Computational tools for assisting teaching of alien music traditions

The Musical Bridges project

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Barcelona

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Outline

- Background
- Objectives
- Work plan
- *Use case: the jingju music player*
- *Case overview: Hindustani art music*
- Conclusions

Background

- **Music Technology Group***
  - Focus on music information retrieval (MIR)
  - Interest in culturally aware and corpus driven research
  - Contribute to music understanding

    Can we put our work at the service of the understanding of alien musics?

- **World music education**
  - Abundant literature
    - Jonathan Stock (1996) *World sound matters*
    - Wade and Campbell (2003–2012) *Global music series*
    - Rao, Meer and Harvey (1999) *The Raga Guide*
  - Shortcomings
    - Addressed to official education curricula
    - Requires certain degree of music literacy
    - Gap between the textual description and the audio examples

*Universitat Pompeu Fabra, Barcelona (https://www.upf.edu/web/mtg)

MusicalBridges

upf. Music Technology Group

recerCaixa

ACUP

Obra Social "la Caixa"

https://www.upf.edu/web/musicalbridges

Objectives

- **Developing computational tools for aiding understanding and appreciation of alien music cultures**
  - to develop listenership, no musicianship (Elliott and Sivlerman, 2015),
  - to reach the broadest audience (no music literacy),
  - to bridge the gap between theoretical explanation and music examples
    - visualization e interaction
    - from “attentive listening” to “engaged listening” (Campbell 2004)
  - to provide self-paced, online study material
- **Design (on-site, on-line) courses to evaluate these tools**

Work plan

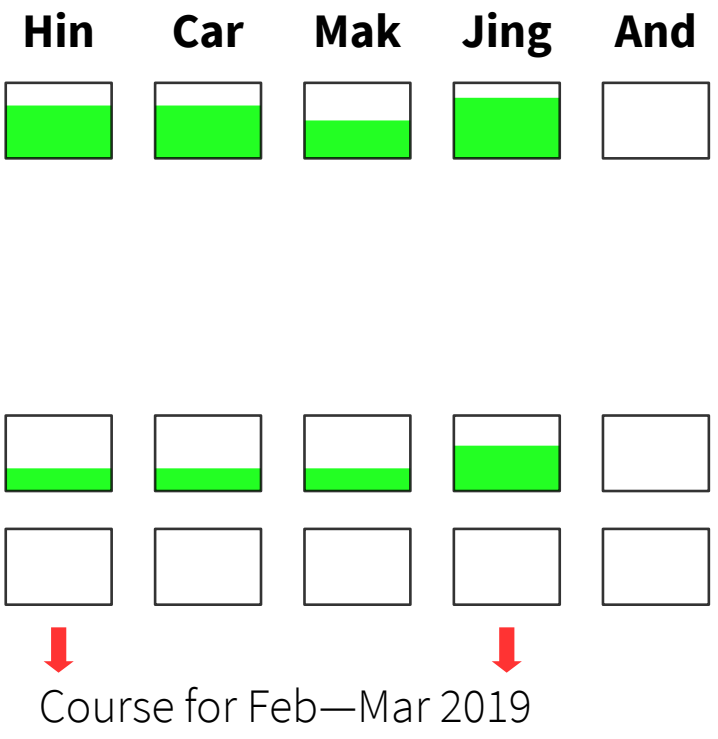
Music research corpora

- Carnatic music corpus (1650 audio recordings, 346 hours)
- Hindustani music corpus (1096 recordings, 300 hours)
- Ottoman-Turkish makam music corpus (6601 recordings, 420 hours; 2200 music scores)
- Jingju music corpus (1249 recordings, 123 hours)
- Arab-Andalusian music corpus (164 recordings, 125 hours; 162 music scores)

http://compmusic.upf.edu/

Work plan

- Identify **elements** of these music traditions that can be experienced
  - through computational tools
  - using the available data
- Develop culturally specific, interactive, on-line **tools**
- Design an evaluation **method**



