

Assignment 1

CSCI E-80a Introduction to Artificial Intelligence

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In this coding assignment, we will set up a coding environment for the class. We will be using a Python and package version control software called Anaconda3. This assignment will be a review of its core functionality, while at the same time taking a deep dive into how it stores and manages different versions of packages and Python releases. By the end of the assignment, we will be running a program that trains a deep learning model on one of your Conda environments.

Conda environment assignment

Install anaconda

The environment already had Anacoda 3 installed from a previous deep learning class. Note that the base environment is the active environment, as denoted by the asterisk.

```
[STEVENs-MacBook-Pro:Week01 stevendevisch$ conda info --envs
# conda environments:
#
base                  * /opt/anaconda3
FigureQA              /opt/anaconda3/envs/FigureQA
deep                  /opt/anaconda3/envs/deep
deep37                /opt/anaconda3/envs/deep37

STEVENs-MacBook-Pro:Week01 stevendevisch$ ]
```

Create three new environments

Python 2.7

```
STEVEs-MacBook-Pro:Week01 stevendevisch$ conda create -n py27 python=2.7
Collecting package metadata (current_repodata.json): done
Solving environment: failed with repodata from current_repodata.json, will retry with next repodata source.
Collecting package metadata (repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.7.12
  latest version: 4.8.4

Please update conda by running

$ conda update -n base -c defaults conda

## Package Plan ##

environment location: /opt/anaconda3/envs/py27

added / updated specs:
- python=2.7

The following packages will be downloaded:

  package          |      build
  --::              |
ca-certificates-2020.6.20 |      hecd079_0
certifi-2019.11.28       |      py27h8c360ce_1
libcxx-10.0.1             |      h5f48129_0
libffi-3.2.1               |      hb1e8313_1007
ncurses-6.2                 |      hb1e8313_1
openssl-1.1.1g             |      haf1e3a3_1
pip-20.1.1                  |      pyh9f0ad1d_0
python-2.7.15                |      h8e446fc_1011_cpython
python_abi-2.7                 |      1_cp27m
readline-8.0                   |      h0678c8f_2
setuptools-44.0.0              |      py27_0
sqlite-3.33.0                  |      h960bd1c_0
tk-8.6.10                      |      hb0a8c7a_0
wheel-0.35.1                    |      pyh9f0ad1d_0
zlib-1.2.11                     |      h7795811_1009

Total:           23.3 MB
```

```

The following NEW packages will be INSTALLED:

ca-certificates      conda-forge/osx-64::ca-certificates-2020.6.20-hecd079_0
certifi               conda-forge/osx-64::certifi-2019.11.28-py27h8c360ce_1
libcxx                conda-forge/osx-64::libcxx-10.0.1-h5f48129_0
libffi                conda-forge/osx-64::libffi-3.2.1-hb1e8313_1007
ncurses               conda-forge/osx-64::ncurses-6.2-hb1e8313_1
openssl               conda-forge/osx-64::openssl-1.1.1g-haf1e3a3_1
pip                   conda-forge/noarch::pip-20.1.1-pyh9f0ad1d_0
python                conda-forge/osx-64::python-2.7.15-h8e446fc_1011_cpython
python_abi              conda-forge/osx-64::python_abi-2.7-1_cp27m
readline               conda-forge/osx-64::readline-8.0-h0678c8f_2
setuptools             conda-forge/osx-64::setuptools-44.0.0-py27_0
sqlite                conda-forge/osx-64::sqlite-3.33.0-h900bd1c_0
tk                     conda-forge/osx-64::tk-8.6.10-hb0a8c7a_0
wheel                 conda-forge/noarch::wheel-0.35.1-pyh9f0ad1d_0
zlib                   conda-forge/osx-64::zlib-1.2.11-h7795811_1009

Proceed ([y]/n)? y

Downloading and Extracting Packages
python_abi-2.7          | 4 KB      | #####| 100%
certifi-2019.11.28       | 149 KB    | #####| 100%
python-2.7.15            | 12.2 MB   | #####| 100%
openssl-1.1.1g           | 1.9 MB    | #####| 100%
ncurses-6.2              | 902 KB    | #####| 100%
ca-certificates-2020     | 146 KB    | #####| 100%
readline-8.0              | 255 KB    | #####| 100%
wheel-0.35.1              | 29 KB     | #####| 100%
libffi-3.2.1              | 42 KB     | #####| 100%
libcxx-10.0.1             | 1.0 MB    | #####| 100%
tk-8.6.10                 | 3.3 MB    | #####| 100%
setuptools-44.0.0         | 649 KB    | #####| 100%
pip-20.1.1                 | 1.1 MB    | #####| 100%
sqlite-3.33.0             | 1.7 MB    | #####| 100%
zlib-1.2.11                | 102 KB    | #####| 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
#     $ conda activate py27
#
# To deactivate an active environment, use
#
#     $ conda deactivate
STEVENs-MacBook-Pro:Week01 stevendevisch$ 

