

# TimeSide

## *Open web audio processing framework*

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IRCAM - WAVE  
13/03/2014

# TimeSide - Goals

## Server side - TimeSide Engine

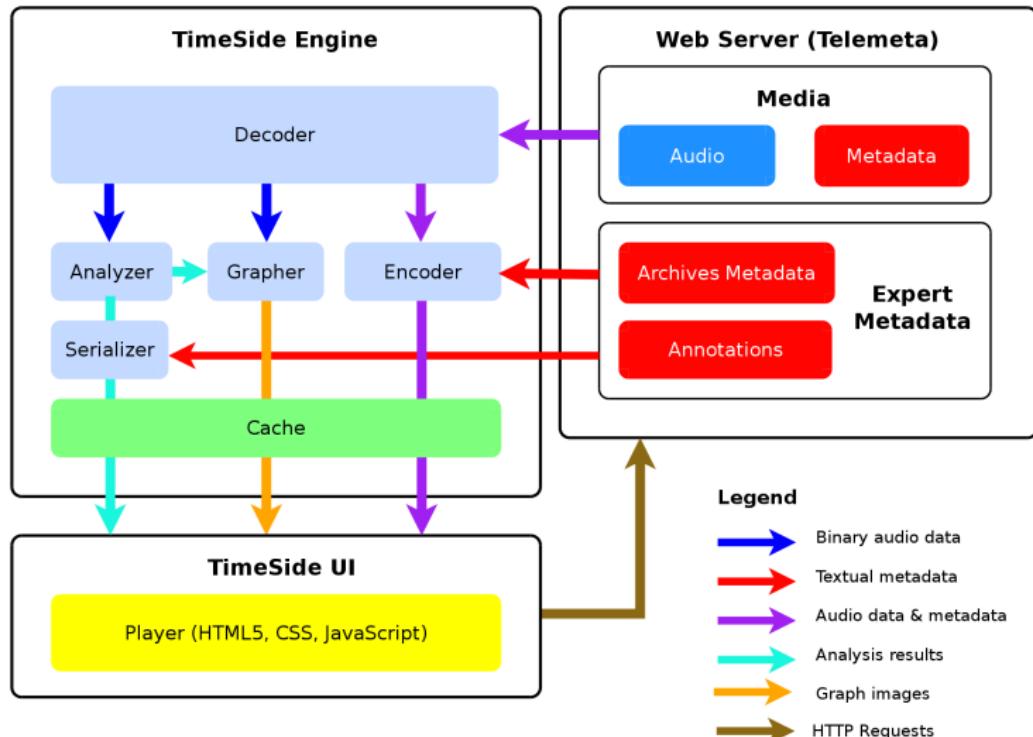
- **Do** asynchronous and fast audio processing with Python,
  - **Decode** audio frames from ANY format into numpy arrays,
  - **Analyze** audio content with state-of-the-art audio feature extraction libraries,
  - **Organize**, serialize and save analysis metadata through various formats,
- 
- **Draw** various fancy waveforms, spectrograms and other cool graphers,
  - **Transcode** audio data in various media formats and stream them through web apps,

## Client side - TimeSide UI

- **Playback** and **interact** on demand through a smart high-level HTML5 extensible player,
- **Index, tag** and **organize semantic metadata**  
(see [Telemeta](#) which embeds TimeSide).



# TimeSide Engine Architecture



# Processors

## 4 types of processors

- Decoder
- Analyzer
- Encoder
- Grapher



: timeside/api.py, timeside/core.py

# Processors - Decoders

## Decoders

- FileDecoder: Decode audio through Gstreamer  gstreamer
  - File source: an uri
  - A segment of audio can be specified: start, duration
- ArrayDecoder: Use an Numpy array as source input
- LiveDecoder: Capture audio from an live input source



: timeside/decoder/core.py, timeside/decoder/file.py

# Processors - Encoders

## Encoders

- Support streaming to the server
- Available formats (through Gstreamer)  **gstreamer**
  - WavEncoder, FlacEncoder
  - AacEncoder, VorbisEncoder, Mp3Encoder
  - WebMEncoder, **OpusEncoder**
  - LiveEncoder : Send sound to soundcard