Use case: the jingju music player

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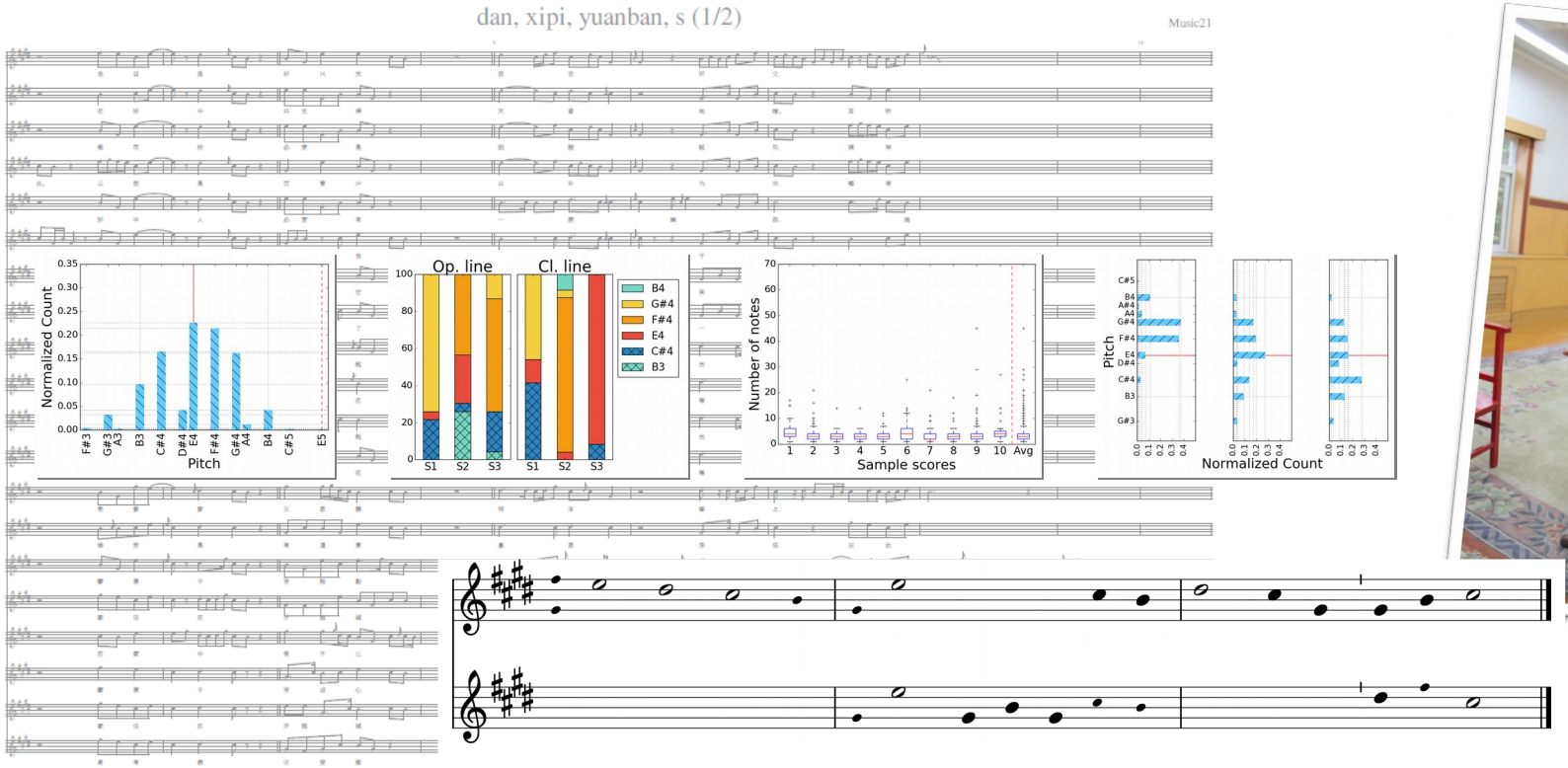


中国戏曲学院
National Academy of Chinese Theatre Arts (Beijing)

