Python for Earth Observation

By Seyed Ali Ahmadi


مرکز آموزش‌های عالی آزاد دانشگاه – دانشکده نقشه برداری برگزار می‌کند
با اعطای گواهینامه معتبر از دانشگاه صنعتی خواجه نصیرالدین طوسی
سومین دوره از دوره های آموزش
پایتون در علوم داده
DATA MINING
آنچه در این دوره خواهید آموخت
Review on Python (syntax, numpy, matplotlib, scipy, pandas)
Business Understanding
Data Understanding
Data Preparation
Modeling (KNN, K-means, Linear/logistic Regression, neural networks, text mining, decision tree)
Evaluation
Visualization
Data Presentation
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با اعطای گواهینامه معتبر از دانشگاه صنعتی خواجه نصیرالد
مباحث دور
- آشنایی با
- توابع، لیست ها، آرایه
comprehension، lambda functions و ...
- کار کردن با کتابخانه های مشهور numpy،
scipy، pandas و matplotlib
- پیاده سازی پروژه توسط دانشجویان
روزهای فرد ۲۴ تیر تا ۲ مرداد
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python
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دومین دوره
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سری دوره های «پایتون در علوم کامپیوتر»
آموزش برنامه نویسی با زبان پایتون
تئوری و عملی
با اعطای گواهینامه معتبر از دانشگاه
صنعتی خواجه نصیرالدین طوسی
زمان برگزاری: روزهای زوج، 23 تیر تا 1 مرداد
طول دوره: 18 ساعت
learn
مباحث دوره:
- آشنایی با زبان برنامه نویسی پایتون
- توابع، لیست ها، آرایه ها، lambda ،OOP
- کار کردن با کتابخانه های مشهور numpy،
scipy، pandas و matplotlib
- پیاده سازی پروژه توسط دانشجویان
تهران، خ ولیعصر، بالاتر از میدان ونک، دانشگاه صنعتی خواجه نصیرالد

WHAT WILL YOU LEARN?

Python programming

You will be able to

1) write simple to complex programs in Python,
2) use various packages,
3) and find your way to the best solution.

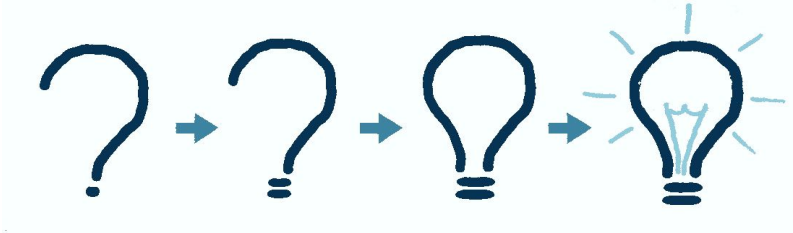
Machine Learning

You will become familiar with ML/DL packages in Python; and will learn how to implement machine learning tasks in Python.

PY4EO

The final goal is to be able to create programs which utilize Python and other available packages (Geospatial, Image processing, Machine learning, etc.) to complete a **“Remote Sensing”** project.

WHAT DO WE DO IN THIS COURSE?



first

Learn basics of Python

Start programming with Python

Become familiar with well-known and most-used packages

then

Learn how to implement different algorithms in Python

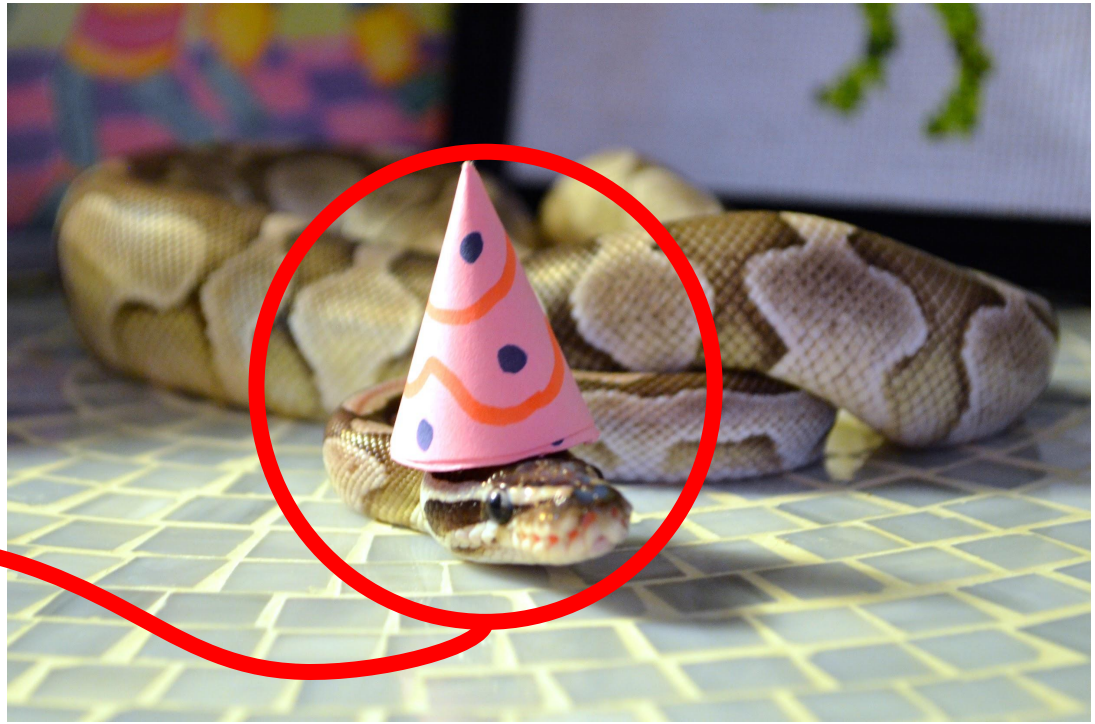
Learn how to read various file formats in Remote Sensing

finally

Complete some simple but real Remote Sensing projects with Python and available packages

a brief Intro to Python

- Interpreted
- High-level
- General-purpose



Actually she’s python!

