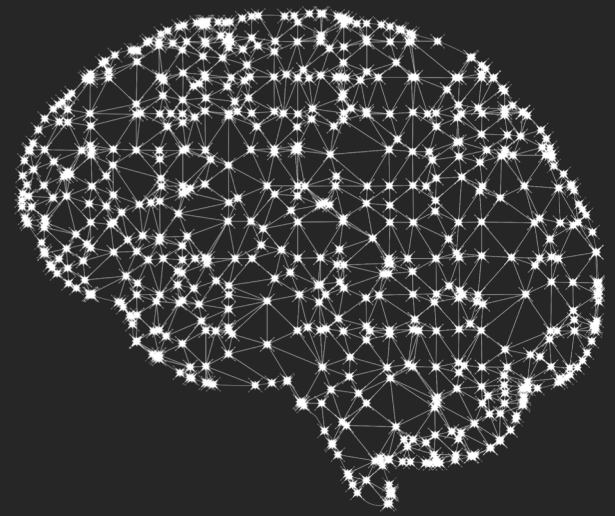


Σεμινάριο:
Μουσική και Τεχνητή Νοημοσύνη

Αρετή Ανδρεοπούλου

a.andreopoulou@music.uoa.gr

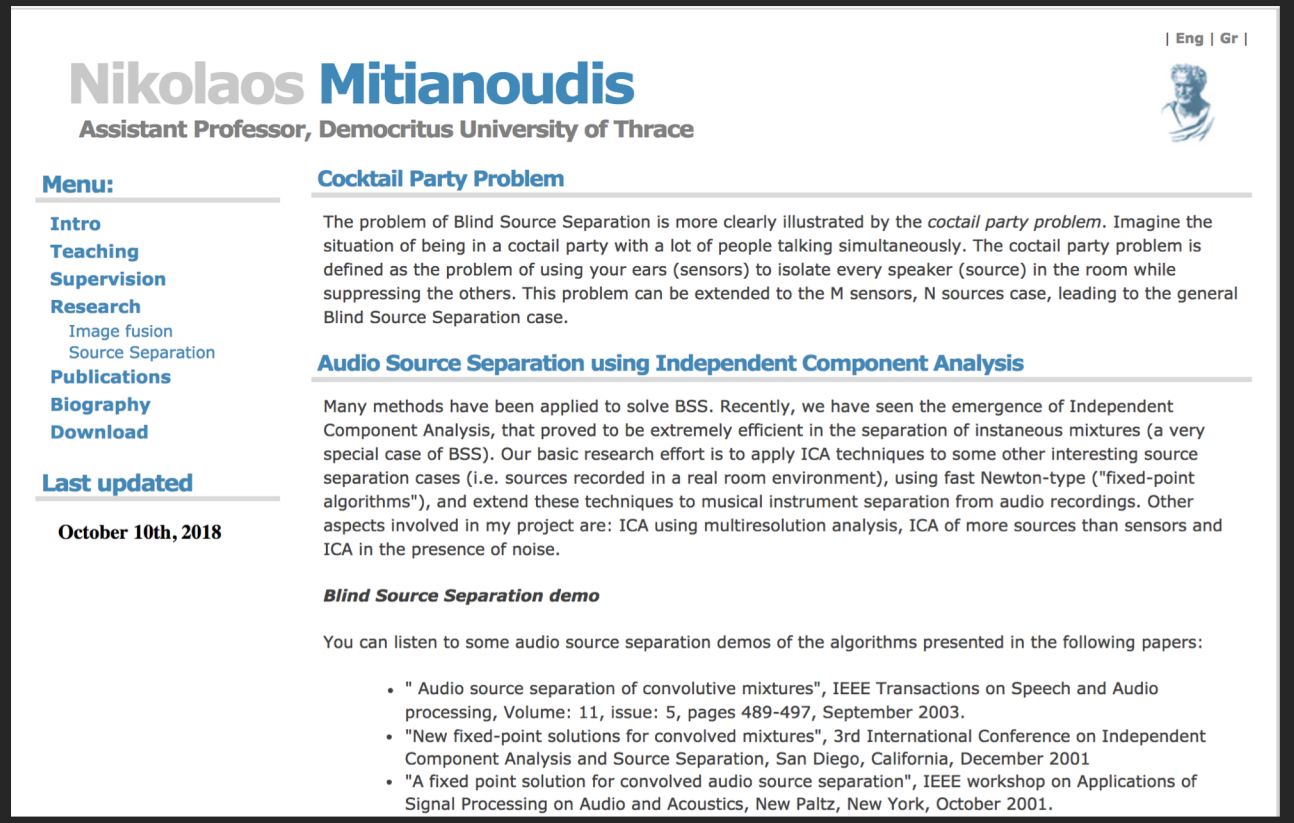
Σχεδιάγραμμα μαθήματος

- Ορισμός M.I.R
- Ενδεικτικά παραδείγματα εφαρμογών του κλάδου

Εφαρμογές MIR

- **MIR** (Music Information Retrieval): Ερευνητικό πεδίο που στοχεύει στην ανάπτυξη μεθόδων και τεχνικών για την ανάκτηση και εξόρυξη πληροφορίας από τη μουσική.
- **Ενδεικτικές εφαρμογές:**
  - **Source separation**
  - **Score following**
  - **Music transcription**
  - **Music improvisation / Music accompaniment**
  - **Audio Similarity**
    - Music genre / instrument classification
    - Music recommendations
  - **Chord recognition**

Source Separation



| Eng | Gr |

Nikolaos **Mitianoudis**

Assistant Professor, Democritus University of Thrace

Menu:

- **Intro**
- **Teaching**
- **Supervision**
- **Research**
  - Image fusion
  - Source Separation
- **Publications**
- **Biography**
- **Download**

Last updated

October 10th, 2018

Cocktail Party Problem

The problem of Blind Source Separation is more clearly illustrated by the *coctail party problem*. Imagine the situation of being in a coctail party with a lot of people talking simultaneously. The coctail party problem is defined as the problem of using your ears (sensors) to isolate every speaker (source) in the room while suppressing the others. This problem can be extended to the M sensors, N sources case, leading to the general Blind Source Separation case.