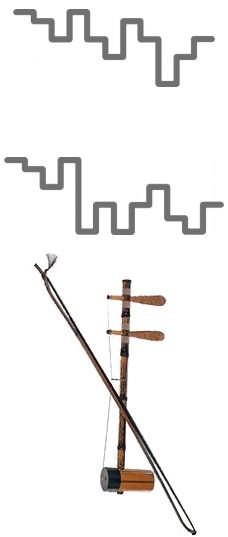
Use case: the jingju music player

couplet

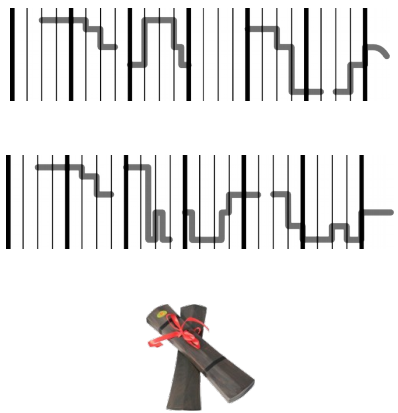
老爹爹　发恩德　将本修上，

明早朝　上金殿　面奏吾皇。

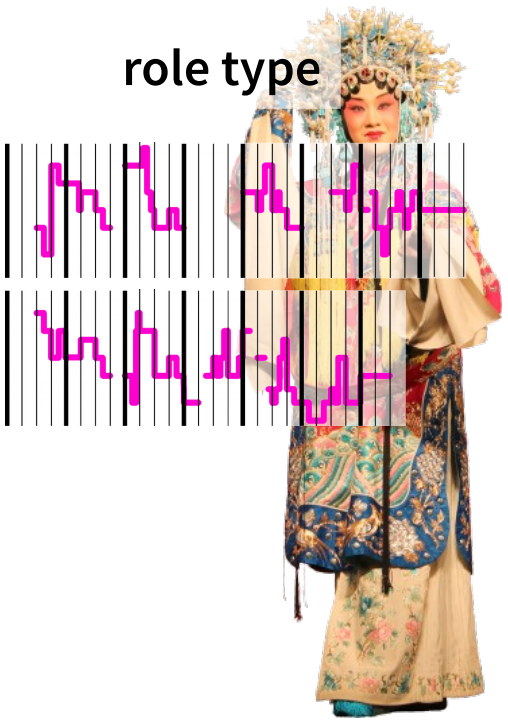
shengqiang



banshi



role type



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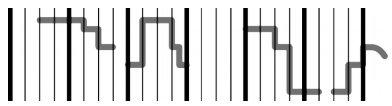
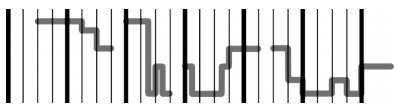
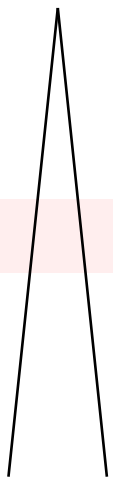




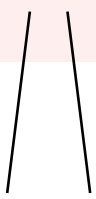
role type

Use case: the jingju music player

	tempo	meter	expressive function
慢板 *manban* (‘slow’)		一板三眼 *1 ban, 3 eyes* (4/4)	calm, introspection
中三眼 *zhongsanyan*		一板三眼 *1 ban, 3 eyes* (4/4)	introspective narration
快三眼 *kuaisanyan*		一板三眼 *1 ban, 3 eyes* (4/4)	calm narration
原板 *yuanban* (‘original’)		一板一眼 *1 ban, 1 eye* (2/4)	narration, conversation
二六 *erliu*		一板一眼 *1 ban, 1 eye* (2/4)	expectation
流水 *liushui*		有板无眼 *ban, no eyes* (1/4)	agitation
快板 *kuaiban* (‘fast’)		有板无眼 *ban, no eyes* (1/4)	anger, fear
散板 *sanban* (‘scattered’)		无板无眼 *no ban, no eyes* (free)	emotional
摇板 *yaoban*		无板无眼 *no ban, no eyes* (free)	inner agitation
导板 *daoban*		无板无眼 *no ban, no eyes* (free)	emotional outburst

Use case: the jingju music player

“ 昔日有个三大贤”——《珠帘寨》（李克用）
“In ancient times there were Three Great Sages”,
from *The Zhulian Stockade* (Li Keyong)

