

Intro to TensorFlow

Intro.1 Installing *TensorFlow*

For installing *TensorFlow*, follow the following steps:

Note: Please consider using Python 3.7 or higher version and Linux operating system.

Go to <https://www.tensorflow.org/install/> and follow the instructions for installing *TensorFlow* depending on your operating system. We will be working with the current **stable release of TensorFlow (r2.8.0)**. Please install this version of TensorFlow.

Please consider the following instructions as a general guide for the installation process:

- If you are using a Linux machine (e.g. Ubuntu 20.04),
 - Install python3 running in a terminal:
sudo apt-get install python3-pip python3-dev python3-venv
 - Go to your project directory (using cd) and create a virtual environment
python3 -m venv myenv
 - Activate virtual environment and update pip
source myenv/bin/activate
pip install --upgrade pip
 - Install *TensorFlow*
pip3 install --upgrade tensorflow
 - Install additional packages:
pip3 install --upgrade numpy matplotlib jupyter
- If you are using Windows machine,
 - Install Microsoft Visual C++ Redistributable 2015-2022 (vc_redist.x64.exe in the following link):
<https://support.microsoft.com/en-us/help/2977003/the-latest-supported-visual-c-downloads>
 - Download and install Anaconda following the instructions in <https://www.anaconda.com/distribution/>. Install the stable version of Anaconda (Python 3.9).
 - Open an Anaconda Prompt (located in the start menu)
 - Create an environment for *TensorFlow*:
conda create -n tensorflow pip python=3.7
 - Activate *TensorFlow* by running
activate tensorflow
 - Update version of pip
python -m pip install --upgrade pip
 - Install *TensorFlow*
pip install --ignore-installed --upgrade tensorflow
 - Install additional packages
pip install --upgrade numpy matplotlib jupyter

Report: None.

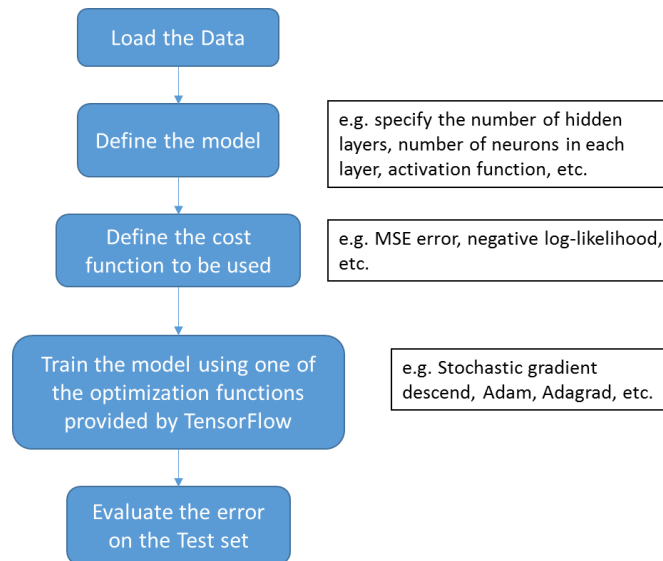
Intro.2 Intro to *TensorFlow*

TensorFlow is a library for numerical computations. In order to work with TensorFlow, you will need to become familiar with Python and Numpy. The following webpages provide quickstart guides for Python and Numpy:

- a) For Python:
<https://www.stavros.io/tutorials/python/>
- b) For Numpy:
<https://docs.scipy.org/doc/numpy/user/quickstart.html>,
<https://docs.scipy.org/doc/numpy/user/numpy-for-matlab-users.html>

Please use Jupyter notebooks (<https://jupyter.readthedocs.io/en/latest/content-quickstart.html>) as a development environment.

TensorFlow enables the training of network models and calculation of gradients via intuitive API. Moreover, the library can take advantage of multiple processors and heterogeneous resources (like GPUs). The high-level steps to supervised learning in TensorFlow are:



To get started with TensorFlow, please familiarize yourself with the TensorFlow Guides <https://www.tensorflow.org/tutorials>, <https://www.tensorflow.org/guide>.

We will be using the low-level API on the assignments. Please familiarize yourself with the API using the following resources:

- <https://www.tensorflow.org/guide/basics>
- <https://www.tensorflow.org/tutorials/customization/basics>
- <https://www.tensorflow.org/guide/variable>
- <https://www.tensorflow.org/guide/tensor>
- <https://www.tensorflow.org/guide/autodiff>

IMPORTANT NOTE: During the course, we will **NOT** use the **Keras** library. Keras is a library that simplifies development but hides a lot of important concepts that we want you to learn. **You are welcome to familiarize yourself with Keras (it's a great library), but you WILL NOT be earning points if you use Keras in your code for the assignments.**

This assignment may be updated.

CMSC 636 Neural Nets and Deep Learning

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Deliverables/Report:

- No report needed
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