PASS SUMMIT2019

Code Like a Snake Charmer

Advanced Data Modeling in Python!

Jamey Johnston, Sr. Data Scientist/Engineer

Please silence cell phones

Explore
everything PASS has to offer

Free Online Resources

Newsletters

PASS.org

Free online webinar events

Local user groups around the world

Free 1-day local training events

Online special interest user groups

Business analytics training

Get involved

Jamey Johnston

Sr. Data Scientist/Engineer

/jameyj

@STATCowboy

Education

Texas A&M - MS in Analytics
LSU - BS in Spatial Analysis

Photographer

http://jamey.photos

Blog

https://STATCowboy.com

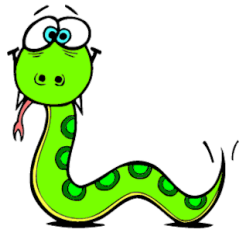
Code

https://github.com/STATCowboy/SnakeCharmer-Adv

Agenda

1. Introduction to Python
2. Anaconda / IDEs
3. Data Wrangling and Visualizations
4. Functions & Classes/Objects
5. Data Science Modeling in Python
6. Flask & Docker Containers
7. Python and Microsoft

Introduction to Python

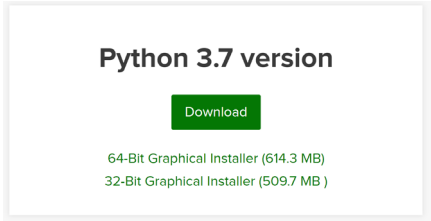


Why Python?

- Expansive Open Source Library of Data Science Tools (Giant Ecosystem)
- Easy language for new programmers
- Microsoft Support in tools like Azure Databricks, Azure Function Apps, Azure Machine Learning, SQL Server 2017+, Microsoft Machine Learning Server
- You can code on a Raspberry Pi (Who doesn't like Pi!)
- The most popular program languages (IEEE Language Rankings 2018 #1)
- Interpreted language, saves you time, no compilation and linking is necessary

Anaconda

Source: http://www.anaconda.com



Anaconda

https://www.anaconda.com/download/

Download the 64-bit Python 3.7 version (still can setup Python 2.7 environments)

You can use miniconda if you don't want the full environment.
(I have switched to it).
https://docs.conda.io/en/latest/miniconda.html

Anaconda

Conda Commands

- Export Conda Environment to YAML file to build a new environment
  - `conda env export > <filename>.yml`
  - * activate the environment to export first
- Create Conda environment from YAML file
  - `conda env create -f <filename>.yml –n <ENV NAME>`

https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

Packages

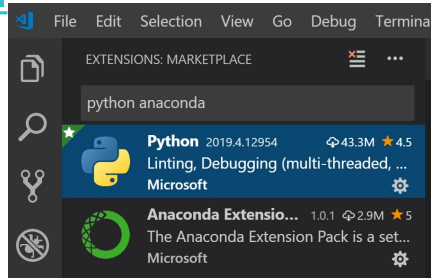
Popular Packages

PACKAGE	DETAILS
pandas	High performance, easy use data structures and analysis (DataFrames)
pyodbc	Open Source Python Module for ODBC data sources
matplotlib	2D Plotting library
scikit-learn	Simple tool for data mining and data analysis / statistics
numpy	N-dimensional arrays, linear algebra, random numbers
SciPy	Math, Stats, Science and Engineering package
tensorflow	Google library to train and develop ML models
keras	High-level neural networks API. Runs on top of TensorFlow, CNTK and Theano

Visual Studio Code

VS Code Python Shortcuts

https://code.visualstudio.com/docs/python/python-tutorial

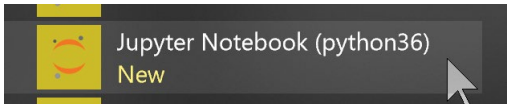


- Command Palette (CP) – `Ctl+Shift+P`
- Select Python Interpreter (in CP) – `Python: Select Interpreter`
- Run Selection/Line in Python Terminal – `Shift+Enter`
- Install pylint for Highlighting Syntax – `conda install pylint (run in all env)`
- Install Python and Anaconda Extensions
- IPython console support in Python Interactive window

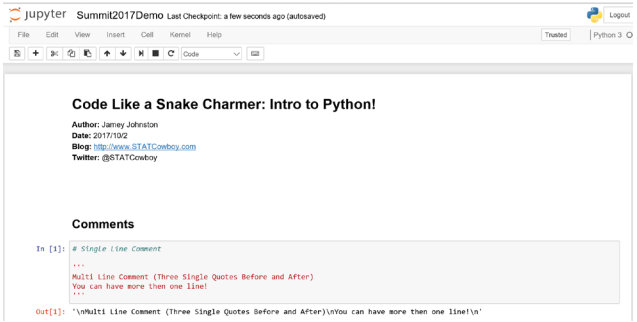
Jupyter Notebooks

Computer Code and Rich Text

http://jupyter-notebook.readthedocs.io/en/latest/



- Activate desired environment first
- Then to Start a Notebook – `jupyter notebook`



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Pandas

Series and DataFrame

Labeled Array Data Structures

Input/output Tools (CSV, Excel, ODBC)

http://pandas.pydata.org/pandas-docs/stable/10min.html

NumPy

Homogeneous Multidimensional Array

N-dimensional arrays, linear algebra, random numbers

https://numpy.org/devdocs/user/quickstart.html

DEMO

Panda & NumPy: Data Wrangling & Visualizations

Functions

Simple Function

```
# NOTE: non-default parameters must be first!
def greetSummit(year, name=None):
    if name is not None:
        print('Welcome to PASS Summit ', year, ', ', name, '!', sep='')
    else:
        print('Welcome to PASS Summit ', year, '!', sep='')

greetSummit(2019)
greetSummit(2019, 'Jamey')
```

