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How To Install TensorFlow GPU (With Detailed Steps)

☐ On August 17, 2018   ☐ 0 Comment

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When I started working on Deep Learning (DL) models, I found that the amount of time needed to train these models on a CPU was too high and it hinders your research work if you are creating multiple models in a day. Later I heard about the superior performance of the GPUs, so I decided to get one for myself. One of the basic problems that I initially faced was the installation of TensorFlow GPU.

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After a lot of trouble and a burnt motherboard (not due to TensorFlow), I learnt how to do it. A few days earlier I spoke to someone who was facing a similar issue, so I thought I might help people who are stuck in a similar situation, by writing down the steps that I followed to get it working.

Installing Tensorflow on Windows

CLICK TO TWEET

In this blog, we will understand how to install tensorflow on a Nvidia GPU system. Before we do that, let us look at the various steps involved in the process of installation:

1. Uninstall Nvidia
2. Install Visual Studio
3. Install CUDA
4. Install cuDNN
5. Install Anaconda
6. Install TensorFlow-GPU
7. Install Keras

1. Uninstall Nvidia

This may not look like a necessary step, but believe me, it will save you a lot of trouble if there are compatibility issues between your current driver and the CUDA. Once you login to your system, go to the control panel, and then to the 'Uninstall a program' link. Then scroll below to the section with programs that have been published by the NVIDIA corporation.

Name *

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Are you human?

4 NYRC

Here, you uninstall all the NVIDIA programs. Do not worry if you have some drivers, they can be updated later once you finish the setup.

Once you have removed all the programs, go to the C drive and check all the program files folders and delete any NVIDIA folders in them.
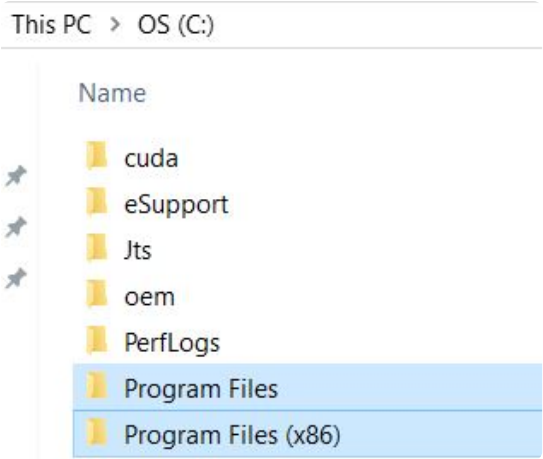
2. Install Visual Studio

In the next step, we will install the visual studio community from **here**

Here, make sure that you select the community option.

Once you have downloaded the Visual Studio, follow the setup process and complete the installation.

3. Install CUDA

This is a tricky step, and before you go ahead and install the latest version of CUDA (which is what I initially did), check the version of CUDA that is supported by the latest TensorFlow, by using **this link**.

I have a windows based system, so the corresponding link shows me that the latest supported version of CUDA is 9.0 and its corresponding cuDNN version is 7.

Requirements to run TensorFlow with GPU support

If you are installing TensorFlow with GPU support using one of the mechanisms described in this guide, then the following NVIDIA software must be installed on your system:

- CUDA® Toolkit 9.0. For details, see NVIDIA's documentation Ensure that you append the relevant Cuda pathnames to the `%PATH%` environment variable as described in the NVIDIA documentation.
- The NVIDIA drivers associated with CUDA Toolkit 9.0.
- cuDNN v7.0. For details, see NVIDIA's documentation. Note that cuDNN is typically installed in a different location from the other CUDA DLLs. Ensure that you add the directory where you installed the cuDNN DLL to your `%PATH%` environment variable.
- GPU card with CUDA Compute Capability 3.0 or higher for building from source and 3.5 or higher for our binaries. See NVIDIA documentation for a list of supported GPU cards.