```

Python 3.6

```
STEVENs-MacBook-Pro:Week01 stevendevisch$ conda create -n py36 python=3.6
Collecting package metadata (current_repodata.json): done
Solving environment: done
```

```
==> WARNING: A newer version of conda exists. <==
  current version: 4.7.12
  latest version: 4.8.4
```

```
Please update conda by running
```

```
$ conda update -n base -c defaults conda
```

```
## Package Plan ##
```

```
environment location: /opt/anaconda3/envs/py36
```

```
added / updated specs:
  - python=3.6
```

```
The following packages will be downloaded:
```

package	build			
certifi-2020.6.20	py36h9f0ad1d_0	151 KB	conda-forge	
pip-20.2.2	py_0	1.1 MB	conda-forge	
python-3.6.11	hc38f9c5_2_cpython	20.3 MB	conda-forge	
python_abi-3.6	1_cp36m	4 KB	conda-forge	
setuptools-49.6.0	py36h9f0ad1d_0	924 KB	conda-forge	
xz-5.2.5	haf1e3a3_1	228 KB	conda-forge	
				Total: 22.6 MB

```
The following NEW packages will be INSTALLED:
```

```
ca-certificates      conda-forge/osx-64::ca-certificates-2020.6.20-hecd079_0
certifi              conda-forge/osx-64::certifi-2020.6.20-py36h9f0ad1d_0
libcxx               conda-forge/osx-64::libcxx-10.0.1-h5f48129_0
libffi               conda-forge/osx-64::libffi-3.2.1-hb1e8313_1007
ncurses              conda-forge/osx-64::ncurses-6.2-hb1e8313_1
openssl              conda-forge/osx-64::openssl-1.1.1g-haf1e3a3_1
pip                  conda-forge/noarch::pip-20.2.2-py_0
python               conda-forge/osx-64::python-3.6.11-hc38f9c5_2_cpython
python_abi            conda-forge/osx-64::python_abi-3.6-1_cp36m
readline              conda-forge/osx-64::readline-8.0-h0678c8f_2
setuptools            conda-forge/osx-64::setuptools-49.6.0-py36h9f0ad1d_0
sqlite               conda-forge/osx-64::sqlite-3.33.0-h960bd1c_0
tk                   conda-forge/osx-64::tk-8.6.10-hb0a8c7a_0
wheel                conda-forge/noarch::wheel-0.35.1-pyh9f0ad1d_0
xz                   conda-forge/osx-64::xz-5.2.5-haf1e3a3_1
zlib                 conda-forge/osx-64::zlib-1.2.11-h7795811_1009
```

```
Proceed ([y]/n)? y
```

```
Proceed ([y]/n)? y

Downloading and Extracting Packages
python_abi-3.6      | 4 KB      | #####
##### | 100%
xz-5.2.5            | 228 KB     | #####
##### | 100%
pip-20.2.2          | 1.1 MB     | #####
##### | 100%
setuptools-49.6.0   | 924 KB     | #####
##### | 100%
certifi-2020.6.20   | 151 KB     | #####
##### | 100%
python-3.6.11        | 20.3 MB     | #####
##### | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
#     $ conda activate py36
#
# To deactivate an active environment, use
#
#     $ conda deactivate
STEVENs-MacBook-Pro:Week01 stevendevisch$
```

Note how all the packages - except for the certificate - are different. Most notably Python-2.7 vs. Python-3.6. Also quite interesting is that the pip installer is a different version as well.

