python™

First chapter

A brief intro to Python

JUN JIN

ECNU Statistic Student

華東師範大學

EAST CHINA NORMAL UNIVERSITY

Theme of Quantitative Finance

East China Normal University, March 11, 2017

A glance of Python

what is Python?

- Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together.

A glance of Python

why we choose it?

These are the advantages of Python use:

Speed

Considering as an advanced computer language, Python bears a fast calculating ability. Though it's hard to say that Python has the most fastest calculating ability (Actually, compared with C or C++, it's too slow.), Python is using as a combination of speed and multifunction.

Multifunction

Just as R but more faster than R, Python's user could import a great deal of libraries to implement different goals. Compared with C, you may write 10 rows of Python code to replace 100 rows of C code.

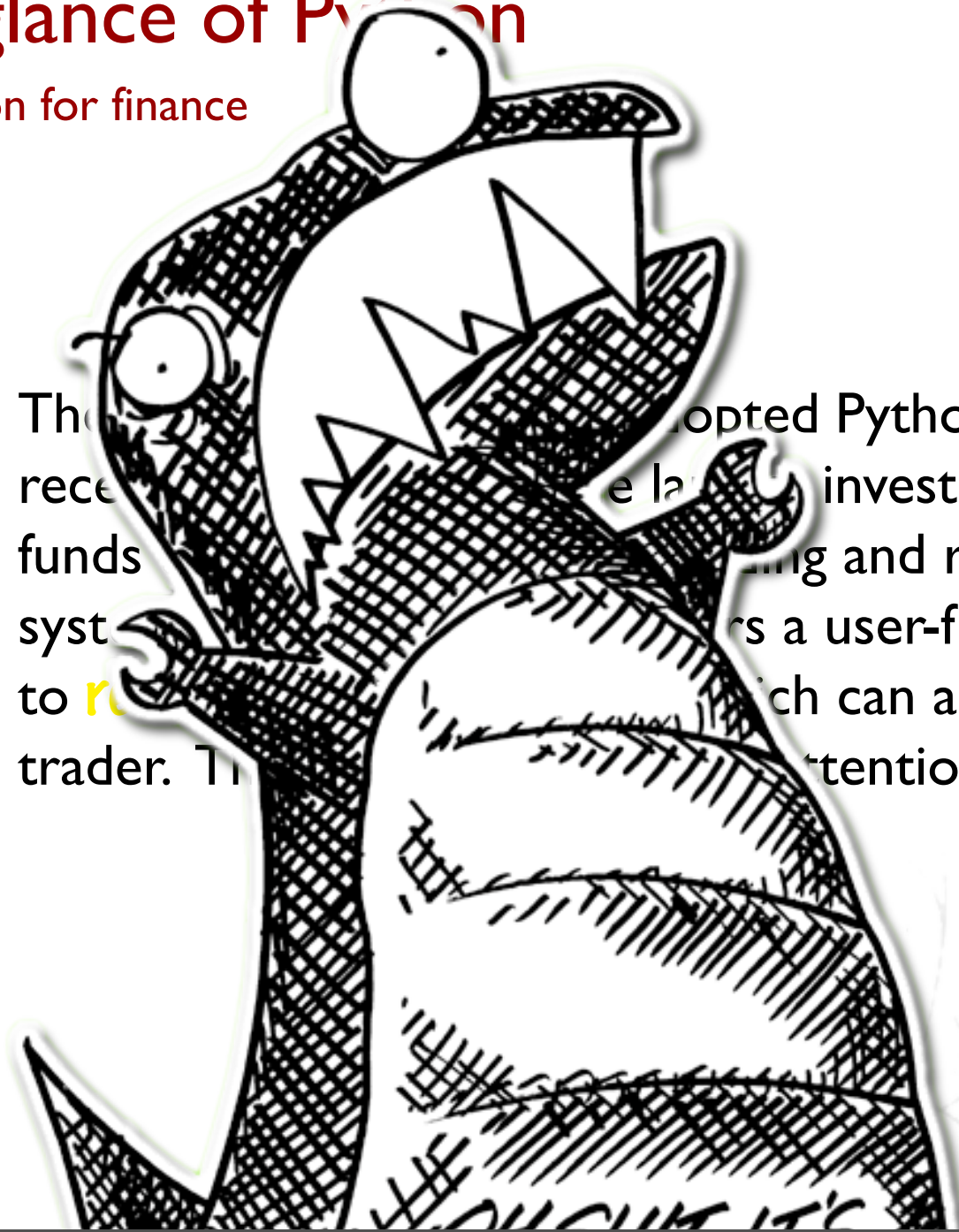
A glance of Python

Python for finance

- The financial industry has adopted Python at a tremendous rate recently, with some of the largest investment banks and hedge funds using it to build core trading and risk management systems , because Python offers a user-friendly language system to reduce the maintain cost which can alleviate the strain of trader. Thus, they can put their attention on forming portfolio.

A glance of Python

Python for finance



- The ...opted Python at a tremendous rate rece... la... investment banks and hedge funds ...g and risk management syst... ...s a user-friendly language system to r... ...ch can alleviate the strain of trader. T... ...ttention on forming portfolio.

Rudimentary knowledge

variable format

There are many formats of Data storage:

Basic format adducing

Character string, Boolean type, Numerical (Integrity and Float), List, Tuple, Dictionary, Date.

Specific intro and examples: Structure.py

Rudimentary knowledge

about library

Most amazing thing of using Python is you can import foreign library to simplify coding. But how to ? And what are most pragmatic libraries?

NumPy (http://www.numpy.org)

NumPy provides users with Multidimensional array object to store the data; Meanwhile a method to operate this kind of object is offered as well.

SciPy (http://www.scipy.org)

SciPy is a group of sublib and functions which can insure the most essential standard function to conduct scientific or financal calculation; For instance, you could find cubic spline interpolation in this library.