Audio Source Separation using Independent Component Analysis

Many methods have been applied to solve BSS. Recently, we have seen the emergence of Independent Component Analysis, that proved to be extremely efficient in the separation of instaneous mixtures (a very special case of BSS). Our basic research effort is to apply ICA techniques to some other interesting source separation cases (i.e. sources recorded in a real room environment), using fast Newton-type ("fixed-point algorithms"), and extend these techniques to musical instrument separation from audio recordings. Other aspects involved in my project are: ICA using multiresolution analysis, ICA of more sources than sensors and ICA in the presence of noise.

Blind Source Separation demo

You can listen to some audio source separation demos of the algorithms presented in the following papers:

- " Audio source separation of convolutive mixtures", IEEE Transactions on Speech and Audio processing, Volume: 11, issue: 5, pages 489-497, September 2003.
- "New fixed-point solutions for convolved mixtures", 3rd International Conference on Independent Component Analysis and Source Separation, San Diego, California, December 2001
- "A fixed point solution for convolved audio source separation", IEEE workshop on Applications of Signal Processing on Audio and Acoustics, New Paltz, New York, October 2001.

http://utopia.duth.gr/nmitiano/separation.html

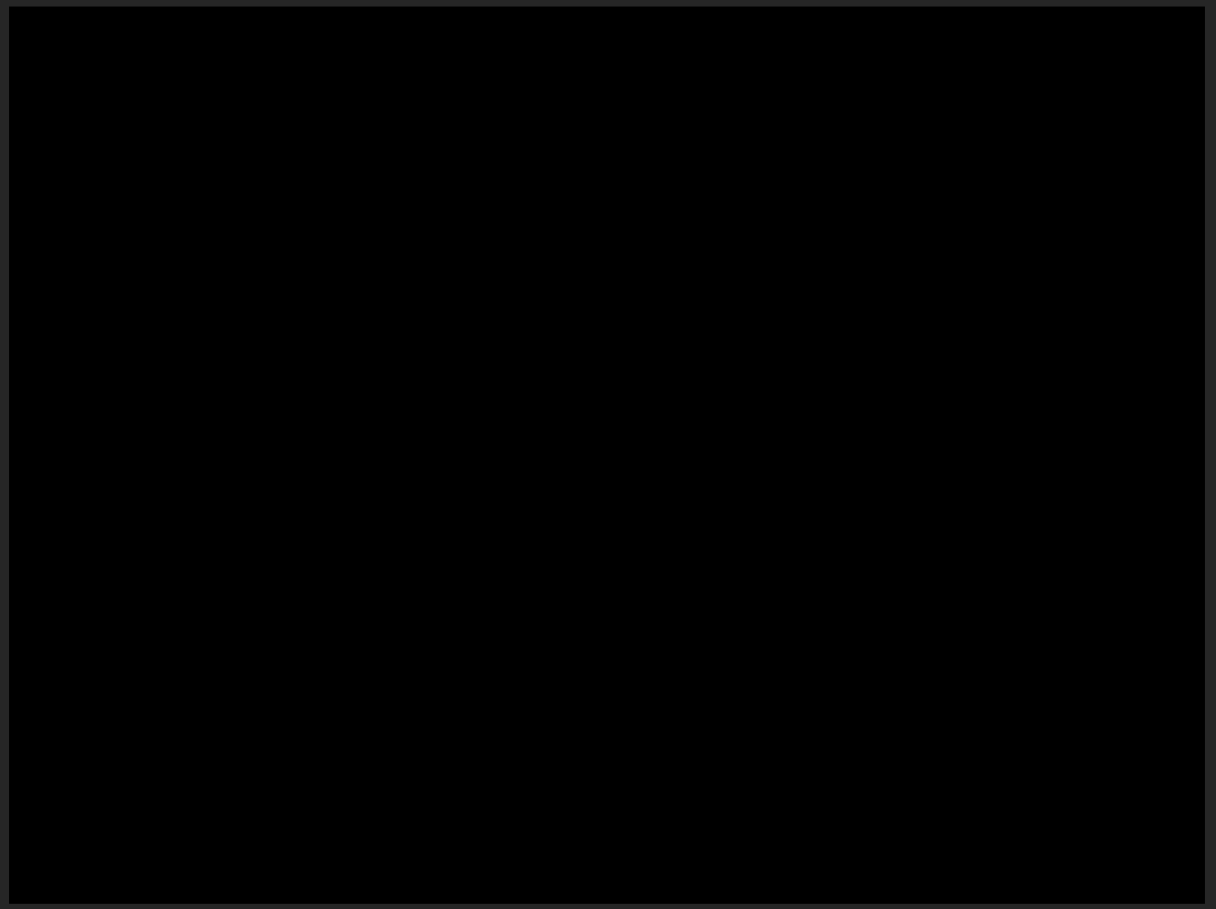
Source Separation