Python 3.7

Creating a new environment with Python 3.7

```
[STEVENs-MacBook-Pro:Week01 stevendevisch$ conda create -n py37 python=3.7
Collecting package metadata (current_repodata.json): done
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.7.12
  latest version: 4.8.4

Please update conda by running

$ conda update -n base -c defaults conda

## Package Plan ##

environment location: /opt/anaconda3/envs/py37

added / updated specs:
- python=3.7

The following packages will be downloaded:

  package          |      build
  -----|-----
certifi-2020.6.20 | py37hc8dfbb8_0      151 KB  conda-forge
python-3.7.8     | hc9dea61_1_cpython  23.8 MB  conda-forge
setuptools-49.6.0 | py37hc8dfbb8_0      925 KB  conda-forge
  -----
                                         Total:    24.9 MB

The following NEW packages will be INSTALLED:

ca-certificates   conda-forge/osx-64::ca-certificates-2020.6.20-hecd079_0
certifi           conda-forge/osx-64::certifi-2020.6.20-py37hc8dfbb8_0
libcxx            conda-forge/osx-64::libcxx-10.0.1-h5f48129_0
libffi            conda-forge/osx-64::libffi-3.2.1-hb1e8313_1007
ncurses           conda-forge/osx-64::ncurses-6.2-hb1e8313_1
openssl           conda-forge/osx-64::openssl-1.1.1g-haf1e3a3_1
pip               conda-forge/noarch::pip-20.2.2-py_0
python             conda-forge/osx-64::python-3.7.8-hc9dea61_1_cpython
python_abi         conda-forge/osx-64::python_abi-3.7-1_cp37m
readline          conda-forge/osx-64::readline-8.0-h0678c8f_2
setuptools        conda-forge/osx-64::setuptools-49.6.0-py37hc8dfbb8_0
sqlite            conda-forge/osx-64::sqlite-3.33.0-h960bd1c_0
tk                conda-forge/osx-64::tk-8.6.10-hb0a8c7a_0
wheel             conda-forge/noarch::wheel-0.35.1-pyh9f0ad1d_0
xz                conda-forge/osx-64::xz-5.2.5-haf1e3a3_1
zlib              conda-forge/osx-64::zlib-1.2.11-h7795811_1009

Proceed ([y]/n)? y

Downloading and Extracting Packages
python-3.7.8      | 23.8 MB  | #####| 100%
setuptools-49.6.0 | 925 KB   | #####| 100%
certifi-2020.6.20 | 151 KB   | #####| 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
# $ conda activate py37
#
# To deactivate an active environment, use
#
# $ conda deactivate
STEVENs-MacBook-Pro:Week01 stevendevisch$
```