原板 *yuanban* (‘original’)		一板一眼 *1 ban, 1 eye* (2/4)	narration, conversation
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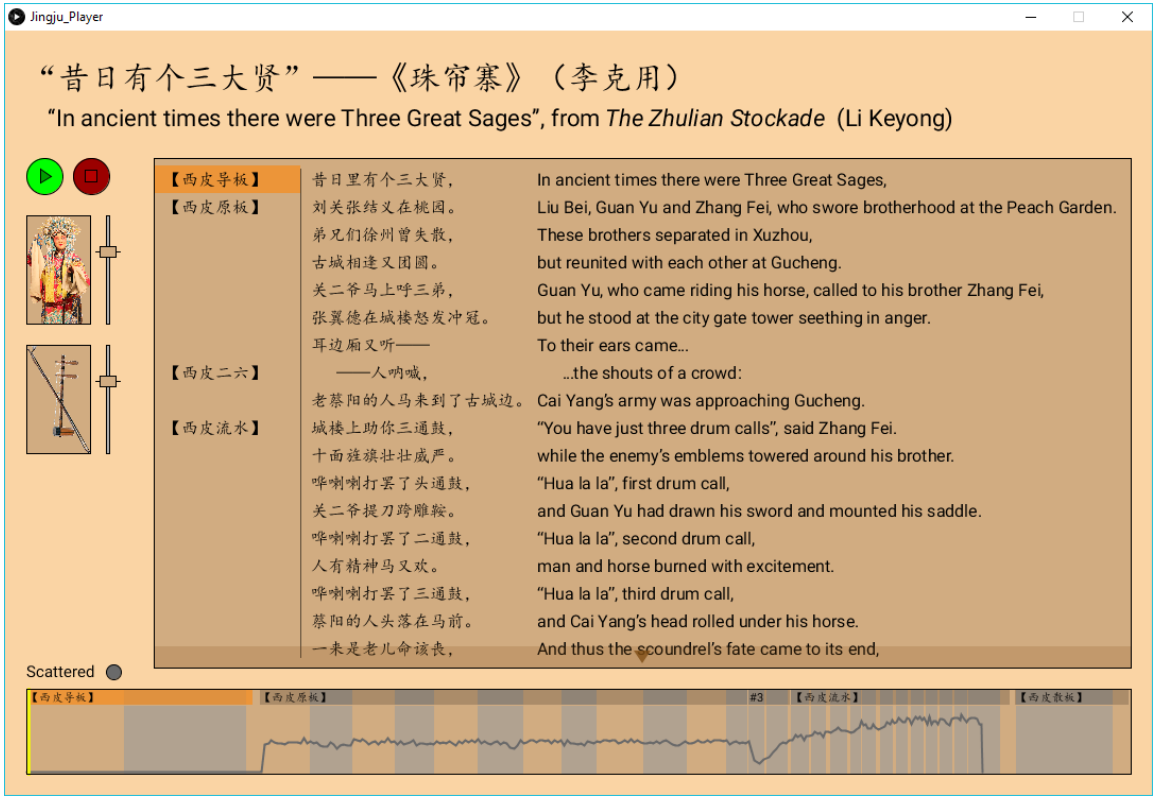

Use case: the jingju music player

Jingju Music Corpus

- **Jingju Audio Recordings Collection** (1249 recordings, 123 hours)
- **Jingju Music Scores Collection** (92 scores, 897 melodic lines)
- **Jingju Lyrics Collection** (850 plays, 2163 scripts)
- **Jingju *a Cappella* Recordings Collection** (226 voice recordings, 69 jinghu recordigns)

