Hvass-Labs / **TensorFlow-Tutorials**   Public

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TensorFlow-Tutorials / README.md

🖼 **Hvass-Labs** Updated to TensorFlow 2   ⟲

👥 **1 contributor**

☰   275 lines (186 sloc) │ 13.9 KB   ⋯

TensorFlow Tutorials

Original repository on GitHub

Original author is Magnus Erik Hvass Pedersen

Introduction

- These tutorials are intended for beginners in Deep Learning and TensorFlow.
- Each tutorial covers a single topic.
- The source-code is well-documented.
- There is a YouTube video for each tutorial.

Tutorials for TensorFlow 2

The following tutorials have been updated and work with **TensorFlow 2** (some of them run in "v.1 compatibility mode").

1. Simple Linear Model (Notebook) (Google Colab)

2. Convolutional Neural Network (Notebook) (Google Colab)

3-C. Keras API (Notebook) (Google Colab)

10. Fine-Tuning ([Notebook](#)) ([Google Colab](#))

13-B. Visual Analysis for MNIST ([Notebook](#)) ([Google Colab](#))

16. Reinforcement Learning ([Notebook](#)) ([Google Colab](#))

17. Hyper-Parameter Optimization ([Notebook](#)) ([Google Colab](#))

18. Natural Language Processing ([Notebook](#)) ([Google Colab](#))

19. Machine Translation ([Notebook](#)) ([Google Colab](#))

20. Image Captioning ([Notebook](#)) ([Google Colab](#))

21. Time-Series Prediction ([Notebook](#)) ([Google Colab](#))

Tutorials for TensorFlow 1

The following tutorials only work with the older **TensorFlow 1** API, so you would need to install an older version of TensorFlow to run these. It would take too much time and effort to convert these tutorials to TensorFlow 2.

3. Pretty Tensor ([Notebook](#)) ([Google Colab](#))

3-B. Layers API ([Notebook](#)) ([Google Colab](#))

4. Save & Restore ([Notebook](#)) ([Google Colab](#))

5. Ensemble Learning ([Notebook](#)) ([Google Colab](#))

6. CIFAR-10 ([Notebook](#)) ([Google Colab](#))

7. Inception Model ([Notebook](#)) ([Google Colab](#))

8. Transfer Learning ([Notebook](#)) ([Google Colab](#))

9. Video Data ([Notebook](#)) ([Google Colab](#))

10. Adversarial Examples ([Notebook](#)) ([Google Colab](#))

11. Adversarial Noise for MNIST ([Notebook](#)) ([Google Colab](#))

12. Visual Analysis ([Notebook](#)) ([Google Colab](#))

13. DeepDream ([Notebook](#)) ([Google Colab](#))

14. Style Transfer ([Notebook](#)) ([Google Colab](#))

15. Estimator API ([Notebook](#)) ([Google Colab](#))

16. TFRecords & Dataset API ([Notebook](#)) ([Google Colab](#))

Videos

These tutorials are also available as [YouTube videos](#).

Translations

These tutorials have been translated to the following languages:

- [Chinese](#)

New Translations

You can help by translating the remaining tutorials or reviewing the ones that have already been translated. You can also help by translating to other languages.

It is a very big job to translate all the tutorials, so you should just start with Tutorials #01, #02 and #03-C which are the most important for beginners.

New Videos

You are also very welcome to record your own YouTube videos in other languages. It is strongly recommended that you get a decent microphone because good sound quality is very important. I used `vokoscreen` for recording the videos and the free [DaVinci Resolve](#) for editing the videos.

Forks

See the [selected list of forks](#) for community modifications to these tutorials.

Installation

There are different ways of installing and running TensorFlow. This section describes how I did it for these tutorials. You may want to do it differently and you can search the internet for instructions.

If you are new to using Python and Linux then this may be challenging to get working and you may need to do internet searches for error-messages, etc. It will get easier with practice. You can also run the tutorials without installing anything by using Google Colab, see further below.

Some of the Python Notebooks use source-code located in different files to allow for easy re-use across multiple tutorials. It is therefore recommended that you download the whole repository from GitHub, instead of just downloading the individual Python Notebooks.

Git

The easiest way to download and install these tutorials is by using git from the command-line:

```
git clone https://github.com/Hvass-Labs/TensorFlow-Tutorials.git
```

This will create the directory `TensorFlow-Tutorials` and download all the files to it.

This also makes it easy to update the tutorials, simply by executing this command inside that directory:

```
git pull
```

Download Zip-File

You can also download the contents of the GitHub repository as a Zip-file and extract it manually.

Environment

I use Anaconda because it comes with many Python packages already installed and it is easy to work with. After installing Anaconda, you should create a conda environment so you do not destroy your main installation in case you make a mistake somewhere:

```
conda create --name tf python=3
```

When Python gets updated to a new version, it takes a while before TensorFlow also uses the new Python version. So if the TensorFlow installation fails, then you may have to specify an older Python version for your new environment, such as:

```
conda create --name tf python=3.6
```

Now you can switch to the new environment by running the following (on Linux):

```
source activate tf
```

Required Packages

The tutorials require several Python packages to be installed. The packages are listed in requirements.txt

To install the required Python packages and dependencies you first have to activate the conda-environment as described above, and then you run the following command in a terminal:

```
pip install -r requirements.txt
```

Starting with TensorFlow 2.1 it includes both the CPU and GPU versions and will automatically switch if you have a GPU. But this requires the installation of various NVIDIA drivers, which is a bit complicated and is not described here.

Python Version 3.5 or Later

These tutorials were developed on Linux using **Python 3.5 / 3.6** (the Anaconda distribution) and PyCharm.

There are reports that Python 2.7 gives error messages with these tutorials. Please make sure you are using **Python 3.5** or later!

How To Run

If you have followed the above installation instructions, you should now be able to run the tutorials in the Python Notebooks:

```
cd ~/development/TensorFlow-Tutorials/  # Your installation directory.
jupyter notebook
```

This should start a web-browser that shows the list of tutorials. Click on a tutorial to load it.

Run in Google Colab

If you do not want to install anything on your own computer, then the Notebooks can be viewed, edited and run entirely on the internet by using Google Colab. There is a YouTube video explaining how to do this. You click the "Google Colab"-link next to each tutorial listed above. You can view the Notebook on Colab but in order to run it you need to login using your Google account. Then you need to execute the following commands at the top of the Notebook, which clones the contents of this repository to your work-directory on Colab.

```
# Clone the repository from GitHub to Google Colab's temporary drive.
import os
work_dir = "/content/TensorFlow-Tutorials/"
if not os.path.exists(work_dir):
    !git clone https://github.com/Hvass-Labs/TensorFlow-Tutorials.git
os.chdir(work_dir)
```

All required packages should already be installed on Colab, otherwise you can run the following command:

```
!pip install -r requirements.txt
```

Older Versions

Sometimes the source-code has changed from that shown in the YouTube videos. This may be due to bug-fixes, improvements, or because code-sections are moved to separate files for easy re-use.

If you want to see the exact versions of the source-code that were used in the YouTube videos, then you can browse the history of commits to the GitHub repository.

License (MIT)

These tutorials and source-code are published under the MIT License which allows very broad use for both academic and commercial purposes.

A few of the images used for demonstration purposes may be under copyright. These images are included under the "fair usage" laws.

You are very welcome to modify these tutorials and use them in your own projects. Please keep a link to the original repository.

Give feedback