Python Data Science Immersion Course - 2018 Syllabus

Overview

This course is intended to be a modular immersion series for data scientists interested in using Python for data science-related tasks. This course is composed of 5 sections and is intended to be held over the course of 5 months. The first 4 months will be introductory course topics that will allow data scientists of varying skills levels to select their course topics and materials for their given interests, but to allow newcomers to go from zero knowledge to a basic, well-rounded scope of data science knowledge using the Python programming language.

- Introductions and Why Python?
  - This is intended for newcomers to data science who have little or no knowledge of how to get started. The course and the learning objectives will be reviewed, special considerations for co-learners will be discussed, and time will be given for questions.
- Introduction to Python Programming Language
  - For those who are new or need a refresher, this section is meant to expose co-learners to the Python programming language. Understanding of the programming language will be important for applying its functionality to later sections.
- Web Development in Flask
  - In addition to learning how to build websites, data analysis results and data visualizations are often published online. This section is intended to expose co-learners to web applications and APIs while further developing Python skills. This will also briefly cover HTML, CSS, and Java Script.
- Data Analysis
  - After gaining some experience with Python, this section will cover specialized libraries and techniques for doing data analysis with Python. This will cover basic statistical learning concepts and processes for doing basic manipulation, analysis, and visualization of data.
- Capstone exercise
  - This section will allow co-learners to present any special projects they may have worked on in this course. We will also review the experience of this course and make changes based on co-learner feedback.

The readings for each section are suggested and co-learners are encouraged to find and use alternative materials to accomplish the learning goals for each section. Understanding that some of the texts can be expensive, free online tutorials and blog posts are more than fine for the purpose of learning and adapting Python to data science learning tasks.

This is a co-learning course in which there are no head instructors. Everyone will work through the materials and help each other in understanding the exercises and challenges over the course of each month.

Learning Objectives

- Gain a working understanding of the Python programming language
- Gain a working knowledge of how to build web applications and APIs in Python
- Gain a good understanding of how to perform data manipulation and analysis in Python

- Gain a good understanding of how to visualize your analytic results using Python

Meetings/Discussions

The immersion course co-learning group will meet once a month to 1) discuss the previous month's readings 2) to share experiences with the materials and 3) discuss specific areas of interest for which the co-learners found challenges in using Python or applying concepts to specific data science tasks.

The Bluegrass Developers Guild Slack will be the common place of discussion throughout the month and our in-person meeting location will be at MakeTime in Lexington, KY. All in-person events will be scheduled and posted via the Bluegrass Data Science Group Meetup site: https://www.meetup.com/Bluegrass-Data-Science-Group/

Please go here to join the Bluegrass Developers Guild Slack if you are not already invited (invitations will be validated within 24 hours): https://www.bluegrassdevs.org/

Schedule

Month 1

- Introduction, Setup, Hello World
  - Course Outline Expectations
  - Operating Systems
  - Virtual Environments
    - Python 3.X
    - Anaconda
  - IDEs
    - Jupyter Lab/Notebooks
    - Spyder
    - PyCharm
    - Text editors
  - Installing
  - Resources
  - Q&A

Month 2

- Introduction to Python Programming Language
  - Python Programming: An Introduction to Computer Science by John M. Zelle
    - http://mcsp.wartburg.edu/zelle/python/
    - Introduction if you have NO experience programming
  - Learning Python by Mark Lutz
    - http://shop.oreilly.com/product/0636920028154.do
    - Should be able to find e-book PDF online
    - If you have experience with programming but are new to Python
  - Effective Python by Brett Slatkin
    - http://www.effectivepython.com/
    - Should be able to find e-book PDF online

        - If you have experience with Python but need tutorial on latest updates

Month 3

- Web Development in Flask
    - Flask Mega Tutorial by Miguel Grinberg
        - https://blog.miguelgrinberg.com/post/the-flask-mega-tutorial-part-i-hello-world
        - Free introduction to Flask
    - Flask Web Development by Miguel Grinberg
        - http://shop.oreilly.com/product/0636920031116.do
        - Should be able to find e-book PDF online
        - Is roughly the same material as the mega tutorial

Month 4

- Data Analysis
    - Introduction to Statistical Learning with Python by Thomas Haslwanter
        - https://github.com/thomas-haslwanter/statsintro_python
    - Python for Data Analysis by Wes McKinney
        - http://wesmckinney.com/pages/book.html

Month 5

- Capstone exercise
    - Hackathon (build anything using what you have learned)
    - 10-15 minute presentations for projects

Homework

Month 1

- Setup
    - Review setup instructions for your OS
    - Install Python 3.5 or higher
    - Install IDE/Text Editor or your choice
    - Setup a virtual environment
    - Obtain any learning materials you need for learning Python
    - Join the Bluegrass Developers Guild Slack
- Beginning with Python
    - Create a “Hello World” program in Python
    - Prepare for Month 2 (readings)
- Think about a Project
    - Create or join a project where you can apply your skills
        - Find something at work to automate
        - Find a school project
        - Find a community organization that may need help
    - Find others who may want to work on a projects
    - Start planning on how to move forward

Month 2

- Python Basics
  - Zelle's Intro to CS (Week 1 & 2)
    - Chapters 1-11, 13 (http://mcsp.wartburg.edu/zelle/python/ppics3/index.html)
    - Review slide content
    - Download and practice with sample programs
  - Python by Mark Lutz (Week 3 & 4)
    - Chapters 4-10, 16, 21, 32, 36
    - Do the end of chapter quizzes

Month 3

- Web Development in Flask
  - Flask Mega Tutorial by Miguel Grinberg (Weeks 1 & 2)
    - Focus on sections 1-4, 7, 11, 12, 15-18, 23
  - Build an app (Weeks 3 & 4)
    - Use your experience with the demo app from Weeks 1 & 2 to create your own applications
      - Build a website
      - Build a data API

Month 4

- Data Analysis
  - Introduction to Statistical Learning with Python by Thomas Haslwanter (Weeks 1 & 2)
    - Clone the repo into a virtual environment
    - Run through all the ***ipynb_slides***
    - Run through the ***ISP*** and ***ipynb*** code samples
  - Python for Data Analysis by Wes McKinney (Weeks 3 & 4)
    - Read the whole thing (believe me, it's worth it)
    - Work through as much of the code as possible

Month 5

- Capstone exercise
  - Discuss what you've learned
  - Share what you've worked on
  - Discuss any issues with Python
  - Discuss issues with course