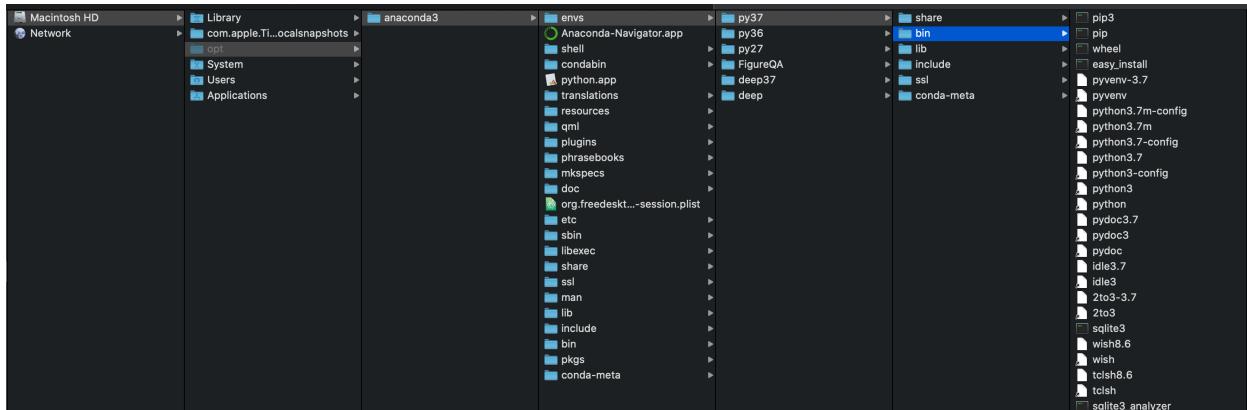
Note that fewer packages needed to be downloaded, probably because certain packages overlap with python 3.6. Also note the specific python-3.7.8 file being downloaded, probably the latest sub version of python 3.7.

Listing the environments

```
STEVENs-MacBook-Pro:Week01 stevendevisch$ conda info --envs
# conda environments:
#
base          * /opt/anaconda3
FigureQA      /opt/anaconda3/envs/FigureQA
deep          /opt/anaconda3/envs/deep
deep37        /opt/anaconda3/envs/deep37
py27          /opt/anaconda3/envs/py27
py36          /opt/anaconda3/envs/py36
py37          /opt/anaconda3/envs/py37
```

It is worth noting that the first column in this table represents the name of the environment. The asterisk in the second column indicates the active environment, and the third column indicates the location of the environments.

The picture below confirms that environments represent folders on disk. And the folders contain the files anaconda and python need to execute programs.



Delete environment py37

Removing the py37 environment

```
[STEVENs-MacBook-Pro:Week01 stevendevisch$ conda remove --name py37 --all

Remove all packages in environment /opt/anaconda3/envs/py37:

## Package Plan ##

environment location: /opt/anaconda3/envs/py37

The following packages will be REMOVED:

ca-certificates-2020.6.20-hecda079_0
certifi-2020.6.20-py37hc8dfbb8_0
libcxx-10.0.1-h5f48129_0
libffi-3.2.1-hb1e8313_1007
ncurses-6.2-hb1e8313_1
openssl-1.1.1g-haf1e3a3_1
pip-20.2.2-py_0
python-3.7.8-hc9dea61_1_cpython
python_abi-3.7-1_cp37m
readline-8.0-h0678c8f_2
setuptools-49.6.0-py37hc8dfbb8_0
sqlite-3.33.0-h960bd1c_0
tk-8.6.10-hb0a8c7a_0
wheel-0.35.1-pyh9f0ad1d_0
xz-5.2.5-haf1e3a3_1
zlib-1.2.11-h7795811_1009

Proceed ([y]/n)? y

Preparing transaction: done
Verifying transaction: done
Executing transaction: done
```

```
STEVENs-MacBook-Pro:Week01 stevendevisch$ conda info --envs
# conda environments:
#
base          * /opt/anaconda3
FigureQA      /opt/anaconda3/envs/FigureQA
deep          /opt/anaconda3/envs/deep
deep37        /opt/anaconda3/envs/deep37
py27          /opt/anaconda3/envs/py27
py36          /opt/anaconda3/envs/py36

STEVENs-MacBook-Pro:Week01 stevendevisch$ █
```

Note that py37 has been removed.

Hello World

Creating the hello world file in a folder of choice.

```
STEVENs-MacBook-Pro:Week01 stevendevisch$ ls
Assignment_2_template_response_v3.docx Assignment_Week1_v2.pdf
STEVENs-MacBook-Pro:Week01 stevendevisch$ pwd
/Users/stevendevisch/E80a/Week01
STEVENs-MacBook-Pro:Week01 stevendevisch$ mkdir hello_world
STEVENs-MacBook-Pro:Week01 stevendevisch$ cd hello_world && touch hello_world.py
STEVENs-MacBook-Pro:hello_world stevendevisch$ ls
hello_world.py
STEVENs-MacBook-Pro:hello_world stevendevisch$ █
```

In addition to hello_world.py, we created a hello_world_par.py and Hello_world_nopar.py. This will illustrate how different python versions respond differently to different versions.

