Data analysis with Python and pandas

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About me

- My name is James Polera, I'm the IT manager for a mid-size law firm in Union county, and part of the sister technology company (they do .NET primarily). I also own a consulting company where I do mostly Python/Django apps (in my spare time, of which I have none).
- I've been working in IT professionally since 2000 in both Sysadmin and Developer roles (often at the SAME TIME).
- I'm an autodidactic polyglot (but Python is my "go to" language)

Things we will do

- Crash course in pandas
  - Introduction to the included data structures
  - Some basic data processing
- Extol the virtues of virtualenv (but not in a pushy way)
- Use the fabulous IPython HTML Notebook

Things we will not do

- Any advanced statistics (it's beyond the scope of this talk and the knowledge of your speaker).
- Go over installing modules via pip.
- Cover *all* of pandas. There’s a lot to it.
- Be apprehensive. If you think I'm wrong about anything, tell me. I'd rather know if there is a better way to do things.

What is pandas?

- A library for doing data analysis in Python
- Project lead: Wes McKinney
- http://pandas.pydata.org
- Built on top of NumPy (http://www.numpy.org)

Notable features

- Data alignment (think relational database tables)
- Data grouping
- Support for various file formats (csv, xls, HDF5, SQL databases)

Notable features

- Ability to add and remove columns on the fly
- Integration with matplotlib
- Intelligent merging and joining of datasets

A little bit about NumPy

- pandas leverages some great work from the NumPy project and builds on it.
- The ndarray data structure and NumPy's broadcasting abilities are heavily used in pandas.

What's ndarray?

- ndarray is an N-dimensional (i.e. multi dimensional) array
- Supports what the NumPy project calls "broadcasting"
- Let's take a look

pandas data structures

- Series
  - A Series is a one dimensional labeled array. It can hold any Python datatype

pandas data structures

- DataFrame
  - A 2-dimensional labeled data structure with columns of potentially different types.
  - It's like a spreadsheet or a database table.
  - It's one of the coolest things about pandas.

pandas data structures

- Panel
  - A Panel is a container for 3 dimensional data.
  - We're not going to cover it in this talk, but I mention it here as an exercise for you to follow up on.

Tonight's dataset (roughly) brought to you by

- This guy:  (@chrisbaglieri)
- Chris is a software engineer who was a PUG/IP regular back in 2011 before moving out of the area.
- He wrote a Ruby gem called "quake" https://github.com/chrisbaglieri/quake
- Check it out!

Processing data: Pure Python

- From the Python standard library
  - The csv module

Processing data: Pure Python

- From the Python standard library
  - collections.namedtuple
    - namedtuple makes it easy to give meaning to the items in a tuple, making them behave more like an object with getters.

Virtues

- Words to live by: *"...the three great virtues of a programmer: laziness, impatience, and hubris."* - **Larry Wall (creator of the Perl programming language)**

Processing data: pandas

- This ***is*** why you came here tonight, right?
- Let's take a look at that dataset again.

What do I need to install?

ipython==0.13.1
matplotlib==1.2.0
numpy==1.6.2
pandas==0.10.1
python-dateutil==2.1
pytz==2012j
pyzmq==2.2.0.1
tornado==2.4.1
wsgiref==0.1.2

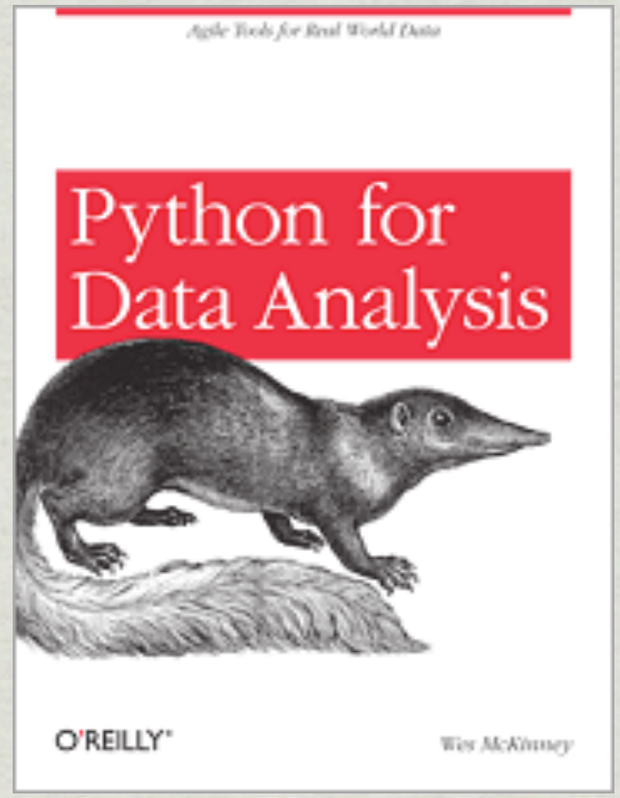
Resources

http://pandas.pydata.org

http://earthquake.usgs.gov/earthquakes/feed/

https://github.com/polera/data_analysis_python_pandas

Other Talks (by other people):
- from PyData NYC 2012
  http://vimeo.com/search?q=python+pandas



Thank you

- Comments and questions welcome.
- You can reach me at james@uncryptic.com or on Twitter @uncryptic.