

Programming for behavioral scientists

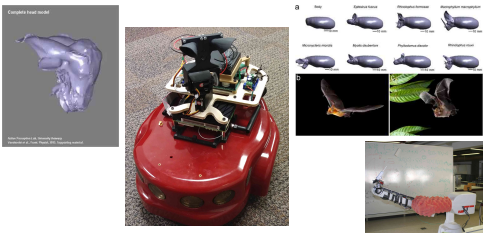
About me

- Education
 - Msc Experimental psychology
 - Msc Artificial intelligence
- Phd models of bat echolocation in engineering lab
- PostDoc Dept. Biology, University of Bristol
- Bristol Robotics Lab
- Started at UC in 2016

Sonar behavior in bats



Methods



About you

- Biochemistry/Psychology - BS 1
- Biological Sciences - BS1
- CECH Baccalaureate - 1
- Criminal Justice1
- Neuroscience - BS 2
- Neuroscience - BS/Psychology - BS 1
- Political Science/Psychology - BS 1
- Psychology 1
- Psychology - BA 1
- Psychology - BS31
- UCBA Associate - 1
- Please reach out if you have suggestions/ideas for improving the course.

PYTHON

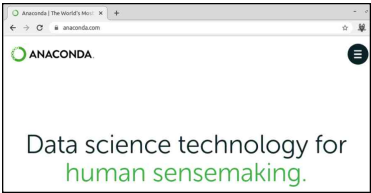
Installing Python

- Mac/Linux: Python might already be installed.
- However, you should still install a 'user version' of Python
- The Python website:



Anaconda Python

- Python + scientific packages + package management software



Anaconda Installers

Windows

Python 3.8
64-Bit Graphical Installer (457 MB)
32-Bit Graphical Installer (403 MB)

Mac OS

Python 3.8
64-Bit Graphical Installer (435 MB)
64-Bit Command Line Installer (428 MB)

Linux

Python 3.8
64-Bit (x86) Installer (529 MB)
64-Bit (Power8 and Power9) Installer (279 MB)

What is Python



- General Programming Language
 - This means that in principle it can be used for any programming task.
 - However, it excels at getting things done, quickly and efficiently

Beautiful is better than ugly.

Complex is better than complicated.

Explicit is better than implicit.

Flat is better than nested.

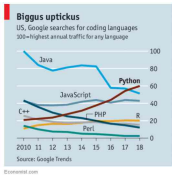
Simple is better than complex.

Sparse is better than dense.

Readability counts.

Popularity

Language Rank	Type	Spectrum Ranking
1. Python	3	96.7
2. C++	2	91.7
3. Java	1	87.5
4. C	4	86.3
5. C#	5	84.4
6. PHP	6	82.9
7. R	7	80.9
8. JavaScript	8	80.6
9. Go	9	76.4
10. Assembly	10	76.1



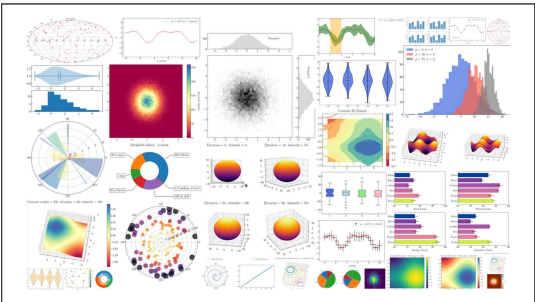
Why it is a good choice


- Easy(ish):
 - Its design makes it very readable
 - High level programming language
 - Python has a gentle learning curve
- But powerful:
 - Many libraries – for real world tasks
 - Applicable to a wide range/size of problems
- Python is valued by employers
- It's free

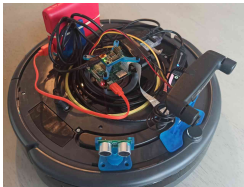


COURSE CONTENT

Data analysis and visualization

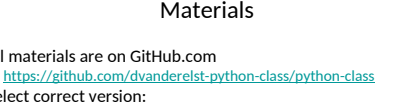
[illegible]

- ## Beyond data analysis
- Robotics
 - Machine Learning
 - Website programming
 - Microcontrollers
 - Raspberry Pi
 - ...
- 
- A photograph of a custom-built robot. It features a black circular base, likely a Pioneer 3 mobile platform. On top, there is a Raspberry Pi board, a camera module, and various sensors connected by a complex network of colored wires. A red battery pack is visible at the top. The robot is positioned on a light-colored floor.



Materials

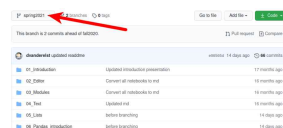
- All materials are on GitHub.com
 - <https://github.com/dvanderelst-python-class/python-class>
- Select correct version:



The screenshot shows the GitHub repository page for `dvanderelst/python-class`. The 'Tags' section is highlighted with a red arrow pointing to the `v1.0.0` tag. The table below lists the releases for this repository.

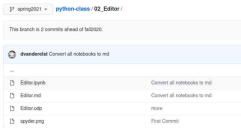
Release Name	Download Link	Release Date
<code>v1.0.0</code>	Download	14 days ago
<code>v0.9.0</code>	Download	14 months ago
<code>v0.8.0</code>	Download	14 months ago
<code>v0.7.0</code>	Download	14 months ago
<code>v0.6.0</code>	Download	14 months ago
<code>v0.5.0</code>	Download	14 months ago
<code>v0.4.0</code>	Download	14 months ago
<code>v0.3.0</code>	Download	14 months ago
<code>v0.2.0</code>	Download	14 months ago
<code>v0.1.0</code>	Download	14 months ago

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- Select correct version:



Course notes

- ipynb files:
 - Course notes
- md files:
 - backup



Planning

Part 1: Basics

- Basics of data analysis in Python
 - Reading in data
 - Selecting data
 - Statistical tests
 - Plotting of data

Part 2: data analysis

- Analysis of real world data:
 - Poverty in the USA
 - Use of force by police
 - Health in developing countries
 - Smoking behavior
 - Climate
 - Price of real estate

Grading

Contact

- vanderdt@ucmail.uc.edu
- Office hours:
 - <https://vanderdt-office-hours.appointlet.com/b/dieter>

Homework

- Install python from anaconda.com
- Make sure you can start Spyder