a brief History of Python

1989: born by Guido Van Rossum

1994: version 1

2008: version 3

Now: python 3.6
3.6.5 as stable version

1991: @Feb, published the code

2000: version 2

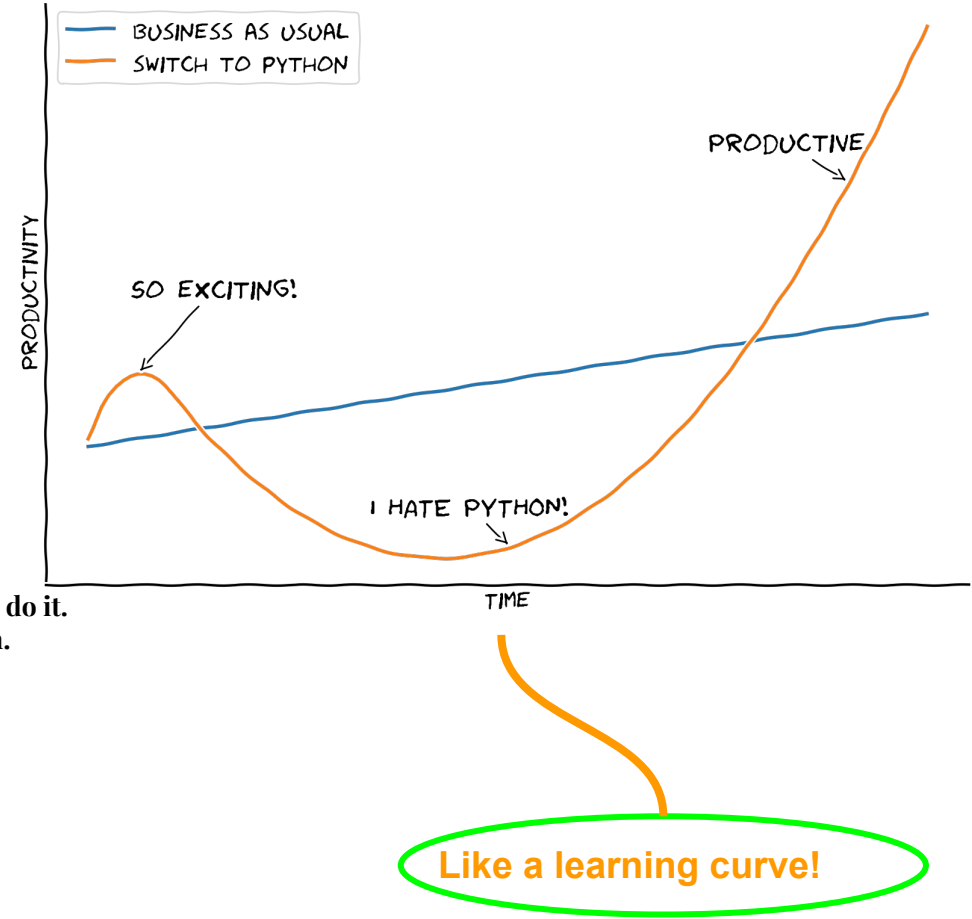
2.x ⇒ print a
3.x ⇒ print(a)

