Be prepared to enter the world of AI

Environment setup guide - Minchang (Carson) Zhang



- Virtual environment setup on Windows OS
- Tensorflow Installation
- Quick introduction to the fundamental libraries
- An important tool: Jupyter Notebook
- Summary

Table of Content

We choose Anaconda over Virtualenv, why? BUILT-IN packages!!

• Over 150 packages are automatically installed with Anaconda.

affine	2.0.0	Matrices describing affine transformation of the plane. / BSD		
alabaster	0.7.9	Configurable, Python 2+3 compatible Sphinx theme / BSD		
alpaca_static	1.5.17	Easy Forms for JQuery / Apache License 2.0		
anaconda-clean	11.0	Delete Anaconda configuration files / BSD		
anaconda-client	1.6.0	anaconda.org command line client library / BSD		
anaconda-navigator	1.5.0	Anaconda Navigator / proprietary - Continuum Analytics, Inc.		
anaconda-project	0.4.1	reproducible, executable project directories / BSD		
anaconda-verify	1.3.2	tool for (passively) verifying conda recipes and conda packages / BSD		
ansi2html	11.1	Convert text with ANSI color codes to HTML or to LaTeX. / GPLv3+		
appdirs	1.4.0	Python module for determining appropriate platform-specific dirs / MIT		
appnope Mec	0.1.0	Disable App Nap on OS X 10.9 / BSD		
appscript Mac	1.0.1	Control AppleScriptable applications from Python / Public-Domain		
apptools	4.4.0	Includes packages useful for creating applications / BSD		
apr	1.5.2	Maintains a consistent API with predictable behaviour / Apache License 2.0		
argcomplete	1.0.0	Bash tab completion of arguments for Python scripts / Apache		
astroid	1.4.9	abstract syntax tree for Python with inference support / LGPL		
astropy	1.3	Community-developed Python Library for Astronomy / BSD		
attrs	15.2.0	Implement attribute-related object protocols without boilerplate / MIT		
autoconf Linux Mac	2.69	M4 Macros to automatically configure software source code / GPL3		
cssselect	1.0.0	cssselect parses CSS3 Selectors and translates them to XPath 1.0 / BSD		
csvkit	0.9.1	utilities for working with CSV, the king of tabular file formats / MIT		
cubes	1.1	A light-weight Python OLAP framework for data warehouses / MIT		
curl	7.52.1	Tool and library for transferring data with URL syntax / MIT/X derivate		
cyxcanon	0.0.23.3	Low-level library to perform the matrix building step in CVXPY / GPL3		
custopt Linux Mec	1.1.8	Library for convex optimization / GPL		
cycler	0.10.0	Composable style cycles / BSD		
cymem ^{Linux} Mac	1.31.2	Manage calls to malloc/free through Cython / MIT		
cython	0.25.2	The Cython compiler for writing C extensions for the Python language / Apache version 2.0		
cytoolz	0.8.2	Cython implementation of Toolz, high performance functional utilities / BSD		
dask	0.13.0	Task scheduling and blocked algorithms for parallel processing / BSD		
datashader	0.4.0	graphics pipeline system for creating representations of large amounts / New BSD		
datashape	0.5.4	Language defining a data description protocol / BSD		
datrie	0.71	Super-fast, efficiently stored Trie for Python, uses libdatrie / LGPLv2		
dbf	0.96.003	Reading/writing dBase, FoxPro, and Visual FoxPro .dbf files / BSD		
dbus ^{Linux}	1.10.10	message bus system, a simple way for applications to talk to one another / GPL2		
decorator	4.0.11	Better living through Python with decorators / BSD		
dill	0.2.5	Serialize all of python (almost) / 3-clause BSD		