ZYLIA
Studio PRO

https://www.youtube.com/watch?v=7-PdjF6wOd4

Score following

IMuSE



https://www.youtube.com/watch?v=PIGHeSlnCyc

Score following

Weezic

https://www.youtube.com/watch?v=EUVQr6ZDM_4

Score following

IRCAM
score following
tool

https://www.youtube.com/watch?v=q55Okme1vTc

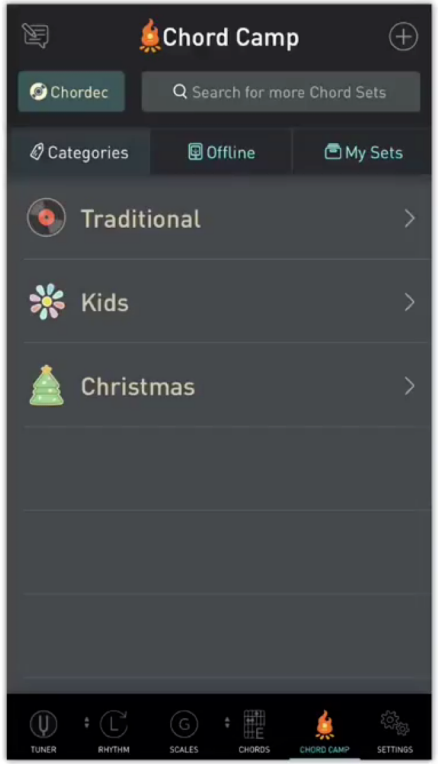
Chord Recognition

Chordec:
Demo 1

https://www.youtube.com/watch?v=H1_9isNISw8

Chord Recognition

Chordec: Demo 2



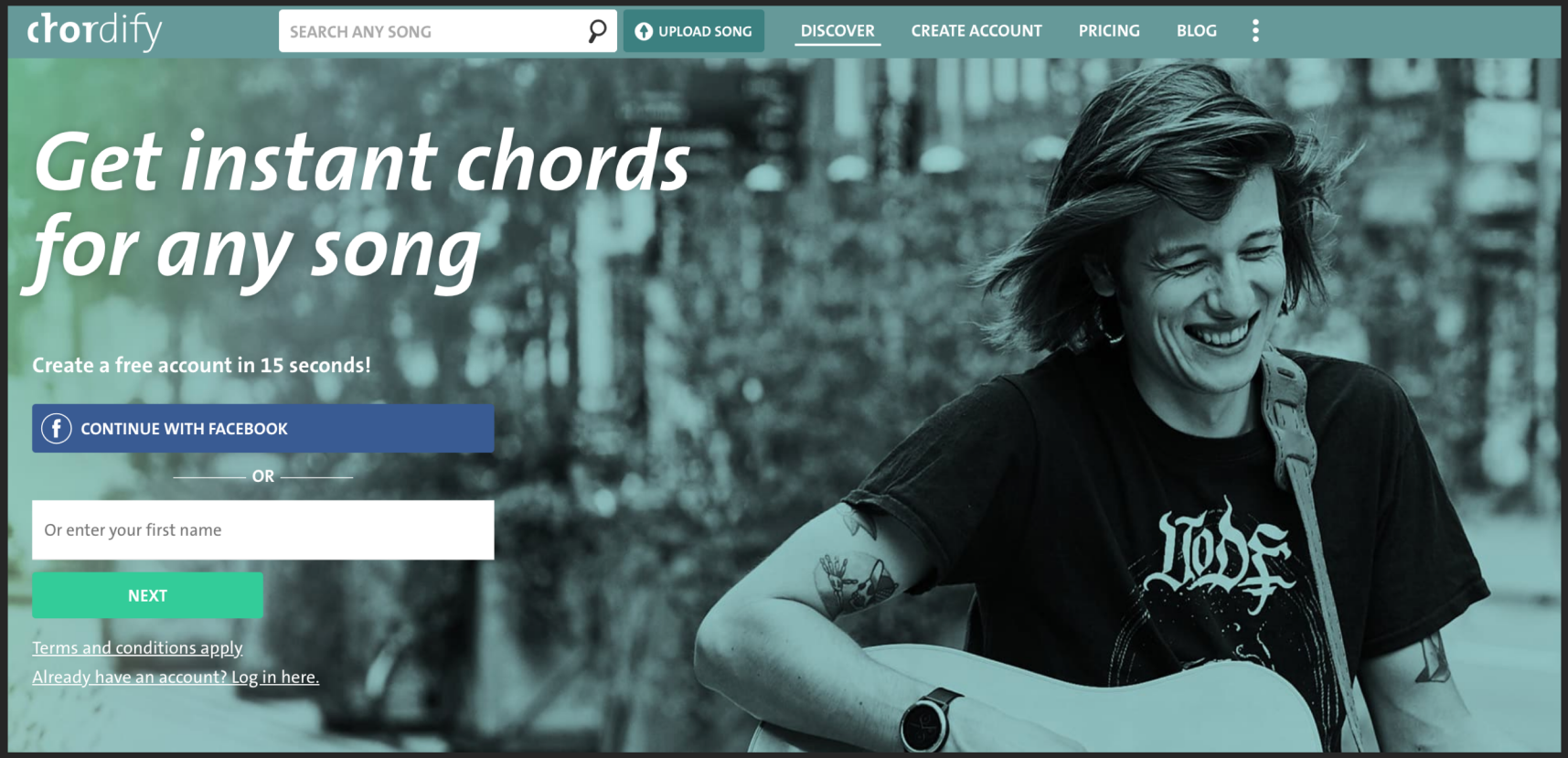
Guitar Master

How To Use Chordec Feature

https://www.youtube.com/watch?v=6Ltb636gvn8

Chord Recognition

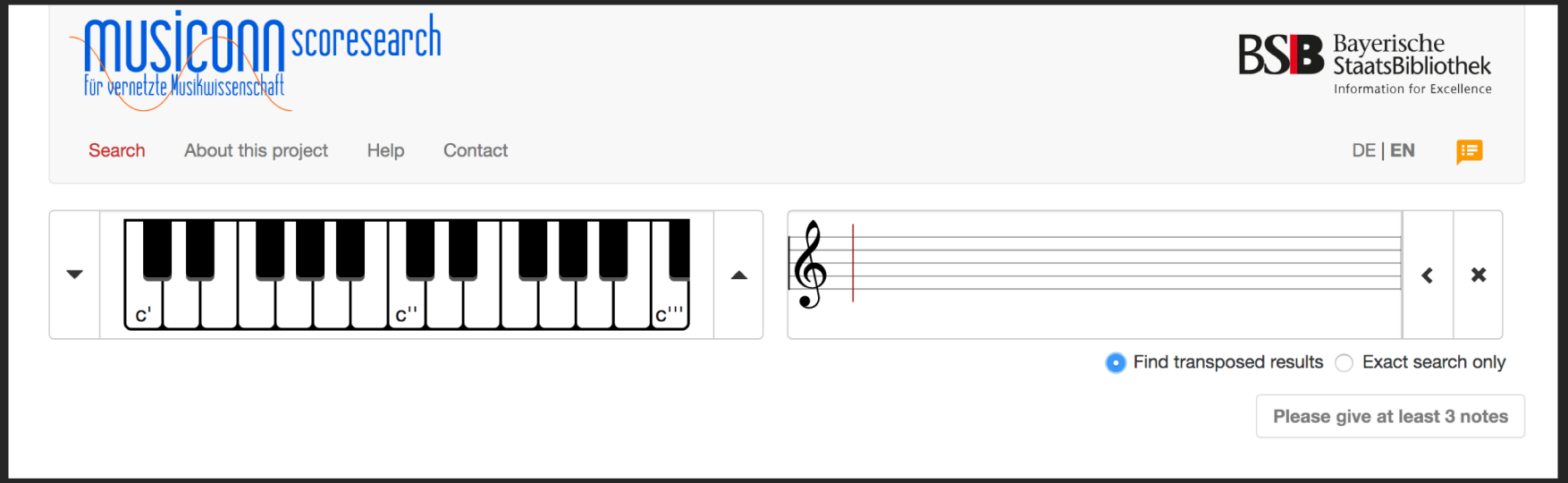
Chordify



https://chordify.net/

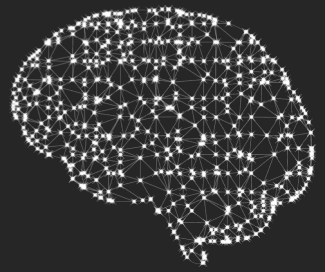
Score searching