Rudimentary knowledge

about library

Matplotlib (http://www.matplotlib.org)

This is the most endemic library for graphics and visualization. Certainly, 2D or 3D versions are both available.

pandas (http://www.pandas.pydata.org)

pandas is a brilliant library which is popularly used in creating TS data administration of tables. It is based on NumPy and have a mature connector with Matplotlib, thus, user could easily make their result visible.

Rudimentary knowledge

about library

Then, it is matter that how to add the library you want. Unfortunately, adding libraries in Python is not as easy as it is in R, with just a simple command "install.packages()", especially in Windows system. However, some programmer has invented several methods to ameliorate the process. Let's have a brief look on the primitive method.

Rudimentary knowledge

set library

Primitive method:

- 1.Visit the offical website of the library and download the packages for correct version.
- 2.find your python root directory, then find your packages directory. In most cases, it will be a folder named "site-packages".
- 3.uncompress the downloaded file to the directory above.

Rudimentary knowledge

set library

Advanced method (Require command of linux shell language):
For linux user, installation of everything seems to be very ez with such a short command of "brew install xxx" and "pip install xxx". (MAC OX is both ok!) That may be one of the reasons why most programmer are prone to use linux system.

- 1."brew install pip"
- 2."pip install numpy"

Rudimentary knowledge

import library

When you complete the installation of library, you can use it in your programme. And let's have a look on this operation.

- 1. frome numpy import * $\Rightarrow$ log()
- 2. import numpy as np $\Rightarrow$ np.log()

Rudimentary knowledge

Financal base

After talking about primary operations of Python, you may have a strong eager to have a try. Just hold on, cause a basic financal trick is necessary indeed.

GBM (also called Wiener process)

People rack their brain to explore the alternative law of the stock market(and other fincancal markets),finally it's paid off- GBM:

$$dS_t = \mu S_t dt + \sigma S_t dW_t \tag{1}$$

In the formula,S_t is the TS of price of the object, μ is called "Drift" and σ is called "fluctuation".

Rudimentary knowledge

Financal base

Now, you can create the fisrt programme mixed with a taste of finance.

Specific info: pure-py-mont.py

Thank you for listening.