_110.dll cuobjdump

fatbinary

All

Best match

Settings

Search the web

Apps

variables Control panel

curand64\_10.dll 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,

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)

Арр

ce tools or visual

Channels Update index...

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

Tree tagger module for automated tree

Cancel

tagging in ArcGIS

This Add-In file is not digitally signed.

Q

jupyter

w\_jlab\_nb\_ex... O

Upgrade Now

Web

Documents

Anaconda Navigator (anaconda3)

Anaconda Prompt (anaconda3)

Anaconda Prompt (miniconda3)

Applications on base (root)

CMD.exe Prompt

ANACONDA.NAVIGATOR

ANACONDA.NAVIGATOR

TreeTagger\_venv

More ▼

Files\ArcGIS\Pro\bin\TreeTagger\Module) Double click to run the TreeTaggerModule.esriAddinX file to open an installer. Click the install button. 🚼 Esri ArcGIS Add-In Installation Utility Χ 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: 👸 TreeTaggerModule Author: Daniel Butt

Click the Add-in Manager options and add the TreeTagger\Module folder using the add Add-In Manager Search for additional Add-Ins in these folders: C:\Program Files\ArcGIS\Pro\bin\TreeTagger\Module

that the Tree Tagger add-in has been installed.

Desktop **Documents** After you click import, Anaconda will automatically install all the required modules, wait until this process has finished. 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.  $(C:\Pr Gram Files \land CGIS \land Pro \land Din \land TreeTagger)$ This PC > Local Disk (C:) > Program Files > ArcGIS > Pro → bin → TreeTagger Name Install links Module Python TreeTagger\_venv install instructions Step 5 Install Add-On Open the Module folder located in the TreeTagger folder, (C:\Program

Install Add-In Open ArcGIS Pro, from the home page, go to settings, and select the add-in Manager section. TreeTaggerModule TreeTa Created by: Date: 6/14/2022 2:28:03 PM Shared Add-Ins 2.9 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. folder button. Make sure "Load all Add-Ins without restriction" is selected.

🖟 TreeTaggerModule.pdb

Python Add-In Manager Help About Load all Add-Ins without restrictions (Least Secure) Exit

**Portals** 

Licensing Options 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.

There should be a test image for you to run the software on located in the downloaded Tree

Add-Ins Options Shared Add-Ins **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. 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.