: timeside/encoder/core.py, timeside/encoder/mp3.py

# Processors - Analyzers

## Analyzers

- Value Analyzers: Level, MeanDCShift
- Wrapping of *state-of-the-art* audio features library:
  - Aubio: <http://aubio.org> AubioTemporal, AubioPitch, AubioMfcc, AubioMelEnergy, AubioSpecdesc
  - Yaafe: <http://yaafe.sourceforge.net>
  - Vamp plugins: <http://www.vamp-plugins.org> VampSimpleHost
- Waveform, Spectrogram
- Speech Activity Detection: IRITSpeechEntropy, IRITSpeech4Hz, LimsiSad
- OnsetDetectionFunction

→ An analyzer can declare other analyzers as *parents*



: timeside/analyzer/core.py, timeside/analyzer/odf.py

# Processors - Graphers

## Graphers

- Waveform
- WaveformCentroid
- **WaveformTransparent**
- WaveformContourBlack
- WaveformContourWhite
- SpectrogramLog
- **SpectrogramLinear**

→ Possibility to define grapher from analyzer

# Principales nouveautés

- Version 0.5.4
- Mise en place d'une documentation :  
<http://files.parisson.com/timeside/doc/>
- Installation par paquets Debian (Timeside + Aubio + Yaafe) pour Debian Stable 7.0 Wheezy  
<https://github.com/yomguy/TimeSide#install>
- Outil en *ligne de commande* : timeside-launch
- Décodeur : possibilité de lire un **segment** de fichier audio

## Analyseurs - Sauvegarde des résultats

- Amélioration de la sérialisation des résultats (xml, json, yaml, **numpy**, **hdf5**)
- Ajout de fonctionnalités et *Réusinage* de code en prévision de l'intégration de méthodes d'analyse automatique
- Notion d'analyseur " parent "

# Analyzer results container

## Results types

Standardization of 8 different types of results:

- time\_mode : global, event, segment, framewise
- data\_mode : value, label

## Metadata & Data fields

- Metadata:

- id\_metadata
- audio\_metadata
- label\_metadata
- frame\_metadata
- parameters

- Data: data\_object

# TimeSide - Github repository

<https://github.com/yomguy/TimeSide/>

- 3 main branches: master (0.5.2), dev, diadems

## Installation

<https://github.com/yomguy/TimeSide#install>

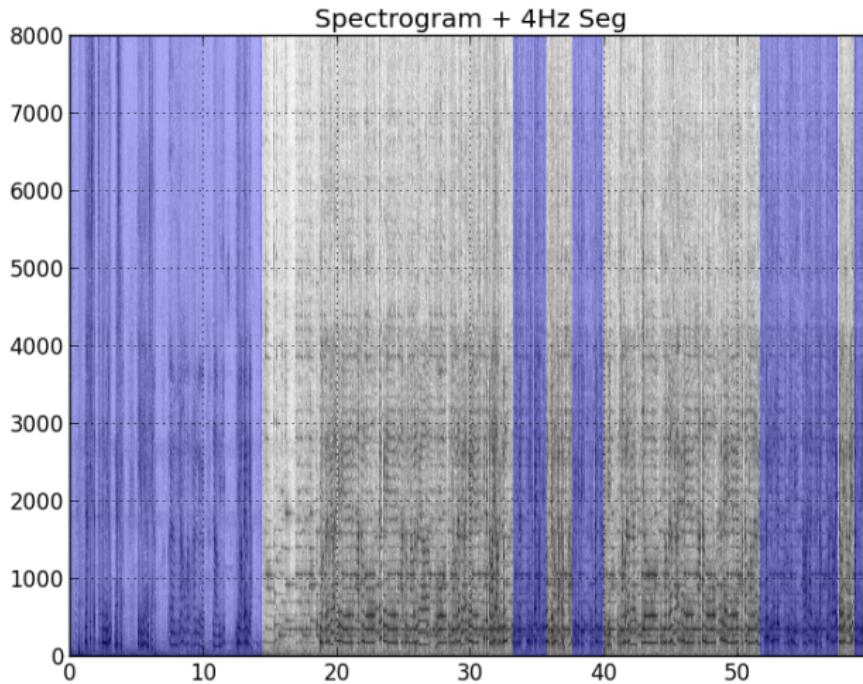
- Installation des dépendances :

```
$ echo "deb http://debian.parisson.com/debian/ stable main" |  
$ sudo tee -a /etc/apt/sources.list  
$ echo "deb-src http://debian.parisson.com/debian/ stable main" | sudo tee -a /etc/apt/sources.list  
$ sudo apt-get update  
$ sudo apt-get install git  
$ sudo apt-get build-dep python-timeside
```