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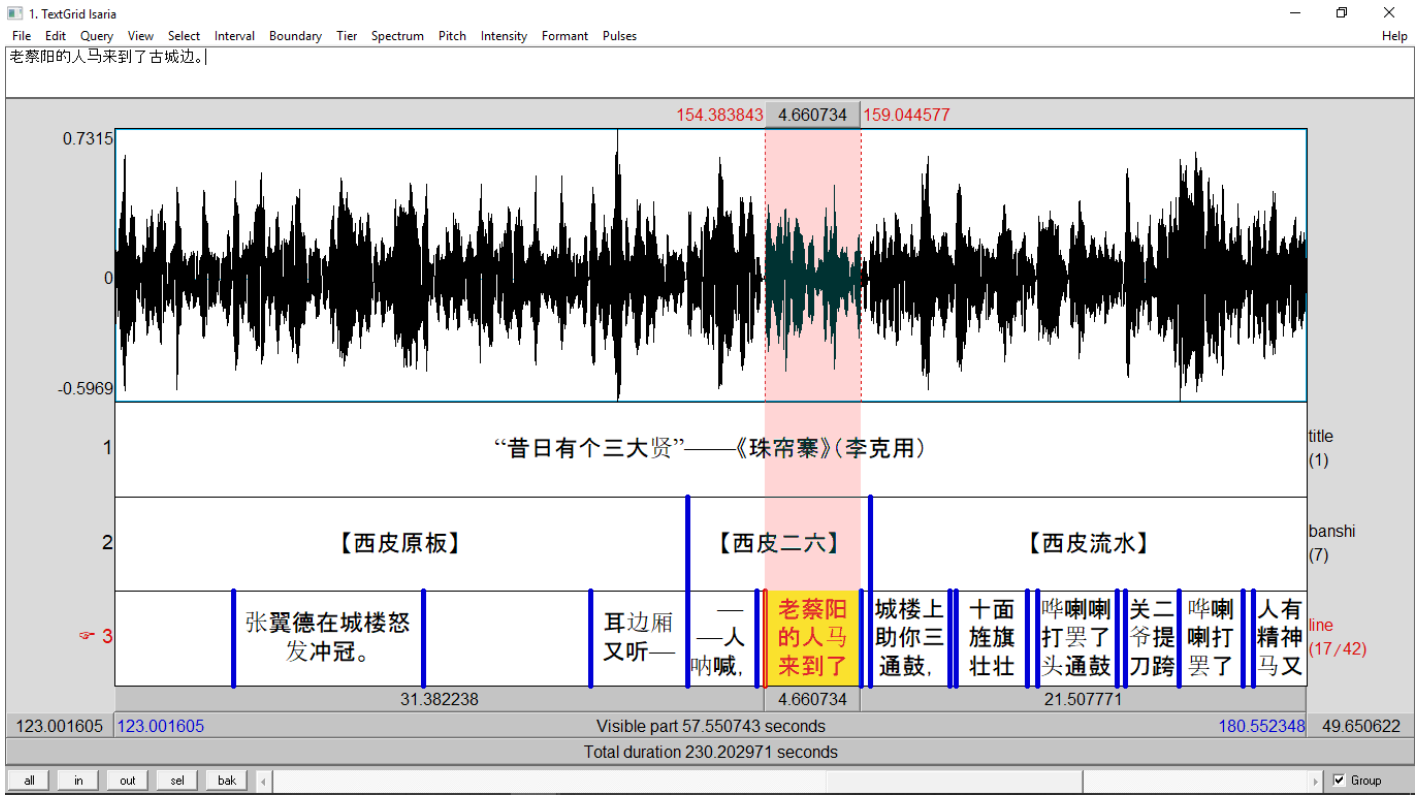
*http://doi.org/10.5281/zenodo.1245942