Hello_world_par.py

```
print("Hello World!")
```

Hello_world_nopar.py

```
print "Hello World!"
```

```
(py27) STEVENs-MacBook-Pro:hello_world stevendevisch$ python hello_world_nopar.py
Hello World!
(py27) STEVENs-MacBook-Pro:hello_world stevendevisch$ python hello_world_par.py
Hello World!
(py27) STEVENs-MacBook-Pro:hello_world stevendevisch$ conda deactivate
STEVENs-MacBook-Pro:hello_world stevendevisch$ conda activate py36
(py36) STEVENs-MacBook-Pro:hello_world stevendevisch$ python hello_world_par.py
Hello World!
(py36) STEVENs-MacBook-Pro:hello_world stevendevisch$ python hello_world_nopar.py
  File "hello_world_nopar.py", line 1
    print "Hello World!"
          ^
SyntaxError: Missing parentheses in call to 'print'. Did you mean print("Hello World!")?
(py36) STEVENs-MacBook-Pro:hello_world stevendevisch$ █
```

Note that we adapted the instructions to illustrate the “environments matter” point. The “par” version of hello world works in both environments. However the “nopar” version of hello world only works in the python 3.6 version. We believe this was the intent of the exercise.

Note how (py36) indicates the environment we’re running in, and how our program produces the expected result.

Directory structure and Bash

Following the instructions, we get to the following result.

```
[(py36) STEVENs-MacBook-Pro:hello_world stevendevisch$ cd  
[(py36) STEVENs-MacBook-Pro:~ stevendevisch$ sudo find . -name anaconda3 2> /dev/null  
./opt/anaconda3  
[(py36) STEVENs-MacBook-Pro:~ stevendevisch$ cd ./opt/anaconda3  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ du -sh  
3.3G .  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ du -sh envs  
8.0K envs  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ echo $PATH  
/opt/anaconda3/envs/py36/bin:/opt/anaconda3/bin:/Users/stevendevisch/opt/anaconda3/condabin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:  
in:/sbin
```

There are several unexpected results: a smaller total conda3 installation, and a set of environments that seems too small. The \$PATH illustrates that the active version of python resides in root instead of home. We'll repeat the commands in the root directory to reproduce the expected results.

```
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ sudo find / -name anaconda3 2> /dev/null  
[Password:  
/System/Volumes/Data/Users/stevendevisch/opt/anaconda3  
/System/Volumes/Data/opt/anaconda3  
/Users/stevendevisch/opt/anaconda3  
/opt/anaconda3  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ cd /opt/anaconda3  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ du -sh  
7.9G .  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ du -sh envs  
2.6G envs  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ ls envs  
FigureQA deep deep37 py27 py36  
[(py36) STEVENs-MacBook-Pro:anaconda3 stevendevisch$ cd envs/py36  
[(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ which python  
/opt/anaconda3/envs/py36/bin/python  
[(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ conda deactivate  
[STEVENs-MacBook-Pro:py36 stevendevisch$ which python  
/opt/anaconda3/bin/python  
[STEVENs-MacBook-Pro:py36 stevendevisch$ conda activate  
[(base) STEVENs-MacBook-Pro:py36 stevendevisch$ which python  
/opt/anaconda3/bin/python
```

We note that

- The environment is larger than 7GB
- Environments represent 3.6GB of that, demonstrating that environments are sizable
- “Conda deactivate” and “conda activate” demonstrate that our system’s default and base conda environment are identical