As it goes without saying, to install TensorFlow GPU you need to have an actual GPU in your system. So please check if you have a GPU on your system and if you do have it, check if it is a compatible version using the third link in the above screenshot.

Once you are certain that your GPU is compatible, download the CUDA Toolkit 9.0 from **this link**.

Please choose your OS, architecture (CPU type of the platform) and version of the OS correctly. Then click on the exe(local) button,

Now download the base installer and all the available patches along with it.

> **Base Installer**
> Download (1.4 GB) ⬇

Installation Instructions:

1. Double click cuda_9.0.176_win10.exe
2. Follow on-screen prompts

> **Patch 1 (Released Jan 25, 2018)**
> Download (54.1 MB) ⬇

cuBLAS Patch Update: This update to CUDA 9.0 includes new GEMM kernels optimized for the Volta architecture and improved heuristics to select GEMM kernels for given input sizes.

> **Patch 2 (Released Mar 5, 2018)**
> Download (54.7 MB) ⬇

cuBLAS Patch Update: This update to CUDA 9 includes GEMM heuristics improvements to selects the most optimized algorithms for input sizes commonly used in Deep Learning RNNs. The update also includes other bug-fixes and performance enhancements.

> **Patch 3 (Released Jun 7, 2018)**
> Download (82.3 MB) ⬇

cuBLAS Patch Update: This update to cuBLAS addresses issues with Convolutional Seq2Seq and RNN inference performance.

> **Patch 4 (Released Aug 6, 2018)**
> Download (56.2 MB) ⬇

cuBLAS Patch Update: This update to cuBLAS includes optimized implementations of GEMV operations for mixed precision input and output types and important fixes to address performance issues.

Once the download is complete, install the base installer first followed by the patches starting from Patch 1 to Patch 4.

If you face any issue during installation, please check the forums using **this link**.

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4. Install cuDNN

Once your installation is completed, you can download the cuDNN files. To do this, go to **this link**.

Here to download the required files, you need to have a developer's login. So, please go ahead and create your login if you do not have one.

Once you create your login and agree to the terms and conditions, visit the archived cuDNN files using **this link**.

And click on the cuDNN version 7.0 for CUDA 9.0

Download cuDNN v7.0.5 (Dec 5, 2017), for CUDA 9.0

Then choose the appropriate OS option for your system.

Download cuDNN v7.0.5 (Dec 5, 2017), for CUDA 9.0

cuDNN Developer Guide

cuDNN Install Guide

cuDNN Release Notes

cuDNN v7.0.5 Library for Linux

cuDNN v7.0.5 Library for Linux (Power8)

cuDNN v7.0.5 Library for Windows 7

cuDNN v7.0.5 Library for Windows 10

cuDNN v7.0.5 Runtime Library for Ubuntu16.04 (Deb)

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cuDNN v7.0.5 Runtime Library for Ubuntu14.04 (Deb)

cuDNN v7.0.5 Developer Library for Ubuntu14.04 (Deb)

cuDNN v7.0.5 Code Samples and User Guide for Ubuntu14.04 (Deb)

This will download a zip file on to your system. Once you unzip the file, you will see three folders in it: bin, include and lib. Extract these three files onto your desktop.

Name	Size
📁 bin	286 877 184
📁 include	107 140
📁 lib	41 814

Once you have extracted them. Go to the C drive, there you will find a folder named NVIDIA GPU Computing Toolkit. Inside this, you will find a folder named CUDA which has a folder named v9.0. In this folder, you can see that you have the same three folders: bin, include and lib. Copy the contents of the bin folder on your desktop to the bin folder in the v9.0 folder. Similarly, transfer the contents of the include and lib folders.