Classes/Objects

Simple Class and Objects

```
class Database:
    def __init__(self, instance):
        self.instance = instance

    def mssql(self, version):
        print(self.instance + " is MSSQL version " + version + " and is Clustered!")

    def oracle(self):
        print(self.instance + " is Oracle and has crashed! Call Larry!")

def main():
    prod = Database("prod")
    prod.oracle()
    dev = Database("dev")
    dev.mssql("2019")

if __name__ == "__main__":
  main()
```

DEMO

Functions & Classes

DEMO

Data Science: Regression, Trees, XGB & Deep Learning

DEMO

Flask & Docker Containers

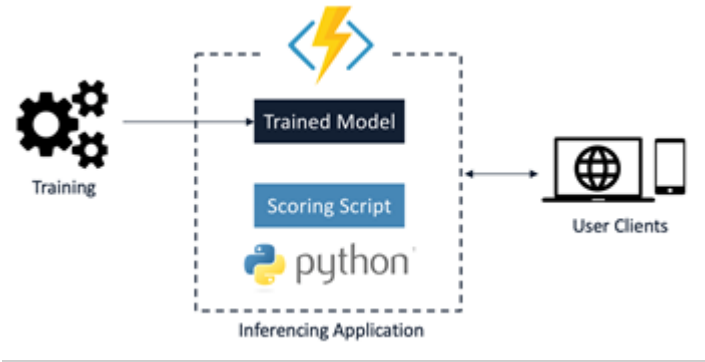
Python and Azure App Sevices

Web Apps on a Fully Managed Platform

https://azure.microsoft.com/en-us/services/app-service/

Python and Azure Functions

Serverless Compute Platform

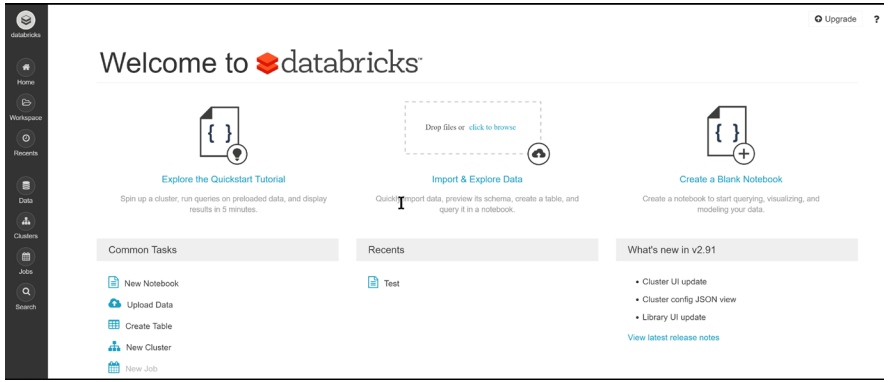


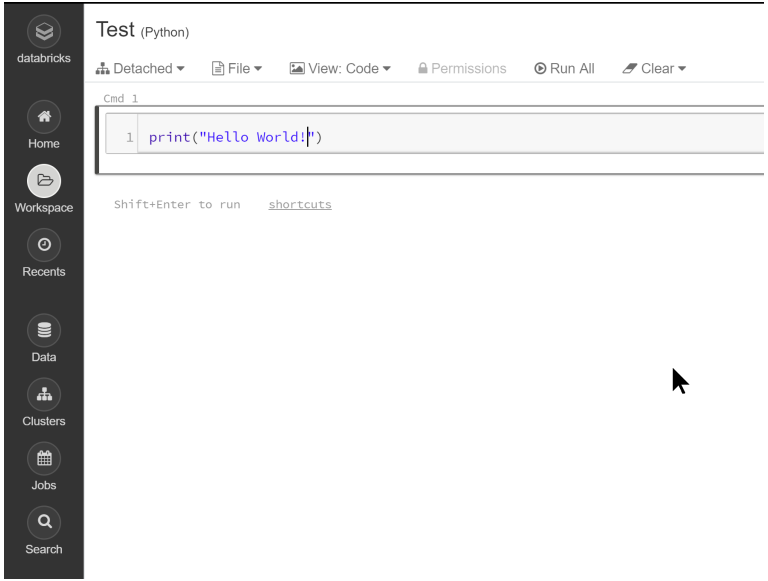
https://azure.microsoft.com/en-us/services/functions/

https://azure.microsoft.com/en-us/blog/announcing-the-general-availability-of-python-support-in-azure-functions/

Python and Azure Databricks

Workbooks





DEMO

MS & Python

References

Python Docs

https://docs.python.org/3/reference/introduction.html

Coursera

https://www.coursera.org/specializations/python

MS Academy

https://academy.microsoft.com/en-us/professional-program/tracks/data-science/

References

The Hitchhiker's Guide to Python!

http://docs.python-guide.org/en/latest/

Code Academy

https://www.codecademy.com/catalog/language/python

Google

https://developers.google.com/edu/python/?hl=en

Session Evaluations

Submit by 5pm Friday, November 15th to win prizes.

3 WAYS TO ACCESS

Go to PASSsummit.com

Download the GuideBook App and search: PASS Summit 2019

Follow the QR code link on session signage

Thank You

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