Packages

```
[STEVENs-MacBook-Pro:py36 stevendevisch$ cd /opt/anaconda3/envs/py36
[STEVENs-MacBook-Pro:py36 stevendevisch$ find . -name site-packages
./lib/python3.6/site-packages
[STEVENs-MacBook-Pro:py36 stevendevisch$ conda activate
[(base) STEVENs-MacBook-Pro:py36 stevendevisch$ pip list
Package          Version
-----
alabaster        0.7.12
anaconda-client  1.7.2
anaconda-navigator  1.9.7
anaconda-project  0.8.3
appnope          0.1.0
appscript         1.0.1
asn1crypto        1.0.1
```

```
(base) STEVENs-MacBook-Pro:py36 stevendevisch$ conda activate py36
(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ pip list
Package      Version
-----
certifi      2020.6.20
pip          20.2.2
pipenv       2018.11.26
setuptools   49.6.0.post20200814
wheel         0.35.1
(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ pip install numpy
Collecting numpy
  Downloading numpy-1.19.1-cp36-cp36m-macosx_10_9_x86_64.whl (15.3 MB)
    |██████████| 15.3 MB 7.3 MB/s
Installing collected packages: numpy
Successfully installed numpy-1.19.1
(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ pip list
Package      Version
-----
certifi      2020.6.20
numpy        1.19.1
pip          20.2.2
pipenv       2018.11.26
setuptools   49.6.0.post20200814
wheel         0.35.1
(py36) STEVENs-MacBook-Pro:py36 stevendevisch$ █
```

Notes: pip list did indeed reflect the package installed for the base, and the specific environments respectively. Note that a numpy pip install reduced the version number from 20.2.2 to 1.19.1. Some references sources (e.g. Prof. Gorlin) would suggest not using pip install for this reason, and using pipenv instead. Pipenv will help resolve version issues, while pip install will override versions without doing so.

Summary description of anaconda and environments

Anaconda and its environments allow the user to run multiple python versions in one operating system. This approach allows different projects to utilize different versions of python and/or packages.

Anaconda and its environments also help the programmer to generate reproducible results. Even if python or packages evolve over time, through environments, users can reproduce the setup the software was created for.

Anaconda accomplishes this capability by organizing environments in directories. The base environment contains the default environments and its associated files. The environment folder contains the unique files needed for a specific setup. Not all files are copied over, only the ones that are different from the base setup.

Users can create and name new environments. They can choose the Python version for each environment. The environment manager also installs specific ancillary packages to form a coherent setup. Pip and setuptools are specific. With the python version, other packages are bundled. They can activate an environment in each terminal.

Users can install different packages in different environments. Different environment managers and package installers exist; e.g., Conda, pip, and Pipenv.

CREATING AND DEPLOYING AN ENVIRONMENT

For the purpose of installing the requirements.txt text file we made the following changes:

- Removed the first two lines
- Removed lines associated with openVoiceVNS
- Replaces spaces with >= as per requirements.txt requirements

An extract from requirements.txt

```
absl-py >= 0.10.0
astunparse >= 1.6.3
awscli >= 1.16.94
cachetools >= 4.1.1
certifi >= 2020.6.20
chardet >= 3.0.4
colorama >= 0.3.9
cyclers >= 0.10.0
gast >= 0.3.3
google-auth >= 1.21.0
google-auth-oauthlib >= 0.4.1
```