musiconn.scoresearch

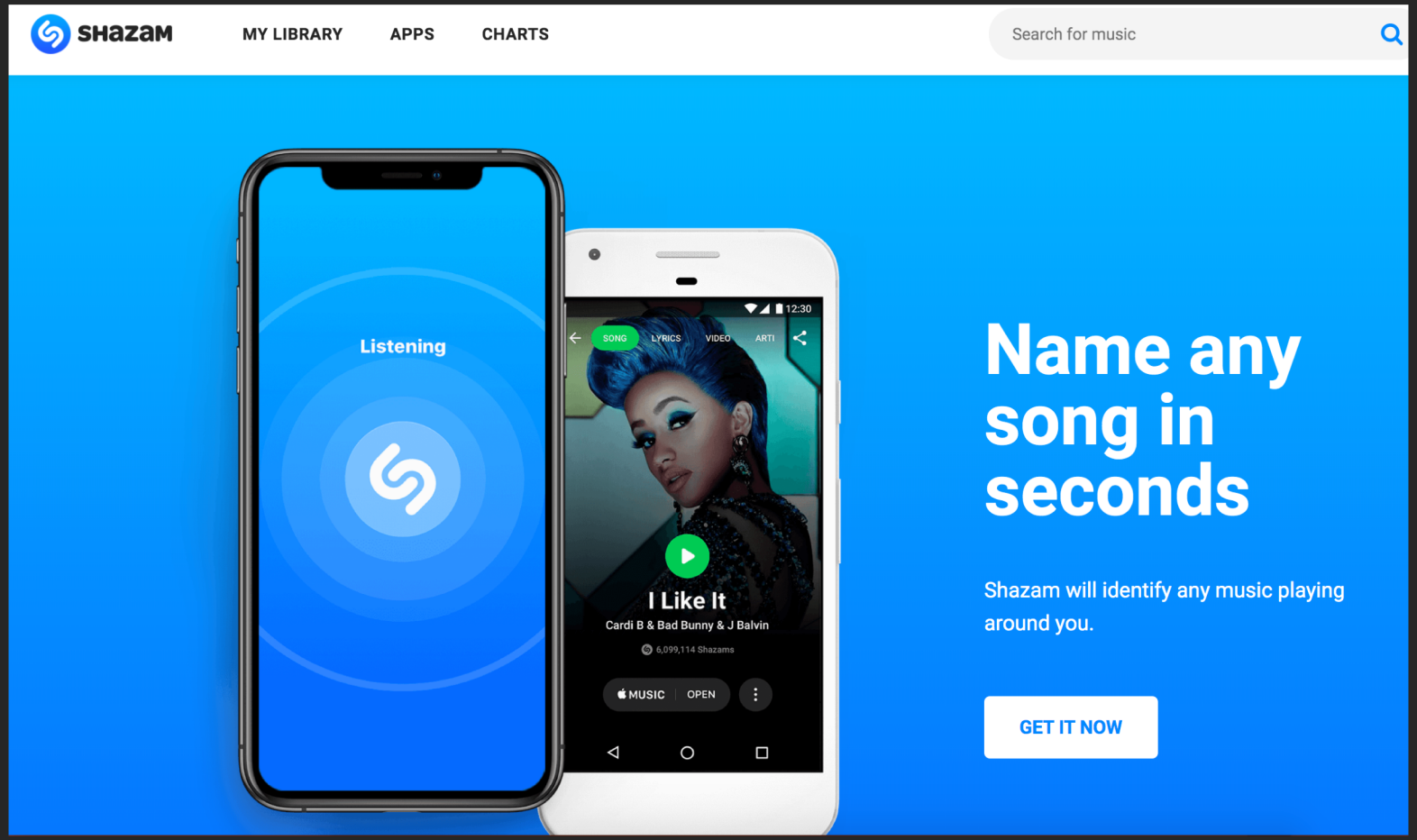


https://scoresearch.musiconn.de/ScoreSearch/

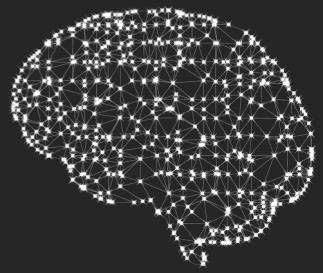
Audio fingerprinting



Shazam



Query by humming

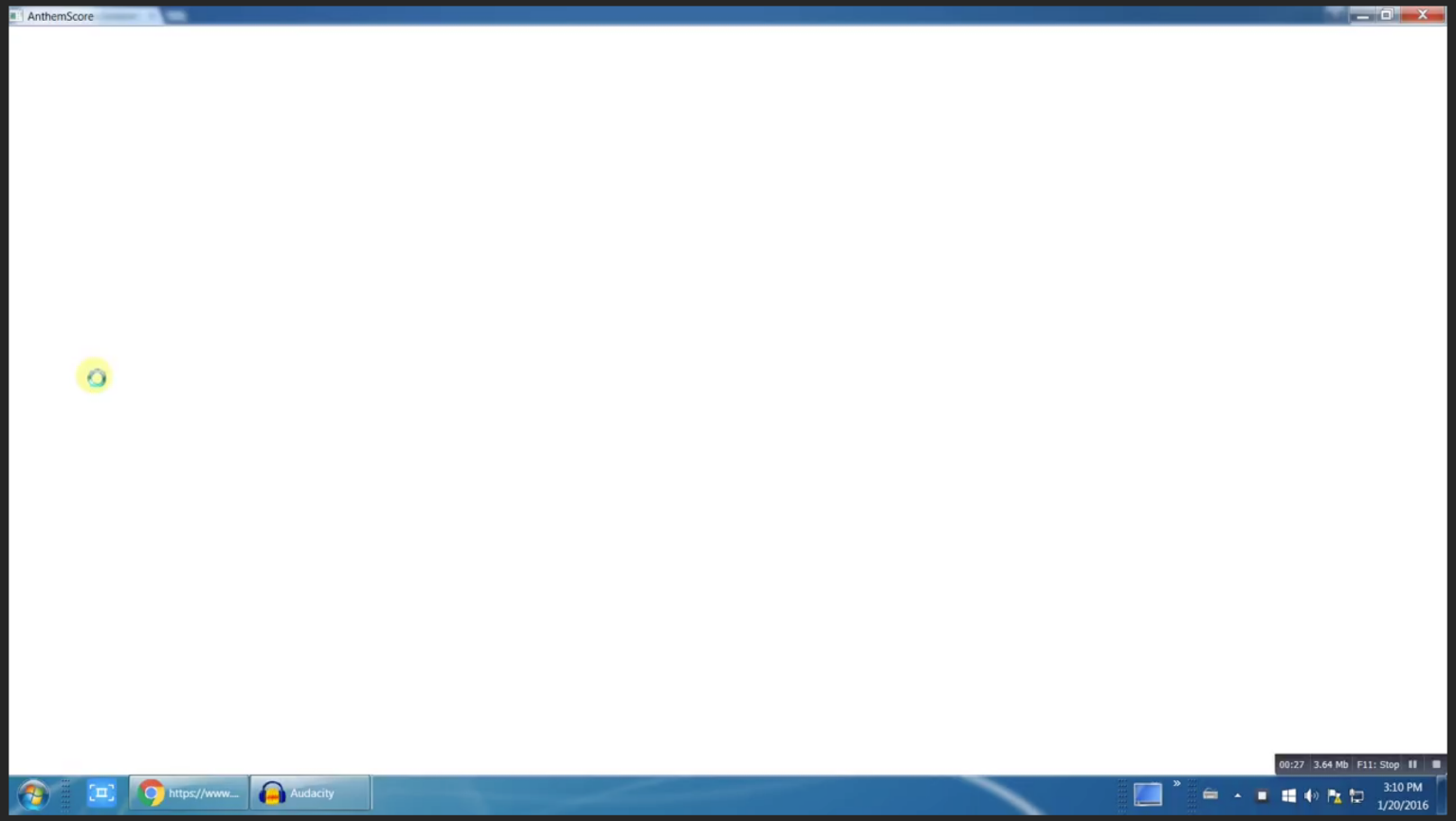


Sound Hound

https://www.soundhound.com/soundhound

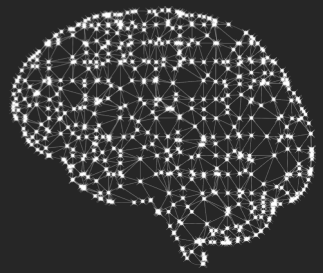
Music Transcription

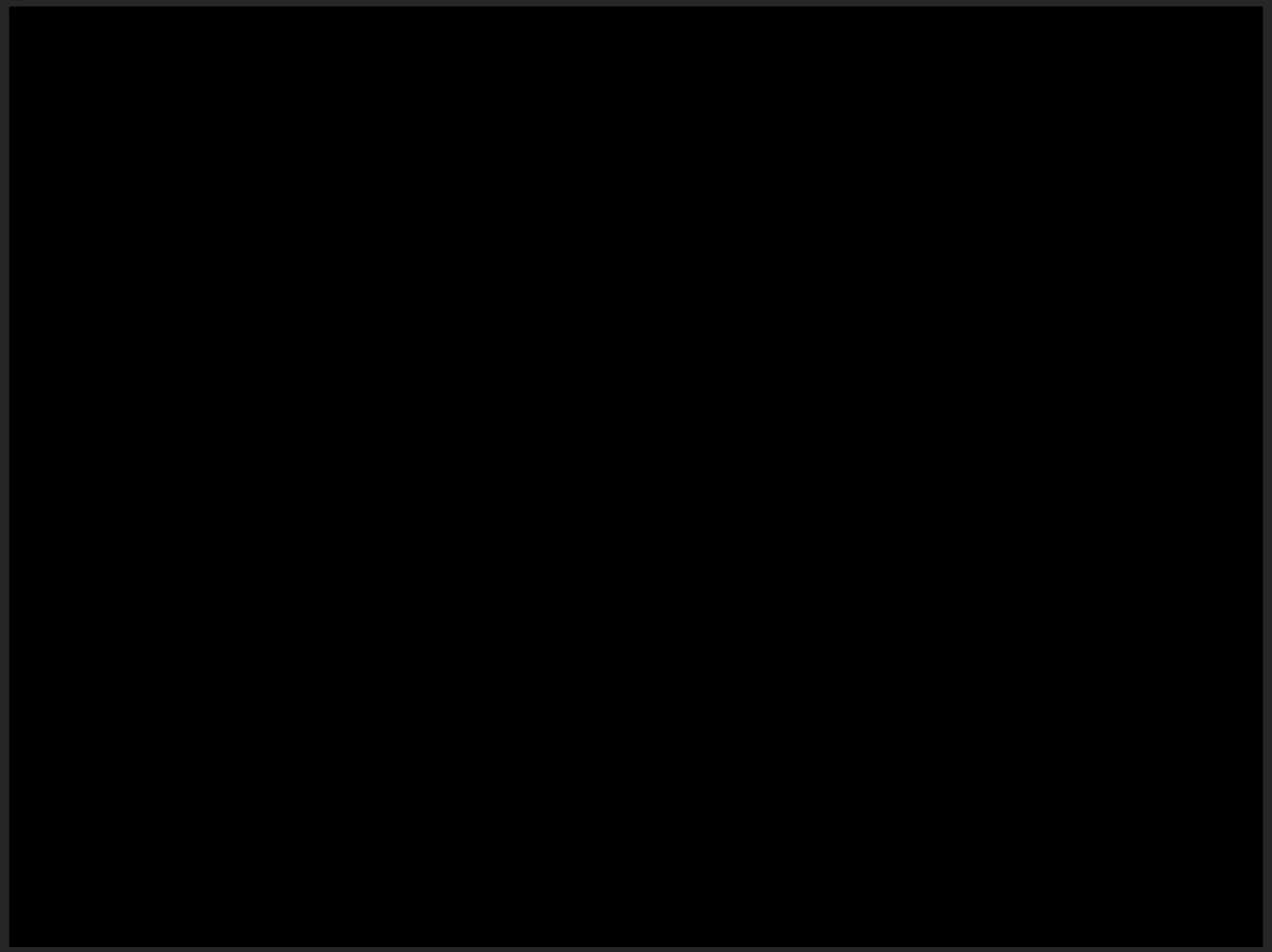
AnthemScore



https://www.youtube.com/watch?v=f8KpE0hyFI0&t=39s

Automatic Music Improvisation





https://www.youtube.com/watch?v=bB8kGVXdlg4

Automatic Music Accompaniment

MySong

MySong:
Automatic Accompaniment
for Vocal Melodies

Ian Simon (University of Washington)
Dan Morris (Microsoft Research)
Sumit Basu (Microsoft Research)