Use case: the jingju music player

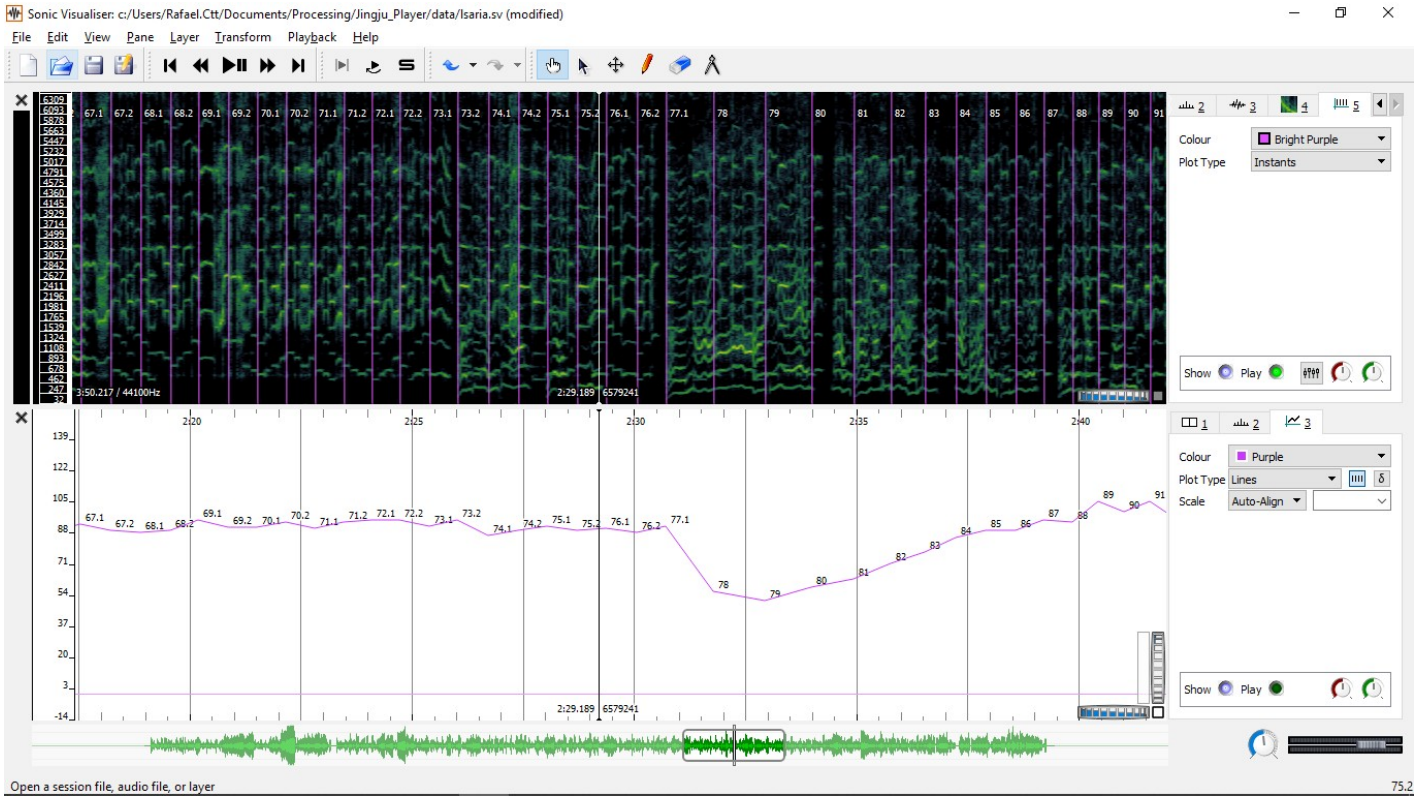
Praat



*http://www.fon.hum.uva.nl/praat/

Use case: the jingju music player

Sonic Visualizer



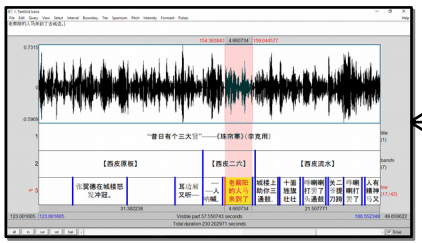
*https://www.sonicvisualiser.org/

Use case: the jingju music player

Jingju *a Cappella* Recordings Collection

voice.mp3

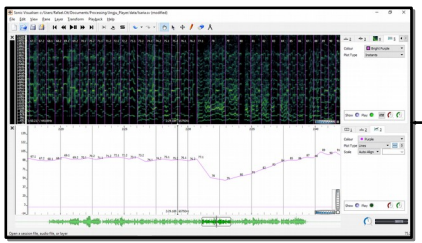
jinghu.mp3



lines.csv

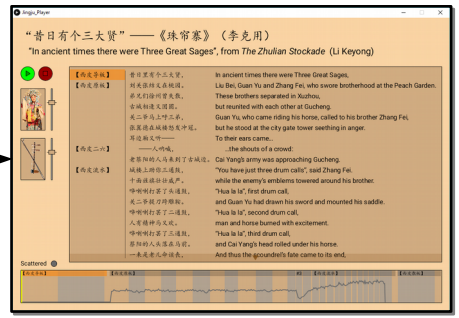
banshi.csv

title.csv



tempo-curve.csv

Processing*



*https://processing.org/

Use case: the jingju music player

- **Potential**
  - Easy visualization of an aria's structure in terms of *banshi* and lyrics lines
  - Concrete visualization of tempo changes and its relationship with *banshi*
  - Interactivity: navigation, source selection
  - Engaged listening: metre following guided by the light signal

Use case: the jingju music player

- **Shortcomings**
  - No longer support for embedding in a web page
  - Limited sources
- **Improvements**
  - Recode it in P5.js*
  - Add visualization of pitch and dynamics