Once you are done with the transfer of the contents, go to the start menu and search for "edit the environment variables". Click on the search result and open the System Properties window and within it open the Advanced tab.
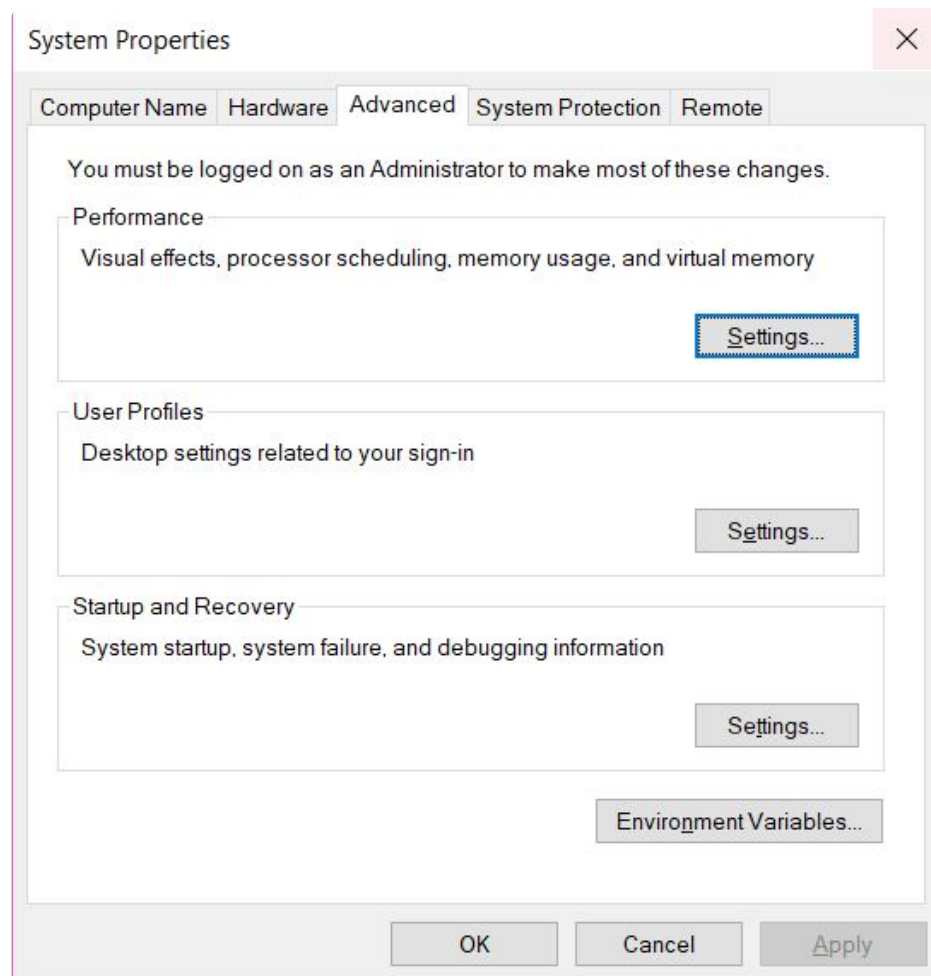
Now click on the 'Environment Variables',
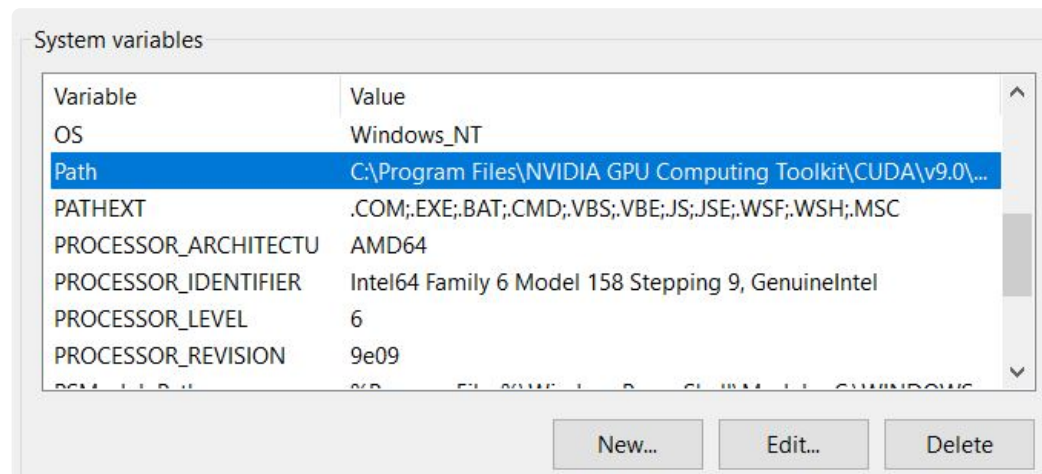
and under System Variables look for PATH, and select it and then click edit.