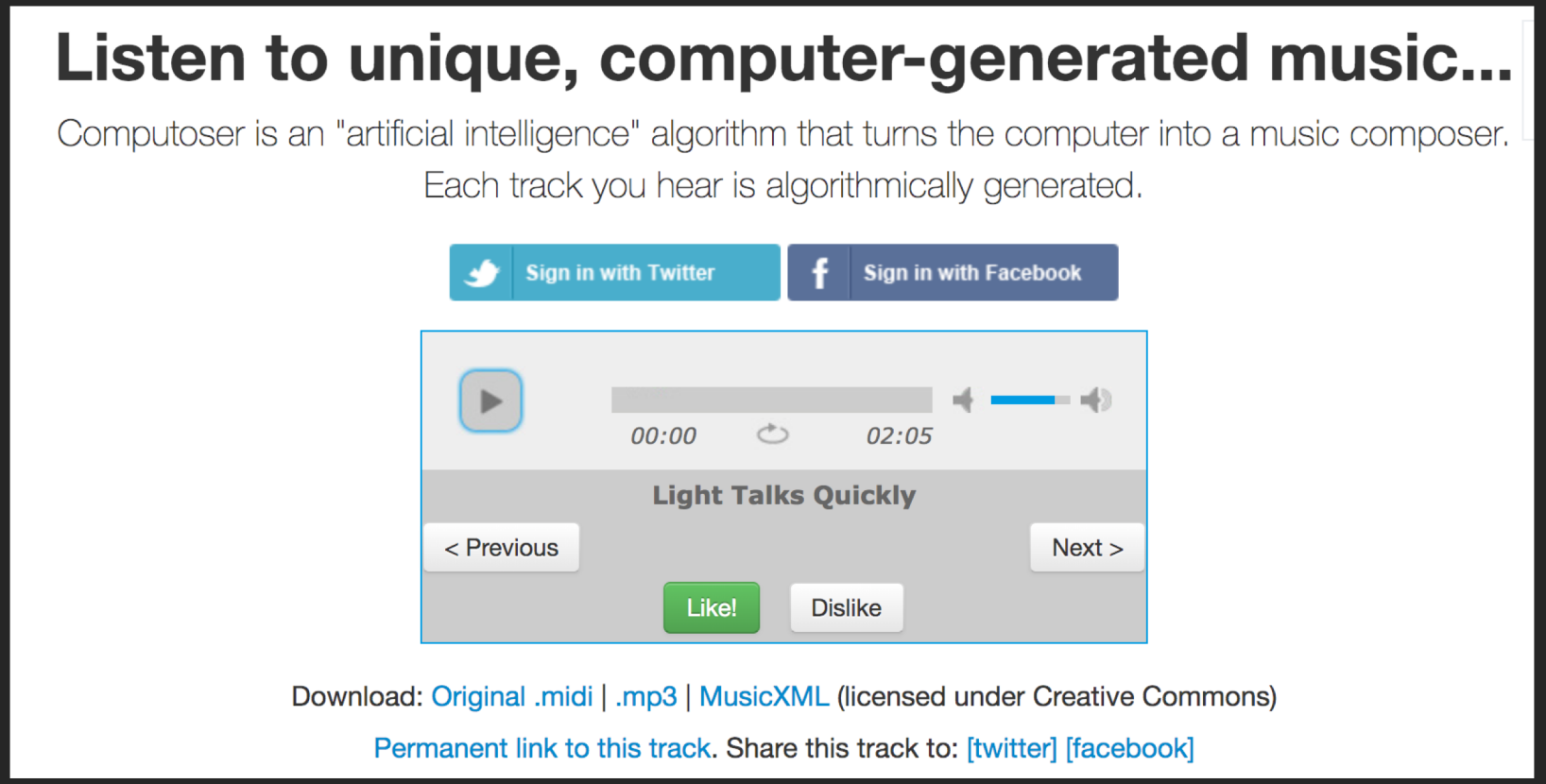
ACM CHI 2008

http://research.microsoft.com/~dan/mysong

https://www.youtube.com/watch?v=DCG3qhz6slE

Automatic Music Generation

Computoser



http://computoser.com/

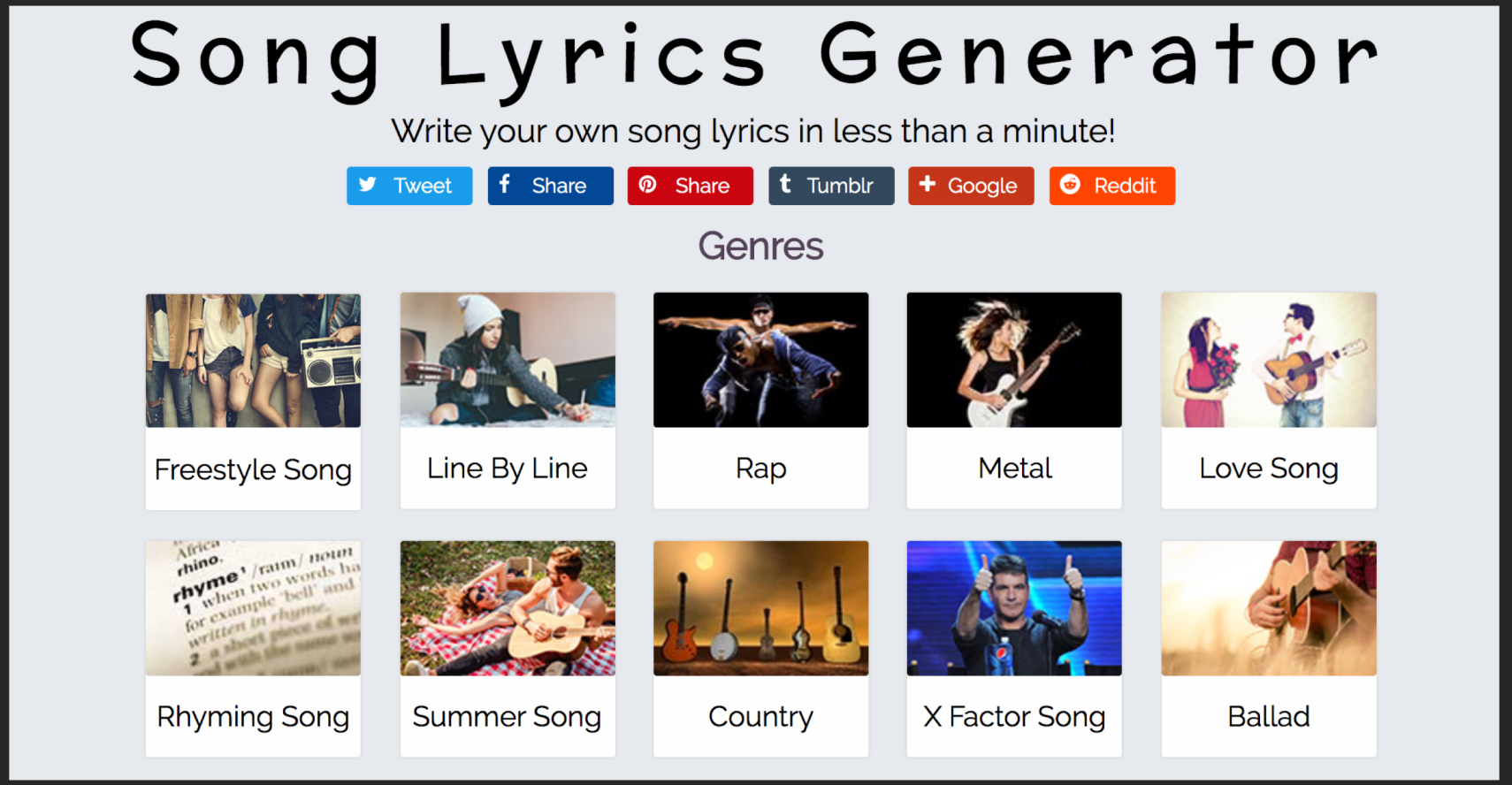
Automatic Music Generation

Jukedeck

https://www.jukedeck.com/

Automatic Lyrics Generation