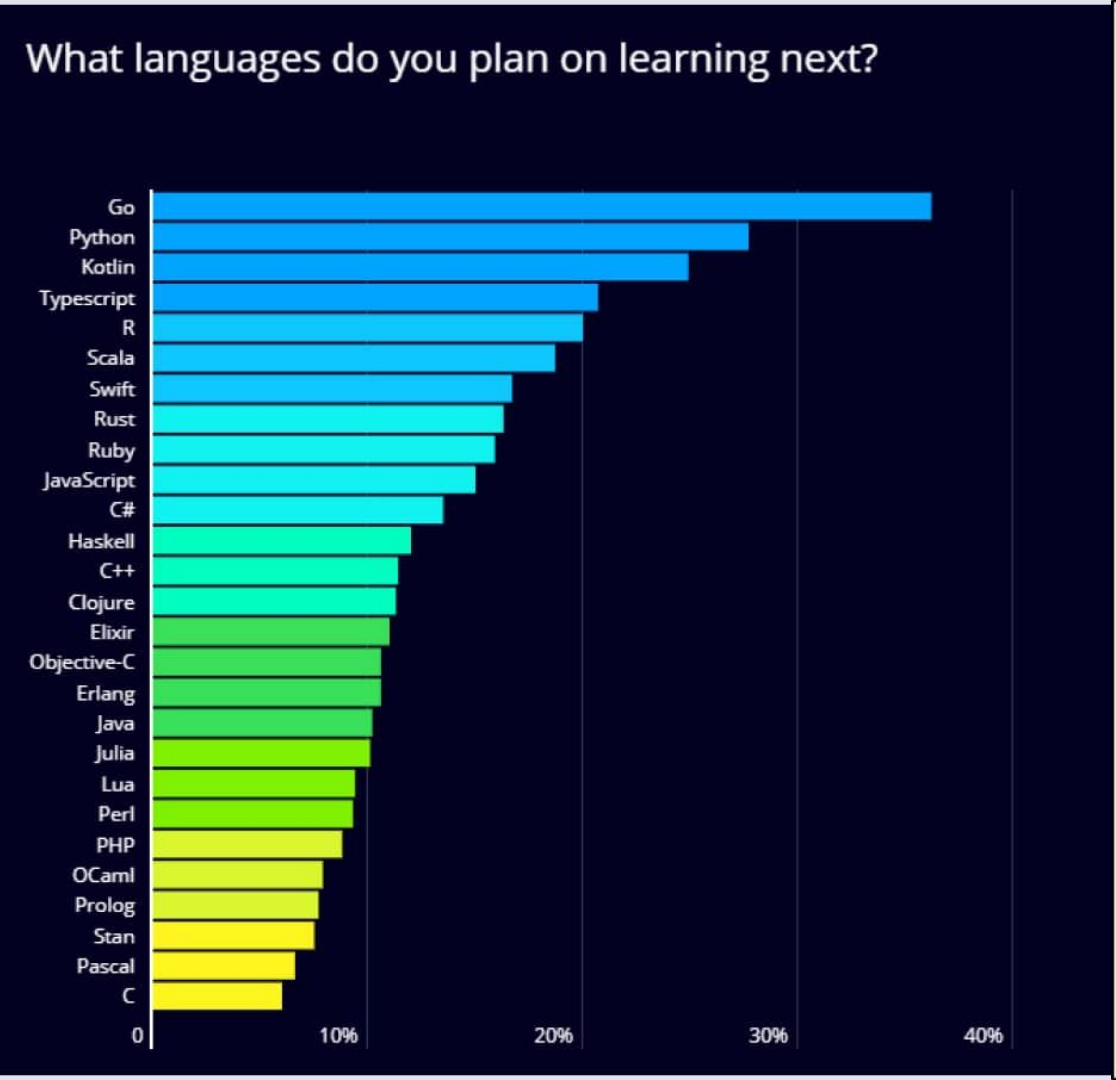
a brief set of Python features

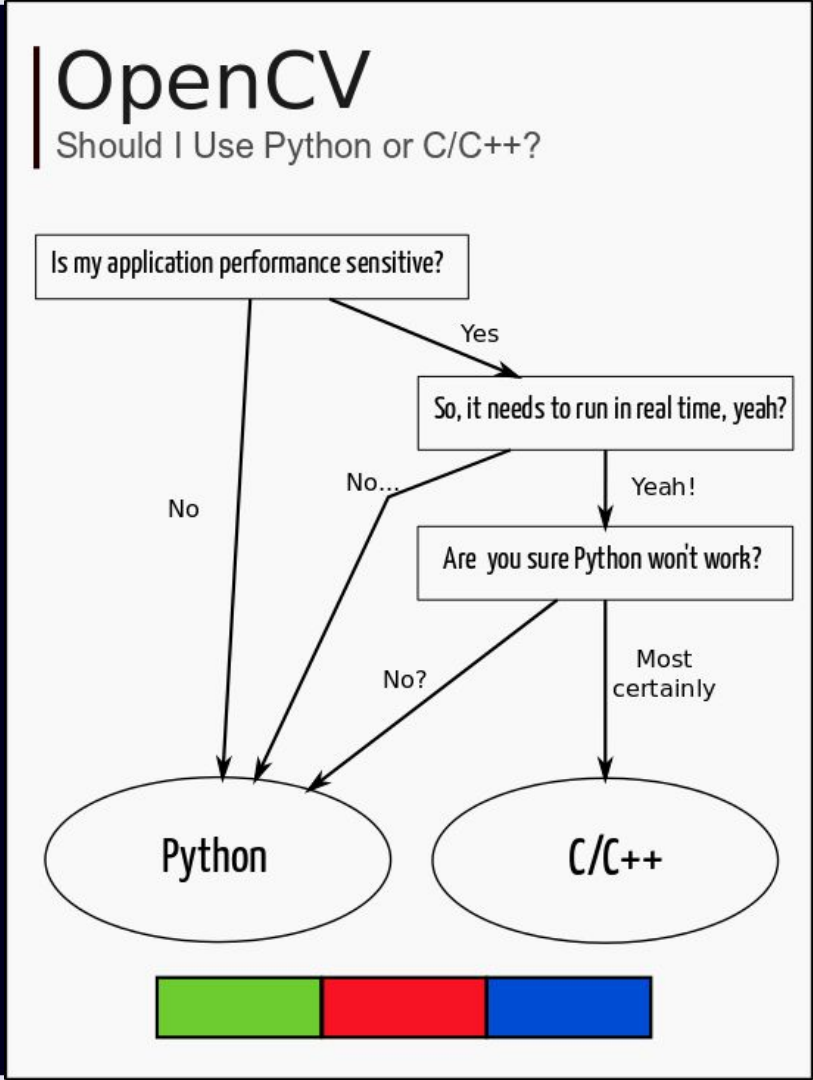
- Dynamic type
- Automatic memory management
- Multiple programming paradigms
  - Object-Oriented
  - Imperative
  - Functional
  - Procedural
- Open-source, Fast, Powerful libraries, etc.

