Installation Guide for AI Fairness 360 Toolkit

Introduction

We will describe how to install AI Fairness 360 toolkit (AIF360) in a standard machine running a Windows, Linux, MacOS operating systems. This guide is created for the audience at the tutorial at ACM FAT* Conference 2019. The audience are requested to sign up to the slack channel since a lot of discussion is expected to happen there. Remote support is also provided through the channel.

Additional help can be obtained from the following places:

1. Tutorial website: https://github.com/IBM/AIF360/wiki/ACM-FAT*2019-Tutorial
2. AIF360 landing page: http://aif360.mybluemix.net
3. AIF360 Github page: https://github.com/ibm/aif360
4. Slack workspace: https://aif360.slack.com/ (request invitation here: https://join.slack.com/t/aif360/shared_invite/enQtNDI5Nzg2NTk0MTMyLTU4N2UwODVmMTYxZWMwZmEzZmZkODdjMTk5NWUwZDNhNDhlMzNkZDNhOTYwZDNlODc1MTdjYzY5OTU2OWQ1ZmY). Please join the *#fat-tutorial-2019* channel (https://aif360.slack.com/messages/CFDG99ER3), where all discussions will happen during the tutorial.
5. One of the instructors

All commands and console messages will be given in `Lucida Console` font.

Requirements

1. Python 3.5 [Anaconda or Pure Python]
    a. Anaconda distribution can be downloaded from https://www.anaconda.com/download/
    Anaconda is the recommended base distribution to use AIF360 and it is likely the easiest way to install AIF360.
    b. Pure python can be downloaded from https://www.python.org/downloads/
    Pure python is not recommended, but instructions are given for expert users.

2. Access to command prompt/terminal (no GUI install available).

Initial Verification:

1. Check if you have python installed by typing `python` in command prompt/terminal. If this is not installed install it. In Windows, command prompt will not work, you have to use *Anaconda Prompt* for working with Anaconda throughout the tutorial.
2. If the header message says `Anaconda` skip to *Installation with Anaconda*. If not there are 2 choices:
    a. Install Anaconda using the instructions above [recommended].
    b. Continue to instructions in *Installation with Pure Python*.

3. In case you want to try the *Optimized Pre-processing* yourself install the `cvxpy` package. The instructions are available in *Installing CVXPY* section. Note that this is non-trivial for Windows and Linux platforms due to complicated dependencies.

Installation with Anaconda

1. Create and activate environment:

   ```
   conda create --name aif360 python=3.5.6
   conda activate aif360
   ```

   The shell should not look like `(aif360) $`

   To exit this environment and deactivate the shell use

   ```
   conda deactivate
   ```

   Do not deactivate until you completed doing experiments with AIF360. The advantage in using environments is that you can fully remove the environment if something goes wrong with the installation (`conda env remove --name aif360`)

2. Install AIF360

   ```
   pip install aif360
   ```

   should install the latest stable version.

3. Download `tutorial_files.zip` from the *#fat-tutorial-2019* slack channel to the `Downloads` folder and unzip it in place. Change to `tutorial_files` directory.

   Windows:
   ```
   cd C:\Users\%USERNAME%\Downloads\tutorial_files
   ```
   Linux and MacOS:
   ```
   cd ~/Downloads/tutorial_files
   ```

4. Run the script `copy_datasets.py` in the `Downloads` folder to copy the datasets to the correct location in the AIF360 toolbox.

   ```
   python copy_datasets.py
   ```

   NOTE: By running this script, you acknowledge the responsibility for reading and abiding by any copyright/usage rules and restrictions as stated on the corresponding links.