Add the following two paths to the path variable:

- C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v8.0\bin
- C:\Program Files\NVIDIA GPU Computing Toolkit\CUDA\v8.0\libnvvp
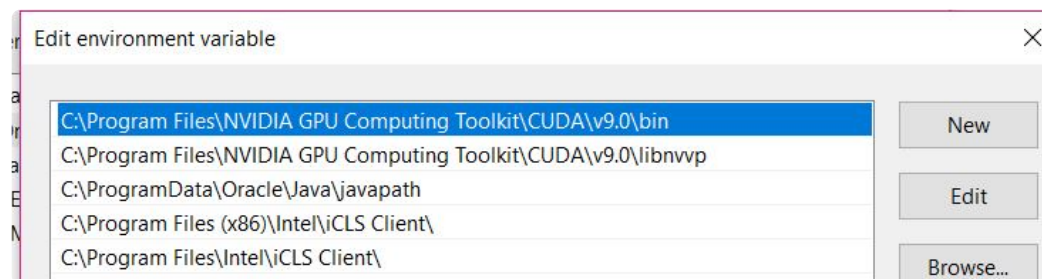
Once you are done with this, you can download Anaconda, and if you already have it, then create a Python 3.5 environment in it.

5. Install Anaconda

To install Anaconda on your system, visit **this link**.

Here choose your OS and the Python 3.6 version, then click on download. Follow the instructions in the setup manager and complete the installation process.

Once you have completed the installation of Anaconda. Create a python 3.5 environment using the following command in the terminal or anaconda prompt.

```
conda create -n tensorflow python=3.5
```

Once the environment is created, activate it using the following command in the terminal or anaconda prompt:

```
activate tensorflow
```

6. Install TensorFlow- GPU

Once you have the environment ready, you can install the tensorflow GPU using the following command in the terminal or anaconda prompt:

```
pip install --ignore-installed --upgrade tensorflow-gpu
```

You will need to specify the version of tensorflow-gpu, if you are using a different version of CUDA and cuDNN than what is shown in this blog. The above line installs the latest version of tensorflow by default. If you have any issues while installing tensorflow, please check **this link**.

7. Install Keras

Once the tensorflow is installed, you can install Keras. Using the following command:

```
pip install keras
```

Once the installation of keras is successfully completed, you can verify it by running the following command on Spyder IDE or Jupyter notebook:

```
import keras
```

Some people might face an issue with the msg package. In case you do, you can install it using the following command

```
conda install -c anaconda msgpack-python
```

I hope you have successfully installed the tensorflow- gpu on your system.

In this article, we have covered many important aspects like how to install Anaconda, how to install tensorflow, how to install keras, by installing tensorflow gpu on windows. We started by uninstalling the Nvidia GPU system and progressed to learning how to install tensorflow gpu.

Next Step

Deep Learning models require a lot of neural network layers and datasets for training and functioning and are critical in contributing to the field of Trading. To learn, how to apply deep learning models in trading visit our new course Neural Networks In Trading by the world-renowned Dr. Ernest P. Chan. It covers core concepts such as back and forward propagation to using LSTM models in Keras.

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