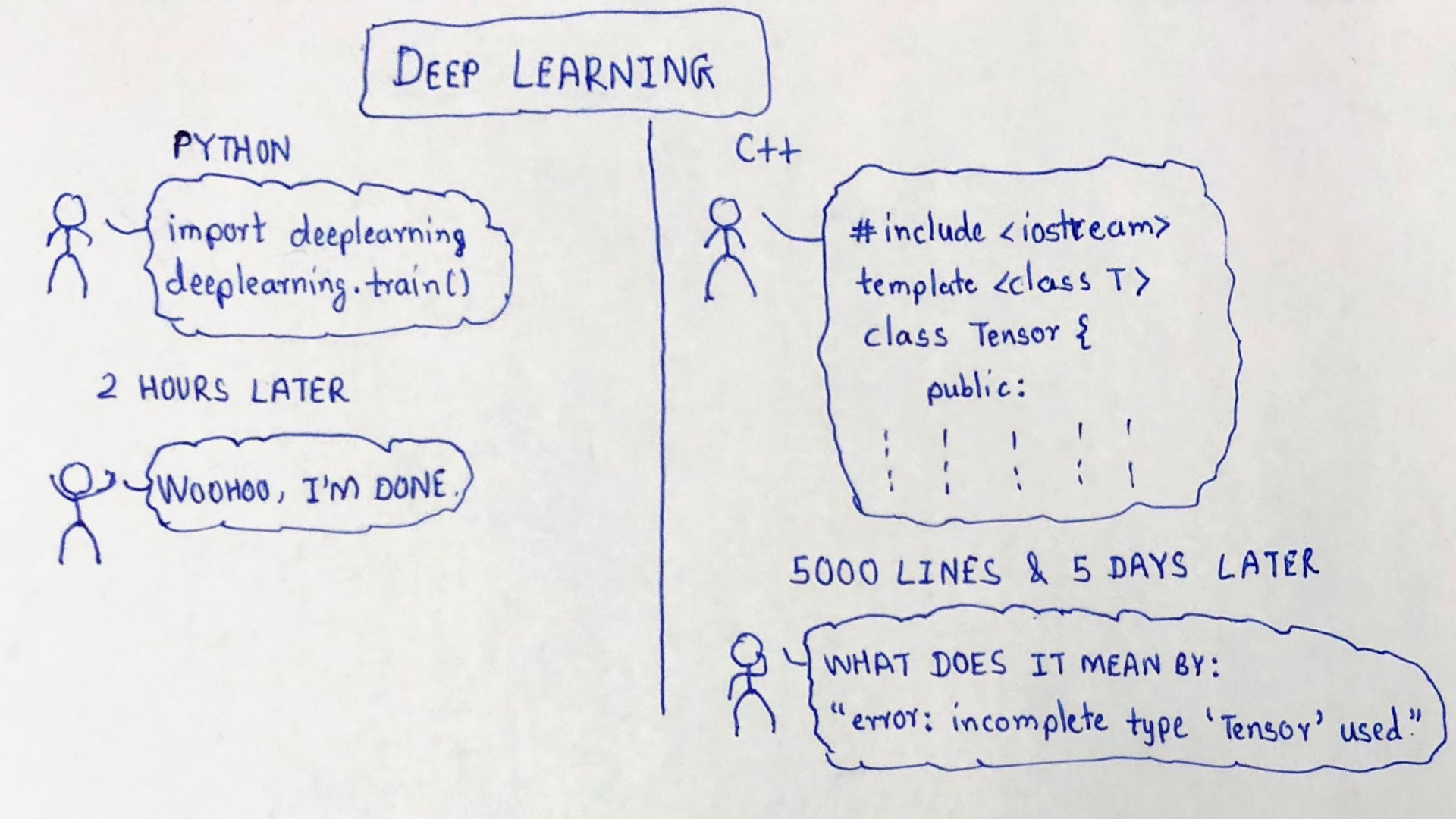
brief Zen of Python

- **Beautiful is better than ugly.**
- Explicit is better than implicit.
- **Simple is better than complex.**
- **Complex is better than complicated.**
- Flat is better than nested.
- Sparse is better than dense.
- Readability counts.
- **Special cases aren't special enough to break the rules.**
- Although practicality beats purity.
- Errors should never pass silently.
- Unless explicitly silenced.
- In the face of ambiguity, refuse the temptation to guess.
- **There should be one -- and preferably only one -- obvious way to do it.**
- **Although that way may not be obvious at first unless you're Dutch.**
- Now is better than never.
- Although never is often better than *right* now.
- **If the implementation is hard to explain, it's a bad idea.**
- **If the implementation is easy to explain, it may be a good idea.**
- Namespaces are one honking great idea -- let's do more of those!

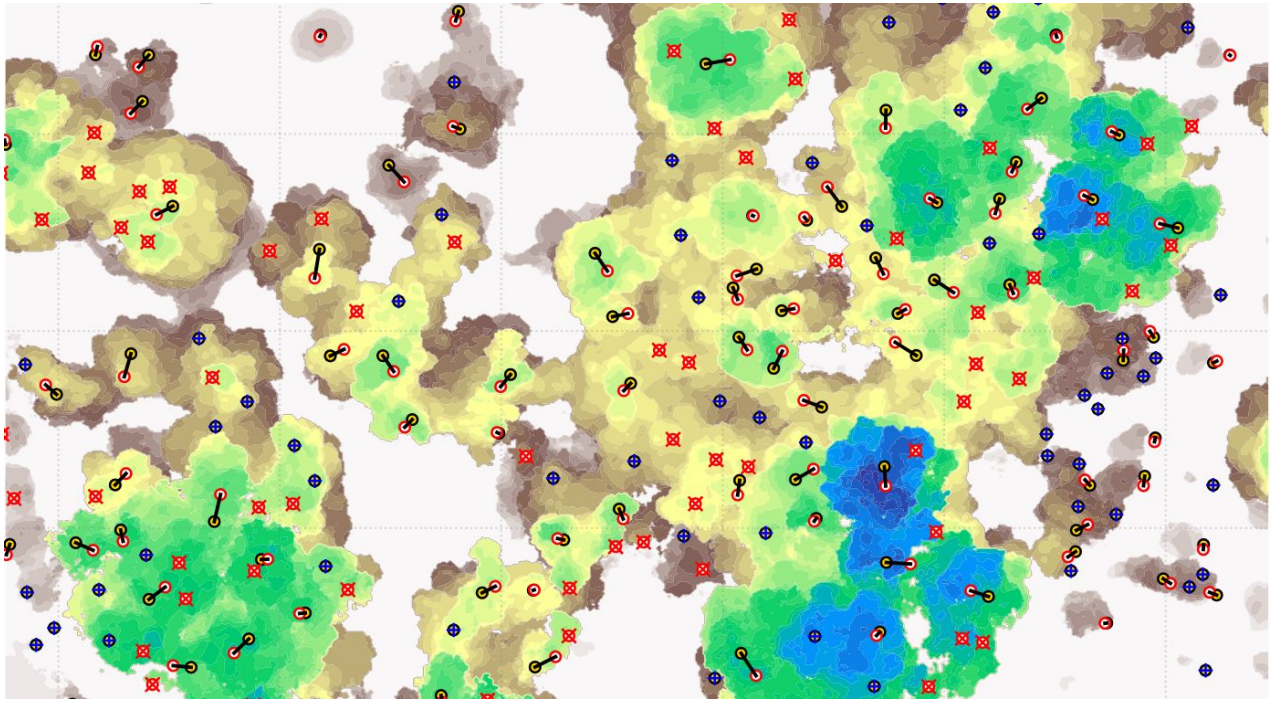



What languages do you plan on learning next?
Go
Python
Kotlin
Typescript
R
Scala
Swift
Rust
Ruby
JavaScript
C#
Haskell
C++
Clojure
Elixir
Objective-C
Erlang
Java
Julia
Lua
Perl
PHP
OCaml
Prolog
Stan
Pascal
C
0
10%
20%
30%
40%

