

Python for Audio Manipulation

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Overview: In this tutorial, we will see issues regarding the use of the Python language for music production and experimentation. Standard library's features, a look into the PySndObj module, and the use of NumPy will be in focus. We will begin with a conceptual overview.

Topics

- Conceptual issues
- Standard Library
- PySndObj
- NumPy

1- Why Python

- Fast Development
- Extensibility
- Interpreted
- NumPy and SciPy
- Great Community
- Open Source
- Cross Platform

1- Bottom-Up Development

- You can start scripting with just a rudimentary notion of what you want.
- Art is mainly a experimental activity.
- Extending your program's features is easy.
- Research.

1- Python

- Scripting Language
- Dynamically Typed
- Object Oriented

2- Standard Modules

- wave
- ossaudiodev
- struct
- math

2- Processes

- Make/Play signals
- Read/write sound files (wave format)
- Use scripts as modules

3- PySndObj

- Access the SndObj c++ library for sound processing
- Victor Lazzarini

4 - NumPy

- Comparable to Matlab
- Adds fast multidimensional array facilities to Python
- Core of the SciPy Scientific tools

5- Ctypes

- Wrap C libraries
- Use C data types and C structures
- Standard in python version ≥ 2.5

Readings

- Python's Standard Documentation:
<http://www.python.org/doc/>
- SndObj Manual:
http://music.nuim.ie//musictec/SndObj/SndObj_Manual-2.6.1.pdf
- NumPy Documentation at:
<http://www.scipy.org/Documentation>

Further Readings

- **Scipy:** <http://www.scipy.org/SciPy>
- **Pyaudio at:** <http://www.ar.media.kyoto-u.ac.jp/members/david/software/pyaudio/>
- **Introduction to Sound Processing:**
<http://profs.sci.univr.it/~rocchess/SP/sp.pdf>

Questions and Contact

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- NICS: <http://www.nics.unicamp.br/atual/>
- This tutorial will soon be available at:
<http://cortex.lems.brown.edu/~renato/>