   - Adult / Census Income
     https://archive.ics.uci.edu/ml/datasets/adult
   - German Credit Data
     https://archive.ics.uci.edu/ml/datasets/Statlog+%28German+Credit+Data%29

- ProPublica Recidivism/COMPAS
  https://github.com/propublica/compas-analysis
- Medical Expenditure Panel Survey (MEPS)
  https://meps.ahrq.gov/data_stats/data_use.jsp

5. Take Download examples from https://github.com/IBM/AIF360/tree/master/examples to `tutorial_files/examples` folder. The easiest way to do this is to download the entire repository https://github.com/IBM/AIF360/archive/master.zip and copy the `examples` folder from there.

6. Download UTK dataset Face dataset from https://susanqq.github.io/UTKFace/
   - Choose Aligned&cropped option and download the UTKFace.tar.gz file.

7. Install additional packages
   ```
   pip install --upgrade numpy
   pip install -r requirements.txt
   ```

8. Install PyTorch (for running gender classification tutorial)
   Download page: https://pytorch.org

   Windows: `conda install pytorch-cpu torchvision-cpu -c pytorch`
   Linux: `conda install pytorch-cpu torchvision-cpu -c pytorch`
   MacOS: `conda install pytorch torchvision -c pytorch`

   Install `torchsummary`:

   ```
   pip install torchsummary
   ```

Installation with Pure Python

1. Download and install Python 3.5.4
   Download page: https://www.python.org/downloads/release/python-354/

   Windows: https://www.python.org/ftp/python/3.5.4/python-3.5.4-amd64.exe
   Linux: Manual install only, see download page
   MacOS: https://www.python.org/ftp/python/3.5.4/python-3.5.4-macosx10.6.pkg

2. Create virtual environment:

   Use `virtualenv` to create a virtual environment. Syntax for this command is:

   ```
   virtualenv –python=<<full path to python3.5.4 executable binary>>
   <<virtual environment folder>>
   ```

   In MacOS for example, this command may work.
   ```
   virtualenv -
   python=/Library/Frameworks/Python.framework/Versions/3.5/bin/python3
   ~/.aif360
   ```

3. Activate the virtual environment:

   In MacOS for example, this command may work.
   ```
   source ~/.aif360/bin/activate
   ```

   The prompt should start with (.aif360)

   Deactivation can be just done using `deactivate` command. Do not deactivate until you completed doing experiments with AIF360. Removing the environment can be done by deleting the entire `~/.aif360` directory.

4. Perform steps 2-6 under *Installation with Anaconda*

5. Install PyTorch (for running gender classification tutorial)

   Download page: https://pytorch.org

   Windows:
   ```
   pip3 install https://download.pytorch.org/whl/cpu/torch-1.0.0-cp35-cp35m-win_amd64.whl

   pip3 install torchvision
   ```

   Linux:
   ```
   pip3 install https://download.pytorch.org/whl/cpu/torch-1.0.0-cp35-cp35m-linux_x86_64.whl

   pip3 install torchvision
   ```

   MacOS:
   ```
   pip3 install torch torchvision
   ```

Installing CVXPY [Optional and Non-Trivial]

Windows only[1]: This step needs to be done to install the CVXPY package. If you do not want this package, you can skip this step and go to step c. RUNNING THIS STEP WILL DOWNLOAD AND INSTALL ABOUT 5GB WORTH OF SOFTWARE.

- Go to: https://www.visualstudio.com/downloads/#build-tools-for-visual-studio-2017
- Select free download under Visual Studio Community 2017
- Run the installer.
- Under workload tab:
  i. Under *Windows* there are 3 choices, select *Desktop development with C++* only.
  ii. Under *Web & Cloud* there are 7 choices, select *Python development* only

[1] Courtesy: https://stackoverflow.com/questions/48541801/microsoft-visual-c-14-0-is-required-get-it-with-microsoft-visual-c-build-t

- Proceed and finish installation.
- Install CVXPY.

```
pip install numpy==1.8
pip install cvxpy
```

Linux:

```
pip install numpy==1.8
pip install cvxpy
```

MacOS: You may have to install XCode tools using `xcode-select --install` for this to work.

```
pip install numpy==1.8
pip install cvxpy
```

That’s all Folks!