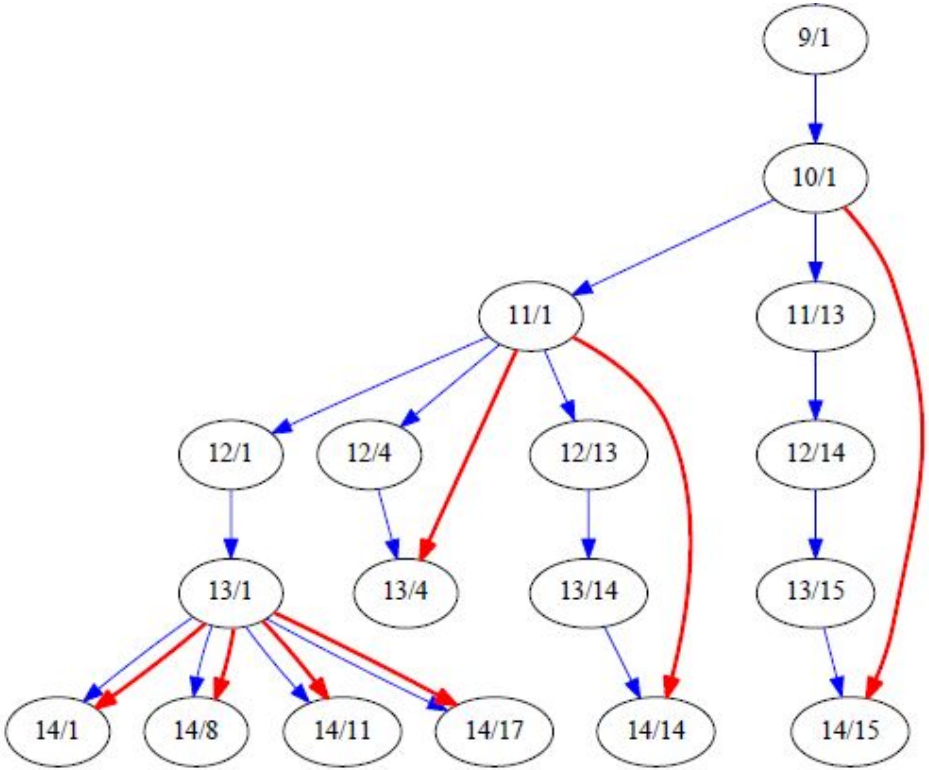

OpenCV
Should I Use Python or C/C++?
Is my application performance sensitive?
Yes
No
So, it needs to run in real time, yeah?
No...
Yeah!
Are you sure Python won't work?
No?
Most certainly
Python
C/C++


DEEP LEARNING
PYTHON
import deeplearning
deeplearning.train()
2 HOURS LATER
WOOHOO, I'M DONE.
C++
#include <iostream>
template <class T>
class Tensor {
public:
5000 LINES & 5 DAYS LATER
WHAT DOES IT MEAN BY:
"error: incomplete type 'Tensor' used"