- Installation depuis le dépôt *Github* :

```
$ git clone https://github.com/yomguy/TimeSide.git  
$ cd TimeSide  
$ git checkout dev  
$ export PYTHONPATH=$PYTHONPATH:'pwd'  
$ python tests/run_all_tests
```

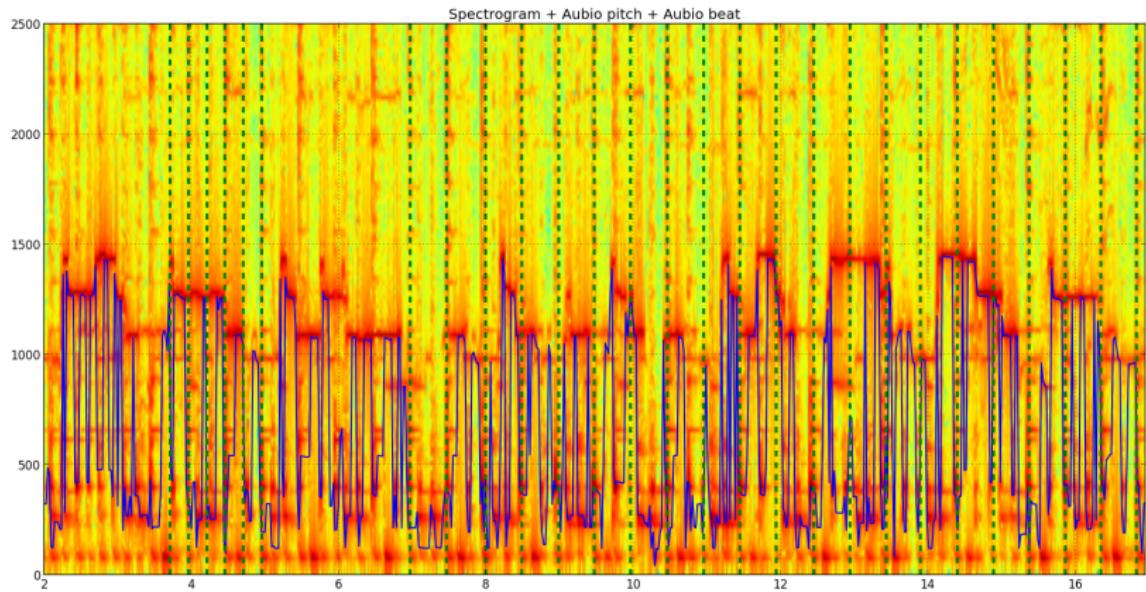
# Détecteur de parole IRIT (4Hz modulation)



CNRSMH\_I\_2013\_202\_001\_06



# Aubio Pitch + Aubio Beat



CNRSMH\_E\_1985\_001\_001\_001\_04

# Telemeta Player Mark



Recherche



Bienvenue, Guillaume Pellerin | Profil | Aide | Déconnexion



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Collection

Date d'enregistrement jan. 1, 1900 - déc. 31, 1900

## Indications géographiques et culturelles

Lieu Algérie, Afrique septentrionale, Afrique

Précisions lieu Stèpe, Hauts Plateaux

Aire culturelle OULED NAYAL

Langue arabe

Population / groupe social ARABE

Contexte ethnographique

Edit mots-clés

## Informations sur la musique

Analyse   Marqueurs

00:00:06.29 Lamentation

auteur: j\_simonnet

00:00:44.63 chant d'imposition du h

adressé au marié.  
Traduction:L'imposition de ton henné est ma plus grande joie  
auteur: j\_simonnet

00:01:15.04 Ayay

Chant non mesuré  
auteur: j\_simonnet

# DIADEMS Project

- ANR project: *Description, Indexation, Accès aux Documents EthnoMusicologiques et Sonores*  
(Description, Indexation, Access to Sound and Ethnomusicological Documents)  
<http://www.irit.fr/recherches/SAMOVA/DIADEMS>
- Partners:
  - Ethnomusicology:
    - CREM (Centre de Recherche en EthnoMusicologie), Univ. Nanterre
    - MNHM (Museum National d'Histoire Naturelle)
  - Computer science, Music Information Retrieval, Speech Processing:
    - IRIT, Toulouse
    - LAM, Paris 6
    - LIMSI, Orsay
    - LABRI, Bordeaux

# Goals

- Improvement of Telemeta User Interface
- Enhance annotation interface and management
- Introduce automatic description, indexation, segmentation with music information retrieval, audio signal and speech processing technologies → *TimeSide*
- Ethnomusicological metadata: [Thesaurus Map](#)

The End

Merci !