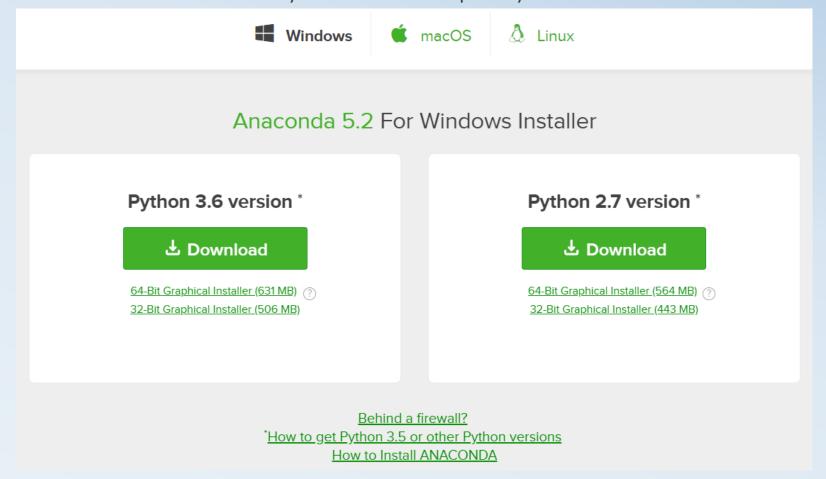
		, , , , , , , , , , , , , , , , , , , 		
automake Linux Mec	1.15	Tool to automatically generate Makefile in files / GPL3		
azure	102	Microsoft Azure SDK for Python / Apache License 2.0		
babel	23.4	Utilities to internationalize and localize Python applications / BSD		
beckports	1.0	/BSD		
basemap Unix No:	107	Plot data on map projections with matplotlib / PSF		
bcolz	10.0	provides columnar, chunked and compressable data containers BSD		
bcrypt	312	modern password hashing for your software and your servers / Apache License, Versian 2.0		
beautifulsoup4	453	Python library designed for screen-scraping / MIT		
biopython	168			
bitarray	0.81	Freely available tools for biological computation / BSD-like efficient representation of arrays of booleans – C extension / PS		
biaze	0101	NumPy and Pandas interface to big data / BSD		
DIAZO		easy whitelst-based HTML-sanitizing tool / Apache Software		
bleach	1.5.0	License		
blist	136	Replacement for Python lists with better performance / BSD		
boketi	0.12.4	Python interactive visualization library for modern web browsers / BSD		
boost	161.0	Boost provides free peer-reviewed portable C++ source librarie Boost license		
tiotis	2.45.0	Amazon Web Services Library / MIT		
boto3	143	Amazon Web Services SDK for Python / Apache License 2.0		
botocore	1.4.90	low-level, core functionality of boto3 / Apache License 2.0		
bottlechest	0.71	fast NumPy array functions specialized for use in Orange / BSD		
bottleneck	12.0	Fast NumPy array functions written in Cython, / Simplified BSD		
distributed	115.1	Lightweight library for distributed computing in Python / BSD 3- Clause		
django	110.5	Web framework that encourages rapid development / BSD		
dnspython	114.0	DNS toolkit for Python / BSD-style		
docopt	0.6.2	Command-line interface description language / MIT		
docutils	0.13.1	Utilities for general- and special-purpose documentation / Public- Domain, PSF, 2-clause BSD, GPLv3		
ecdsa	_	ECDSA cryptographic signature library (pure Python) / MIT		
ecos	0.13	ECDSA cryptographic signature library (pure Python) / MIT		
	2.0.4	ECDSA cryptographic signature library (pure Python) / MIT Embedded Conic Solver (ECOS) / GPL3		
entrypoints	0.10			
entrypoints envisage	2.0.4	Embedded Conic Solver (ECOS) / GPL3 / MIT		
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bsdiff4	115	binary diff and patch using the BSDIFF4-format / BSD		
btrees	4.3.2	scalable persistent object containers / ZPL 21		
bz2file	0.98	library for reading and writing bzip2-compressed files / Apache		
		License, Version 2.0 high-quality data compressor / BSD		
bzip2	1.0.6			
cachecontrol	0.11.7	httplib2 caching algorithms for use with requests / Apache Softwa License		
cached-property	1.3.0	A decorator for caching properties in classes / BSD		
caffe ^{Linux}	1.0.0rc3	A deep learning framework made with expression, speed, and modularity in mind. / BSD 2-Clause		
cairo ^{Linux}	114.8	A 2D graphics library with support for multiple output devices / LGPL 21, MPL 1.1		
certifi	2016.2.28	Python package for providing Mozilla's CA Bundle. / ISC		
cffi	1.9.1	C Foreign Function Interface for Python / MIT		
chalmers	0.8.0	Monitor and control a number of processes on any operating system / MIT		
chameleon	2.24	HTML/XML template engine for Python / BSD-like		
chardet	23.0	Universal character encoding detector / GNU Library or Lesser General Public License		
cherrypy	3.8.0	Pythonic, object-oriented web framework / BSD		
chest	0.2.3	A dictionary that writes its contents to disk / BSD		
chrpath Linux	0.16	Tool to edit the rpath in ELF binaries / GPL2		
click	6.7	Command line interface creation kit / BSD		
click-plugins	10.3	extension module for click to enable registering CLI commands / BSD		
cligj	0.4.0	Click-based argument and option decorators / BSD		
flask-cors	302	Flask extension adding a decorator for CORS support / MIT		
flask-login	0.32	User session management for Flask / MIT		
flask-wtf	0.12	Simple integration of Flask and WTForms / BSD		
fontconfig Linux	2121	A library for configuring and customizing font access / BSD		
freeglut Linux	2.81	An alternative to the OpenGL Utility Toolkit (GLUT) library / MIT		
freeimage	317.0	Supports popular graphics image formats like PNG, BMP, JPEG,		
freetype	2.5.5	TIFF / GPLv2 and Freelmage Public License		
future	016.0	A Free, High-Quality, and Portable Font Engine / FreeType License		
odal Linux Mec	210	Clean single-source support for Python 3 and 2 / MIT Geospatial Data Abstraction Library / MIT		
gensim	013.41	Topic Modelling in Python / GNU Lesser General Public License v2		
geos Unix Mic	350	or later		
geotiff Linux Mac	141	A C++ port of the Java Topology Suite (JTS) / LGPL		
get_terminal_size	100	/MIT backport of the get_terminal_size function from Python 3.3 / MIT		
get_terminal_size gevent	121			
gevent afleas Linux	212	Coroutine-based Python network library / MIT A C++ library that implements commandline flags processing. / BSD		
glags trus	212			
glib Linux	2.50.2	Distributed version control system / GPL v2 and LGPL 2.1 Core application building blocks for libraries and applications in C /		
		LGPL		
glog Lifeix	0.3.4	C++ implementation of the Google logging module. / BSD		
glueviz	0.91	Multi-dimensional linked data exploration / 3-clause BSD License		
grako	3.10.0	takes variation of EBNF as input, and outputs parser in Python / BSD		