Running pip install -r requirements.txt downloads and installs all the packages in requirements.txt.

```

  Downloading botocore-1.17.56-py2.py3-none-any.whl (6.6 MB)
    |████████| 6.6 MB 547 kB/s
Collecting jmespath<1.0.0,>=0.7.1
  Downloading jmespath-0.10.0-py2.py3-none-any.whl (24 kB)
Building wheels for collected packages: python-speech-features, sklearn, termcolor, wrapt, PyYAML
  Building Wheel for python-speech-features (setup.py) ... done
  Created wheel for python-speech-features: filename=python_speech_features-0.6-py3-none-any.whl size=5887 sha256=989e61e44074f4d803f081e929dd27ddf9c3705aeef6981de0d28c3b4d5a1d889
  Stored in directory: /Users/stevendevisch/Library/Caches/pip/wheels/6e/e3/24/f8faecfe9da17460cef7bcdbe3c59ec476339e828fc66751
5
  Building wheel for sklearn (setup.py) ... done
  Created wheel for sklearn: filename=sklearn-0.0-py2.py3-none-any.whl size=1316 sha256=116407c8389a698dad0fdee556ac3486cb6706cc75d593945404ce54efb3cdf
  Stored in directory: /Users/stevendevisch/Library/Caches/pip/wheels/23/9d/42/5ec745cbbb17517000a53cecc49d6a865450d1f5cb16dc8a9c
c
  Building wheel for termcolor (setup.py) ... done
  Created wheel for termcolor: filename=termcolor-1.1.0-py3-none-any.whl size=4830 sha256=c8cb4e51a267c48b51387aef4a49d077d915a616c749426696b4e268fbfb48673
  Stored in directory: /Users/stevendevisch/Library/Caches/pip/wheels/93/2a/eb/e58dbcbc963549ee4f065ff80a59f274cc7210b6eab962acd
c
  Building wheel for wrapt (setup.py) ... done
  Created wheel for wrapt: filename=wrapt-1.12.1-cp36-cp36m-macosx_10_7_x86_64.whl size=33209 sha256=91f0554d3f593fcba43842013e5929144e6bf928604c9043e2a9ccb3bdfb8510
  Stored in directory: /Users/stevendevisch/Library/Caches/pip/wheels/32/42/7f/23cae9ff6ef66798d00dc5d659088e57dbba01566f6c60db63
3
  Building wheel for PyYAML (setup.py) ... done
  Created wheel for PyYAML: filename=PyYAML-5.3.1-cp36-cp36m-macosx_10_7_x86_64.whl size=44626 sha256=6a9841093a39c455719edf9a57d84de61692966f20914b439c57ded787b31734
  Stored in directory: /Users/stevendevisch/Library/Caches/pip/wheels/e5/9d/ad/2ee53cf262cba1ffd8afe1487eef788ea3f260b7e6232a80fc
c
Successfully built python-speech-features sklearn termcolor wrapt PyYAML
Installing collected packages: six, absl-py, astunparse, colorama, pyasn1, rsa, python-dateutil, jmespath, docutils, urllib3, botocore, s3transfer, PyYAML, awscli, cachetools, chardet, gast, pyasn1-modules, google-auth, oauthlib, idna, requests, requests-oauthlib, google-auth-oauthlib, google-pasta, grpcio, numpy, h5py, zipp, importlib-metadata, joblib, Keras-Preprocessing, kiwisolver, Markdown, Pillow, Pyparsing, matplotlib, opt-einsum, pytz, pandas, protobuf, python-speech-features, threadpoolctl, scipy, scikit-learn, sklearn, tensorflow-plugin-wit, Werkzeug, tensorboard, termcolor, tensorflow-estimator, wrapt, tensorflow
ERROR: After October 2020 you may experience errors when installing or updating packages. This is because pip will change the way that it resolves dependency conflicts.

We recommend you use --use-feature=2020-resolver to test your packages with the new resolver before it becomes the default.

awscli 1.18.133 requires rsa<=4.5.0,>=3.1.2; python_version != "3.4", but you'll have rsa 4.6 which is incompatible.
tensorflow 2.3.0 requires gast==0.3.3, but you'll have gast 0.4.0 which is incompatible.
tensorflow 2.3.0 requires numpy<1.19.0,>>1.16.0, but you'll have numpy 1.19.1 which is incompatible.
tensorflow 2.3.0 requires scipy==1.4.1, but you'll have scipy 1.5.2 which is incompatible.
Successfully installed Keras-Preprocessing-1.1.2 Markdown-3.2.2 Pillow-7.2.0 PyYAML-5.3.1 Werkzeug-1.0.1 absl-py-0.10.0 astunparse-1.6.3 awscli-1.18.133 botocore-1.17.56 cachetools-4.1.1 chardet-3.0.4 colorama-0.4.3 cycler-0.10.0 docutils-0.15.2 gast-0.4.0 google-auth-1.21.1 google-auth-oauthlib-0.4.1 google-pasta-0.2.0 grpcio-1.31.0 h5py-2.10.0 idna-2.10 importlib-metadata-1.7.0 jmespath-0.10.0 joblib-0.16.0 kiwisolver-1.2.0 matplotlib-3.3.1 numpy-1.19.1 oauthlib-3.1.0 opt-einsum-3.3.0 pandas-1.1.1 protobuf-3.13.0 pyasn1-0.4.8 pyasn1-modules-0.2.8 pyparsing-2.4.7 python-dateutil-2.8.1 python-speech-features-0.6 pytz-2020.1 requests-2.24.0 requests-oauthlib-1.3.0 rsa-4.6 s3transfer-0.3.3 scikit-learn-0.23.2 scipy-1.5.2 six-1.15.0 sklearn-0.0 tensorboard-2.3.0 tensorflow-plugin-wit-1.7.0 tensorflow-2.3.0 tensorflow-estimator-2.3.0 termcolor-1.1.0 threadpoolctl-2.1.0 urllib3-1.25.10 wrapt-1.12.1 zipp-3.1.0
(speech36) STEVENs-MacBook-Pro:installation_guide stevendevisch$ ls