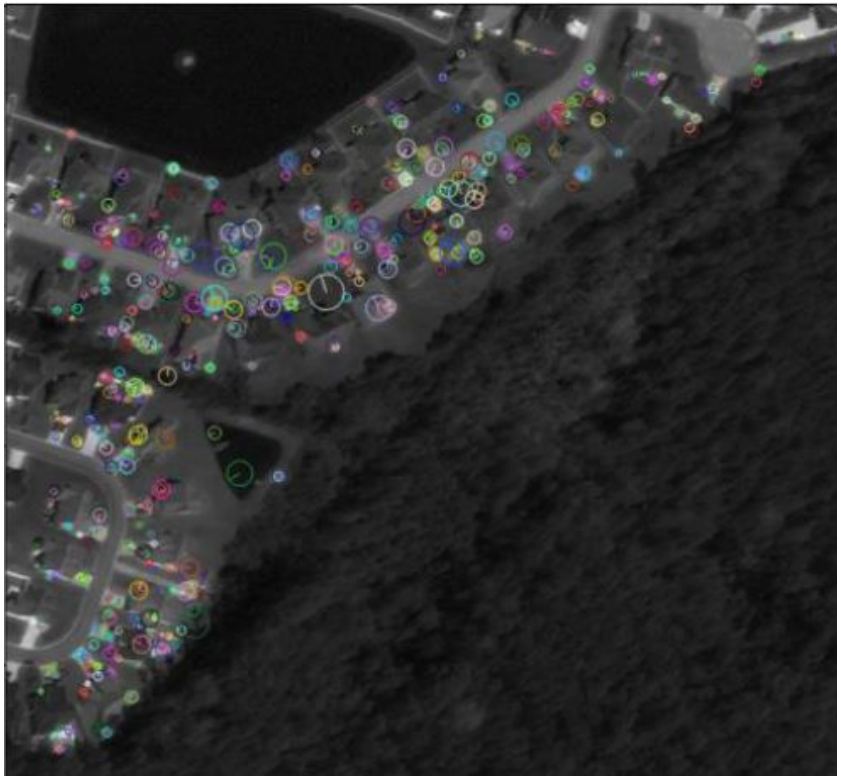
Point Cloud and DSM Analysis



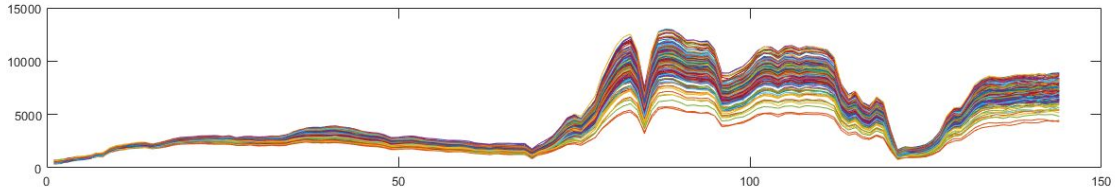
Graph Processing

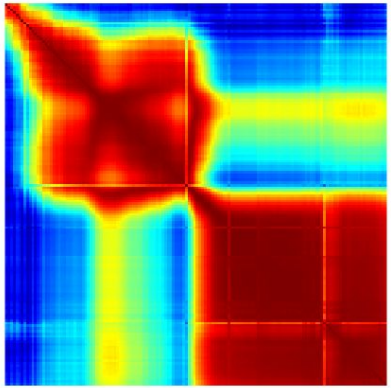


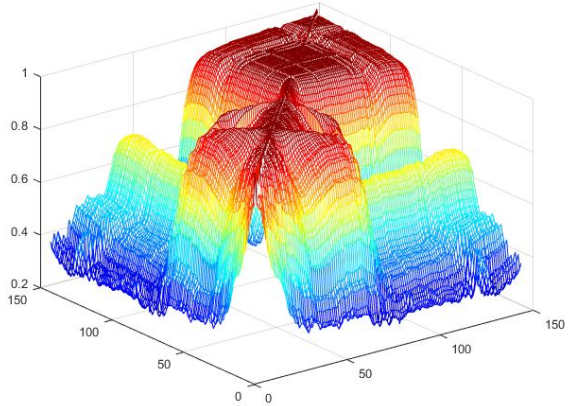
Computer Vision



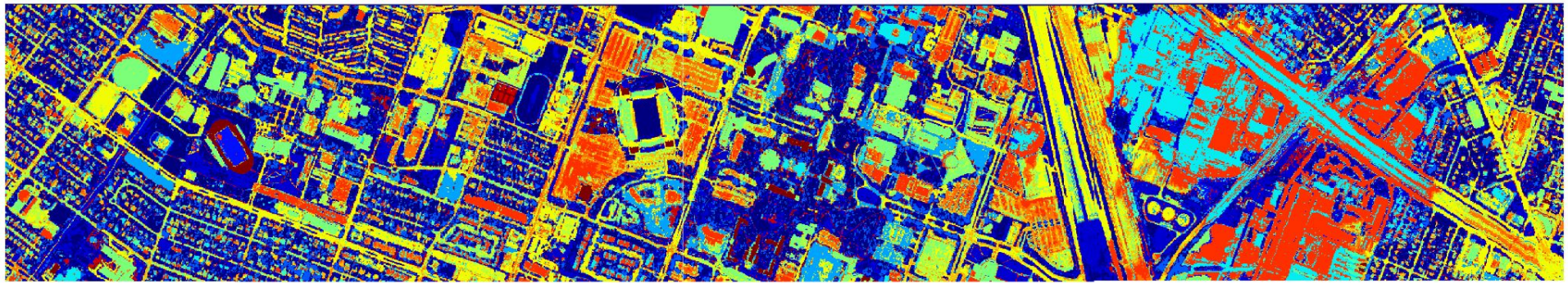
Hyperspectral Image Analysis



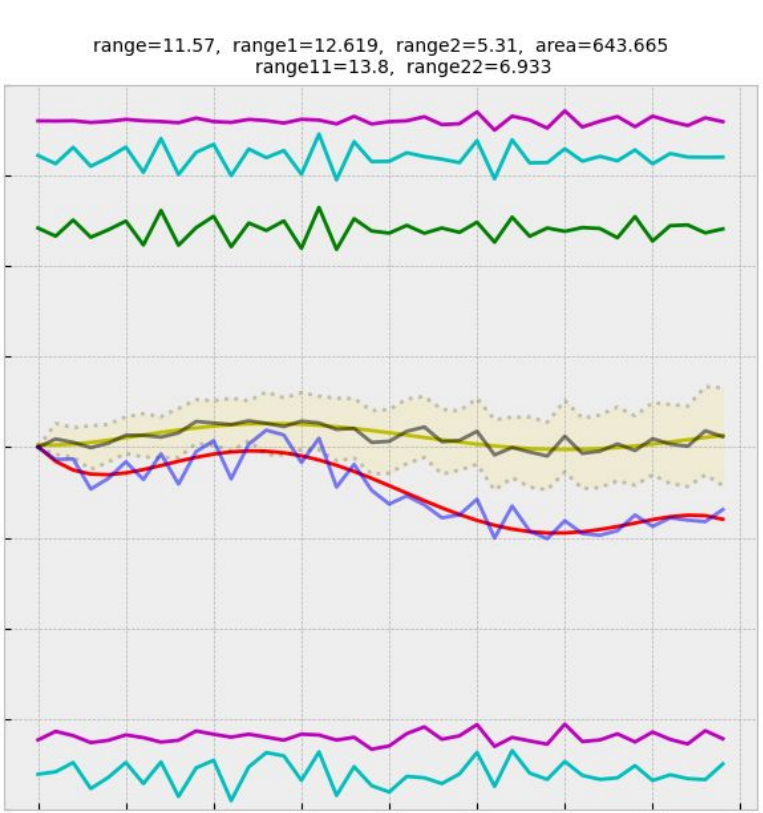


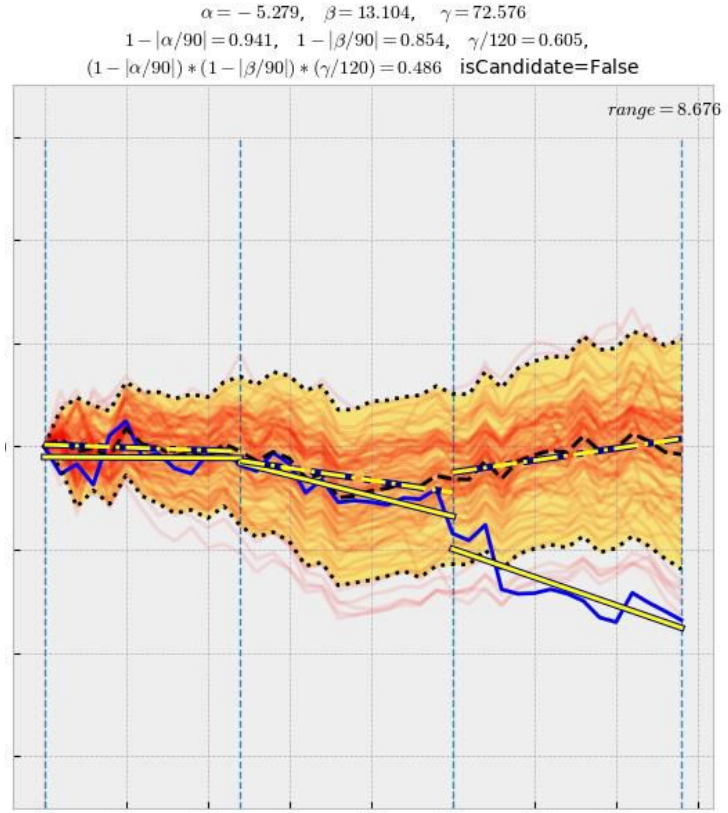


Classification

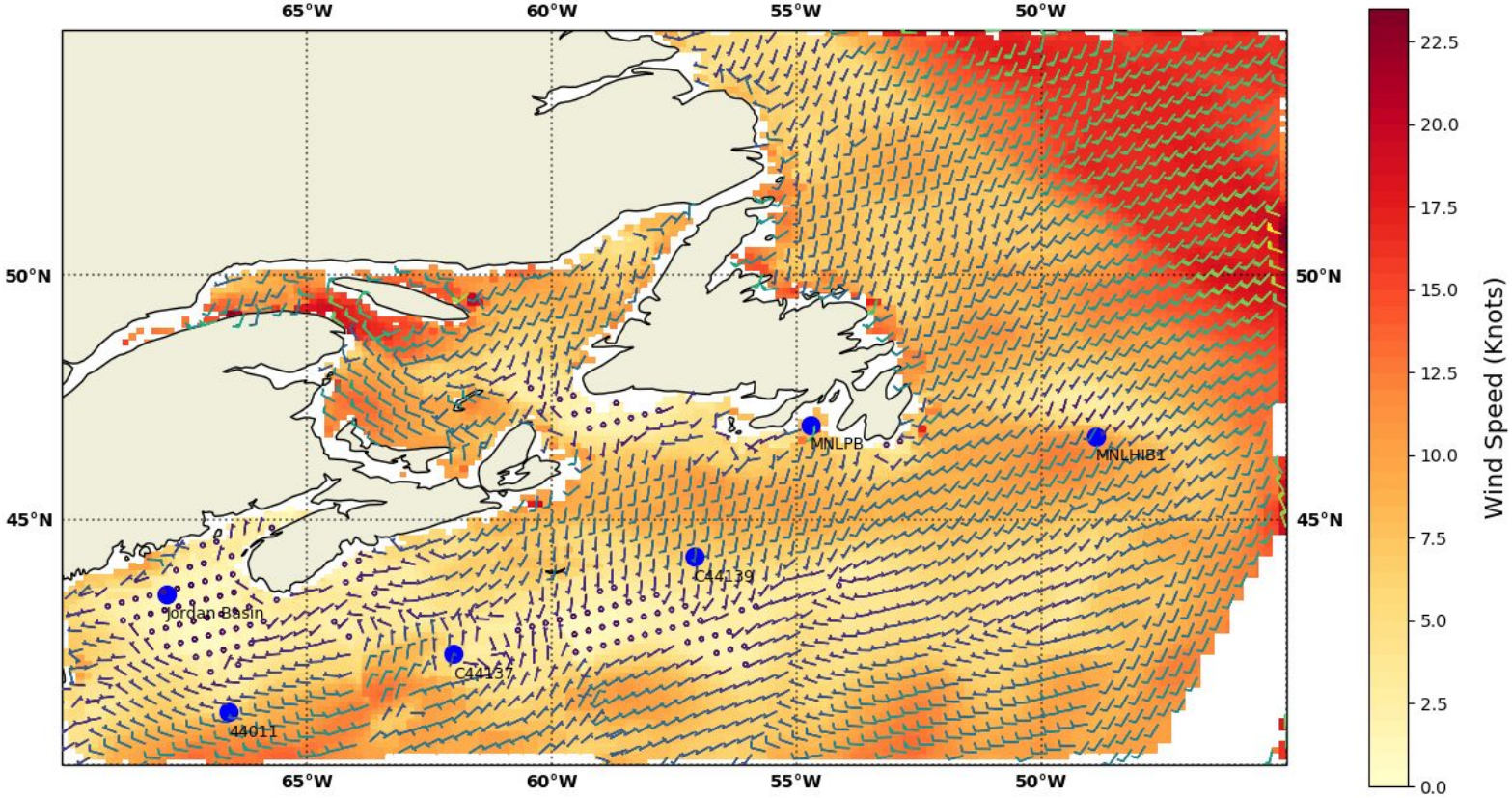


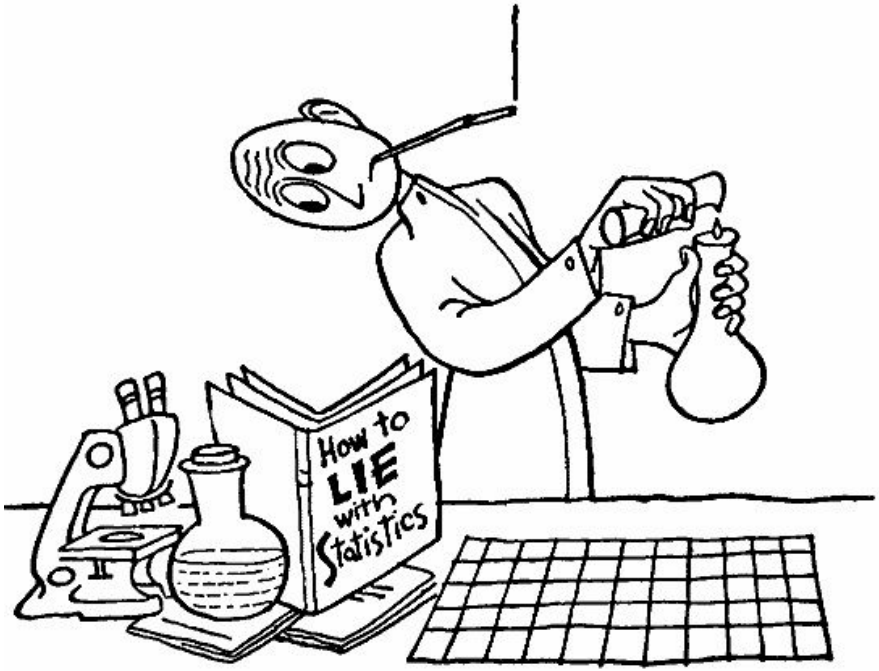
Time Series Processing and Curve Fitting