Song Lyrics Generator



https://www.song-lyrics-generator.org.uk/

Audio Similarity – Classification

- Κατηγοριοποιήστε τους παρακάτω ήχους

A

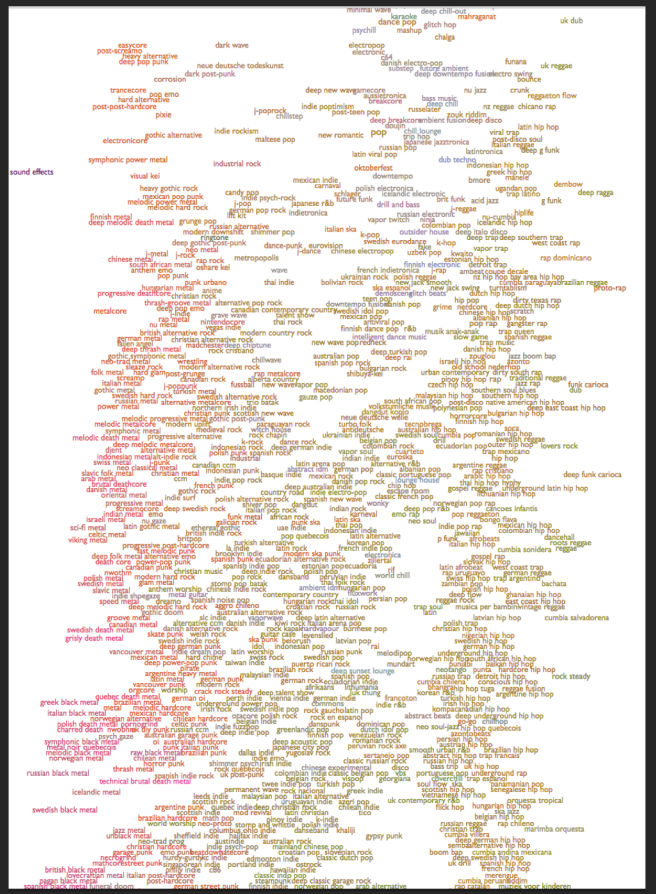
B

C

D

E

Audio Similarity – Music Genre Classification



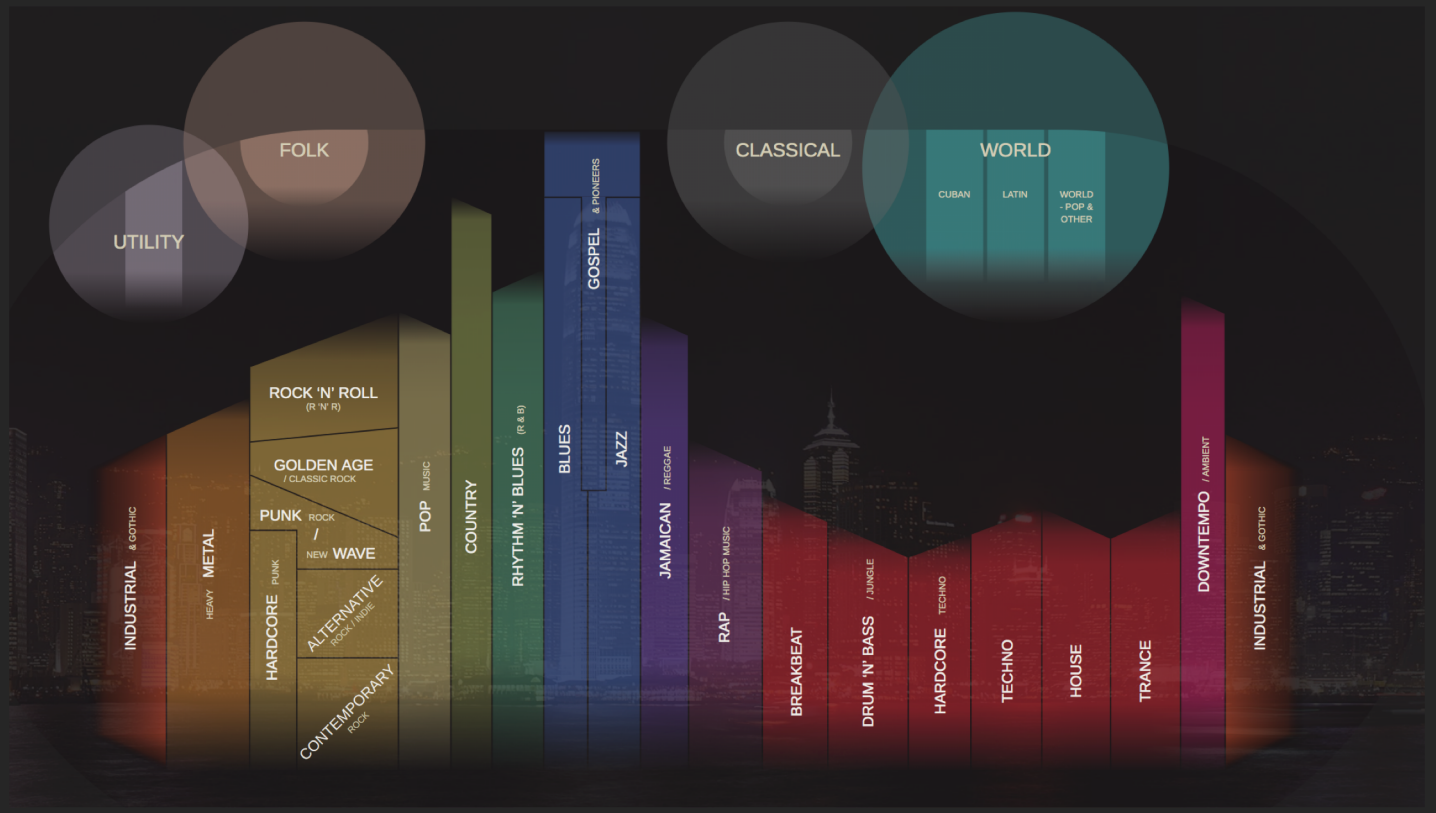
Every Noise at once
Music Genre Map