```

We ran assignment1.py to confirm the installed environment can effectively run a tensorflow model.

```
((speech36) STEVE's-MacBook-Pro:installation_guide stevendevisch$ ls
assignment1.py           imdb                  requirements.txt      speech_commands_v0.01
db_utils.py              models                requirements.txt.bu
((speech36) STEVE's-MacBook-Pro:installation_guide stevendevisch$ python assignment1.py
Established Secure Connection.
2020-09-07 16:20:44.292423: I tensorflow/core/platform/cpu_feature_guard.cc:142] This TensorFlow binary is optimized with oneAPI
Deep Neural Network Library (oneDNN)to use the following CPU instructions in performance-critical operations: AVX2 FMA
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
2020-09-07 16:20:44.321990: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x7fec576b0990 initialized for platform Host (this does not guarantee that XLA will be used). Devices:
2020-09-07 16:20:44.322012: I tensorflow/compiler/xla/service/service.cc:176] StreamExecutor device (0): Host, Default Version
Ended Secure Connection.
Epoch 1/7
300/300 [=====] - 1s 5ms/step - loss: 0.5367 - accuracy: 0.8533 - val_loss: 0.2336 - val_accuracy: 0.93
30
Epoch 2/7
300/300 [=====] - 1s 4ms/step - loss: 0.1993 - accuracy: 0.9412 - val_loss: 0.1818 - val_accuracy: 0.94
76
Epoch 3/7
300/300 [=====] - 1s 4ms/step - loss: 0.1397 - accuracy: 0.9588 - val_loss: 0.1415 - val_accuracy: 0.95
70
Epoch 4/7
300/300 [=====] - 1s 5ms/step - loss: 0.1072 - accuracy: 0.9686 - val_loss: 0.1176 - val_accuracy: 0.96
44
Epoch 5/7
300/300 [=====] - 1s 4ms/step - loss: 0.0849 - accuracy: 0.9760 - val_loss: 0.1173 - val_accuracy: 0.96
34
Epoch 6/7
300/300 [=====] - 1s 5ms/step - loss: 0.0693 - accuracy: 0.9807 - val_loss: 0.0983 - val_accuracy: 0.97
13
Epoch 7/7
300/300 [=====] - 1s 5ms/step - loss: 0.0563 - accuracy: 0.9842 - val_loss: 0.0998 - val_accuracy: 0.96
96
313/313 - 0s - loss: 0.0998 - accuracy: 0.9696
Baseline Error: 3.04%
```

It seems reasonable to state the environment was installed correctly. Tensorflow runs a number of epochs, and calculates loss and accuracy.