cloudpickle	0.2.2	Extended pickling support for Python objects / BSD			
clyent	1.2.2	Command line client library for windows and posix / BSD			
cmake ^{Linux Mac}	3.6.3	CMake is an extensible, open-source system that manages the build process / BSD 3-clause			
colander	1.2	A serialization, deserialization, and validation library / BSD-like			
colorama	0.37	Cross-platform colored terminal text in Python / BSD			
colorcet	0.91	collection of perceptually uniform colormaps / Creative Commons Attribution 4.0 International Public License			
comtypes ^{Windows}	1.1.2	pure Python COM package / MIT			
conda	4.334	OS-agnostic, system-level binary package and environment manager. / BSD			
conda-build	2.1.2	Commands and tools for building conda packages / BSD 3-clause			
conda-env	2.6.0	/BSD			
conda-verify	2.0.0	tool for (passively) verifying conda recipes and conda packages / BSD			
configargparse	0.11.0	allowing options to be set via config files and/or env vars / MIT			
configobj	5.0.6	Config file reading, writing and validation / BSD			
constantly	15.1.0	symbolic constants in Python / MIT License			
constructor	1.5.2	Tool for creating installers for conda packages / BSD			
contextlib2	0.5.4	backports and enhancements for the contextlib module / PSF			
cookies	2.21	Friendlier RFC 6265-compliant cookle parser/renderer / MIT			
cornice	1.2.1	build and document Web Services with Pyramid / MPL 2.0			
coverage	4.2	Code coverage measurement for Python / Apache 2.0			
cryptography	1.71	Provides cryptographic recipes and primitives to Python developer / Apache			
graphviz	2.38.0	Open Source graph visualization software. / EPL vt.0			
greenlet	0.4.11	Lightweight in-process concurrent programming / MIT			
		GStreamer Base Plug-ins / GPL2			
gst-plugins-base ^{Linux}	18.0	GStreamer Base Plug-ins / GPL2			
gst-plugins-base ^{Linux} gstreamer ^{Linux}	18.0	GStreamer Base Plug-ins / GPL2 library for constructing graphs of media-handling components / LGPL2			
		library for constructing graphs of media-handling components /			
gstreamer Linux	18.0	library for constructing graphs of media-handling components / LGPL2			
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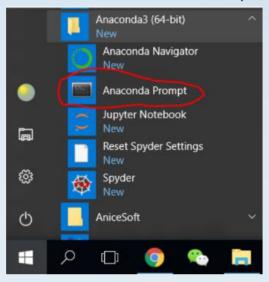
Install Anaconda:

Choose the version that you use most frequently



Setup python environment with Anaconda

Use Anaconda Prompt (NOT the windows Prompt)



- conda create –n environment_name
 - conda create –n new_environment_name --clone existing_env_name
 - conda create –n environment_name python=2.7
 - Check existing environment: conda info --envs

- Working within the environment
 - on Windows: activate environment_name (deactivate)
 - On Mac: source activate environment_name (source deactivate)

```
# To activate this environment, use:
# > source activate py27
#
# To deactivate an active environment, use:
# > source deactivate
#
```

Sublime Text:

Create new built system

```
Check_Version.py × Py36.sublime-build ×

1 {
2    "cmd":
3    [
    "D:/Anaconda3/envs/py36/python",
5    "$file"
6    ],
7    "encoding":"cp936"
8 }
9
```

```
1 {
2    "cmd":
3    [
4        "/Users/Carson/anaconda3/envs/py36/bin/python",
5        "$file"
6    ],
7    "encoding":"utf-8"
8 }
Mac
```

Some useful conda commands:

Commands	Description
conda list	list all the packages installed
conda info –envs	list all the environment created
conda create -n *environment_name	create an environment
conda create —name *name1 —clone *name2	create a new environment (name1) to be a clone of another (name2) one
conda install *package1 *package2	install multipe packages at the same time
conda install *package = version	install a package with a particular version



- 1. Activate virtual environment: activate environment_name
 - For example: activate Tensorflow
- 2. Install Tensorflow (GPU Version): pip install tensorflow-gpu
 - No GPU version: pip install tensorflow
 - IMPORTANT: check the installed version of tensorflow

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.

- Activate virtual environment: activate environment_name
 - For example: activate Tensorflow
- 2. Install Tensorflow (GPU Version): pip install tensorflow-gpu
 - No GPU version: pip install tensorflow
 - IMPORTANT: check the installed version of tensorflow
- 3. Install CUDA
 - Trick 1: Check the legacy release



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 - Trick 3: Use Edge!!
- 4. Download and use cuDnn
 - Copy from download and paste to installed CUDA directory

PC > OS (C:) > Program Files > NVIDIA GPU Computing Toolkit > CUDA > v9.0					
Name	Date modified	Туре	Size		
bin	2018-02-01 7:15 PM	File folder			
doc	2018-02-01 7:14 PM	File folder			
extras	2018-02-01 7:14 PM	File folder			
include include	2018-02-01 7:15 PM	File folder			
📙 jre	2018-02-01 7:14 PM	File folder			
lib lib	2018-02-01 7:14 PM	File folder			
libnvvp	2018-02-01 7:14 PM	File folder			
nvml	2018-02-01 7:14 PM	File folder			
nvvm	2018-02-01 7:14 PM	File folder			
■ src	2018-02-01 7:14 PM	File folder			
La tools	2018-02-01 7:14 PM	File folder			
CUDA_Toolkit_Release_Notes	2017-09-02 7:45 A	Text Document	27 KB		
EULA	2017-09-02 7:45 A	Text Document	82 KB		
version	2017-09-02 7:46 A	Text Document	1 KB		