http://everynoise.com/engenremap.html

Audio Similarity – Music Genre Classification

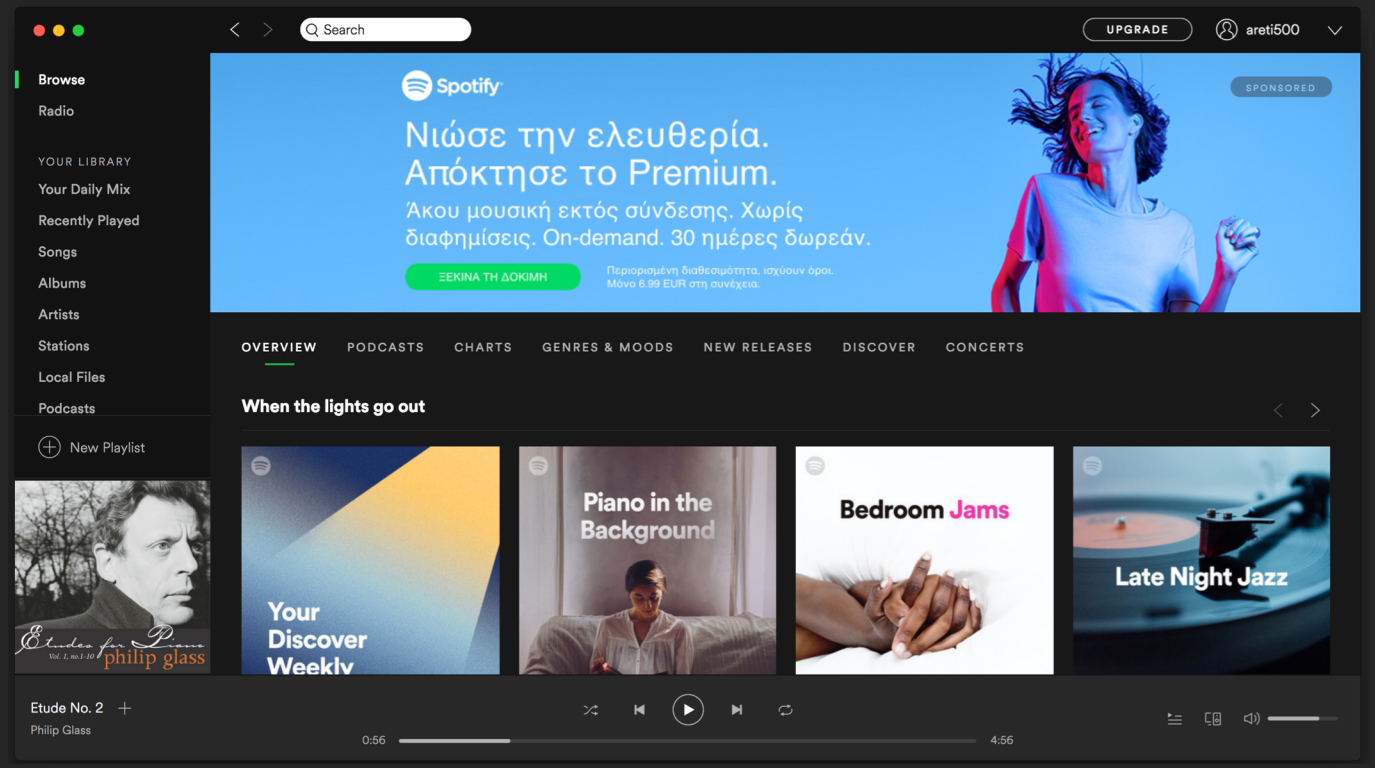
Musicmap

The Genealogy and History of Popular Music Genres from Origin till Present (1870-2016)

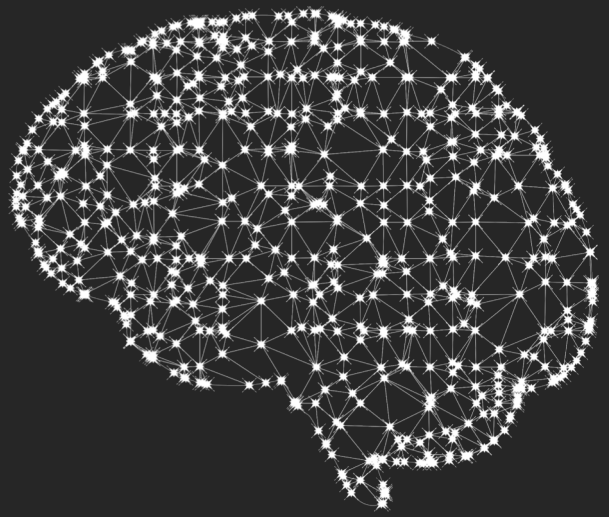


https://musicmap.info/#

Audio Similarity – Music Recommendation



Spotify



Τέλος