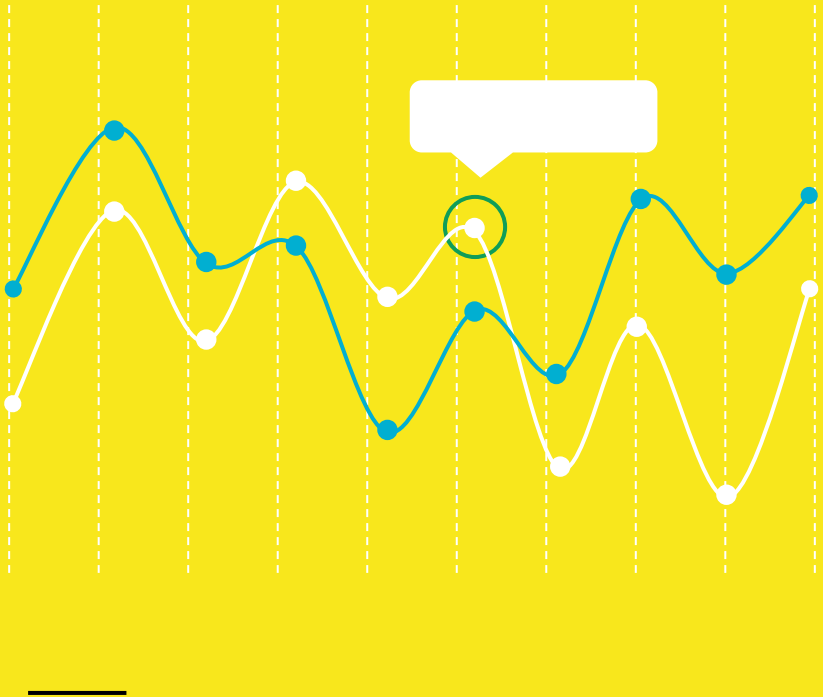




Physical Parameter Estimation from Remote Sensing Data




How to
LIE
with
Statistics



Keep in touch

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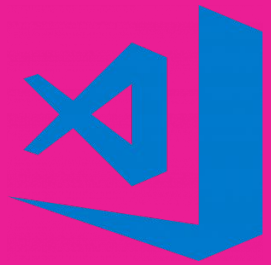
پایتون سنجش از دور

Python IDEs

Where to code...

- Save and reload code files
- Run code from within the environment
- Debugging support
- Syntax highlighting
- Automatic code formatting



https://www.lfd.uci.edu/~gohlke/pythonlibs/

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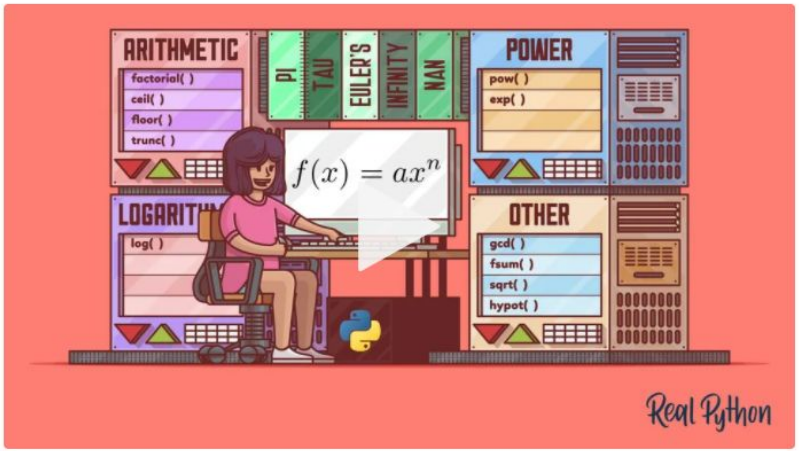

Exploring the Python math Module

In this step-by-step course, you'll learn all about Python's math module for higher-level mathematical functions. Whether you're working on a scientific project, a financial application, or any other type of programming endeavor, you just can't escape the need for

— FREE Email Series —

Python Tricks

```
# How to merge two dicts
# in Python 3.5+

>>> x = {'a': 1, 'b': 2}
>>> y = {'b': 3, 'c': 4}

>>> z = {**x, **y}

>>> z
{'c': 4, 'a': 1, 'b': 3}
```

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