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- 5. Test code

```
import tensorflow as tf
hello = tf.constant('Hello, TensorFlow!')
sess = tf.Session()
```

```
#Creates a graph.
a = tf.constant([1.0, 2.0, 3.0, 4.0, 5.0, 6.0], shape=[2, 3], name='a')
b = tf.constant([1.0, 2.0, 3.0, 4.0, 5.0, 6.0], shape=[3, 2], name='b')
c = tf.matmul(a, b)
#Creates a session with log_device_placement set to True.
sess = tf.Session(config=tf.ConfigProto(log_device_placement=True))
#Runs the op.
print(sess.run(c))
```

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Quick introduction to the fundamental libraries

Core Libraries

- 1. Numpy: advanced calculation package
- 2. Scipy: built upon Numpy, focus on linear algebra, optimization, integration, and statistics
- 3. Pandas: data analysis

2. Data Visualization

- 1. Matplotlib: can produce many types of plots/charts/histograms
- 2. Seaborn: based on Matplotlib, focuse on the visualization of statistical models
- 3. Bokeh: aim at interactive visualizations
- 3. Machine Learning, Deep Learning, etc:
 - 1. Scikit-learn: essential for machine learning algorithms
 - 2. TensorFlow: enables lower (model-wise) level of modeling
 - 3. Keras: built upon TensorFlow or Theano (i.e. use them as low-level calculation source)
 - 4. Theano: no longer being actively maintained or developed

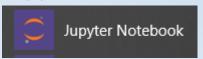
4. Others:

- 1. NLP: NLTK, Gensim
- 2. Data scraping: Scrapy, Beautifulsoup
- 3. Image processing: OpenCV, Pillow

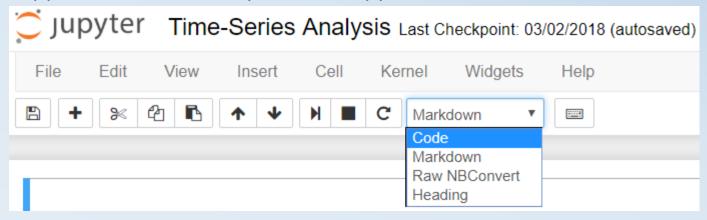
Quick introduction to the fundamental libraries

An important tool: Jupyter Notebook

Jupyter Notebook is integrated with Anaconda

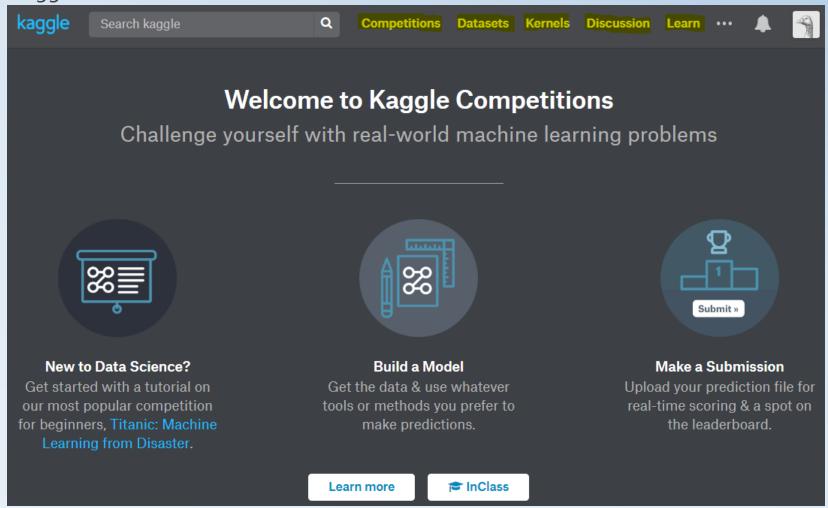


• Jupyter Notebook is very similar to ipython or Methematica



An important tool: Jupyter Notebook

Kaggle!!



An important tool: Jupyter Notebook

Summary

- Virtual environment
 - Anaconda
- Tensorflow Installation
 - GPU version
 - CUDA
 - cuDnn
- Fundamental libraries
 - Numpy
 - Pandas
 - Scikit-learn
- Jupyter Notebook and Kaggle

QUESTIONS?