*https://p5js.org/

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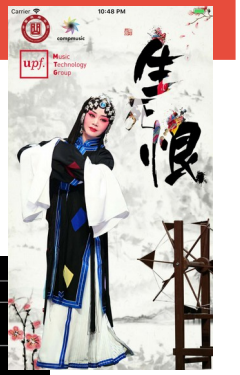
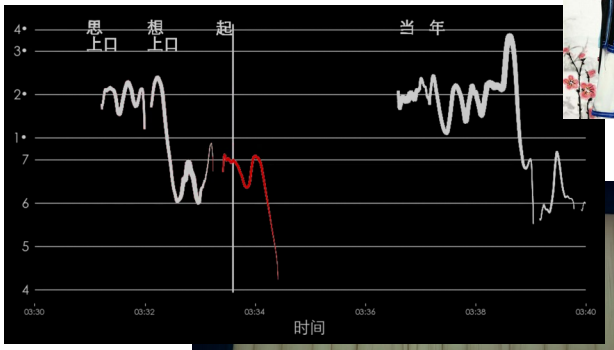
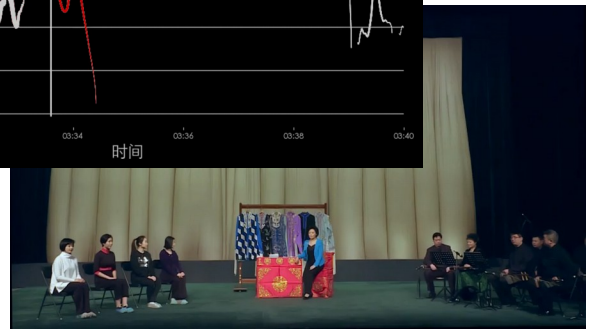
《生死恨》
Regrets of Life and Death
(iPhone app)



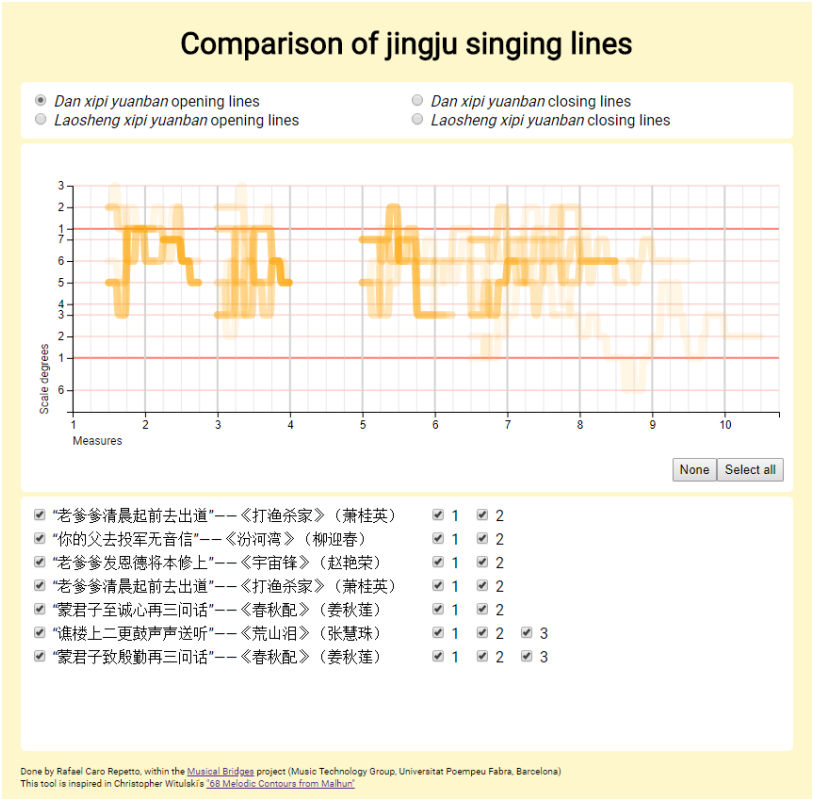




"Research on multimedia and computer aided education of Mei Lanfang's style of singing,"*
PI Zhang Jing, National Academy of Chinese Theatre Arts

*Funded by Academy of Social Sciences of Beijing

Use case: jingju melodic lines comparison



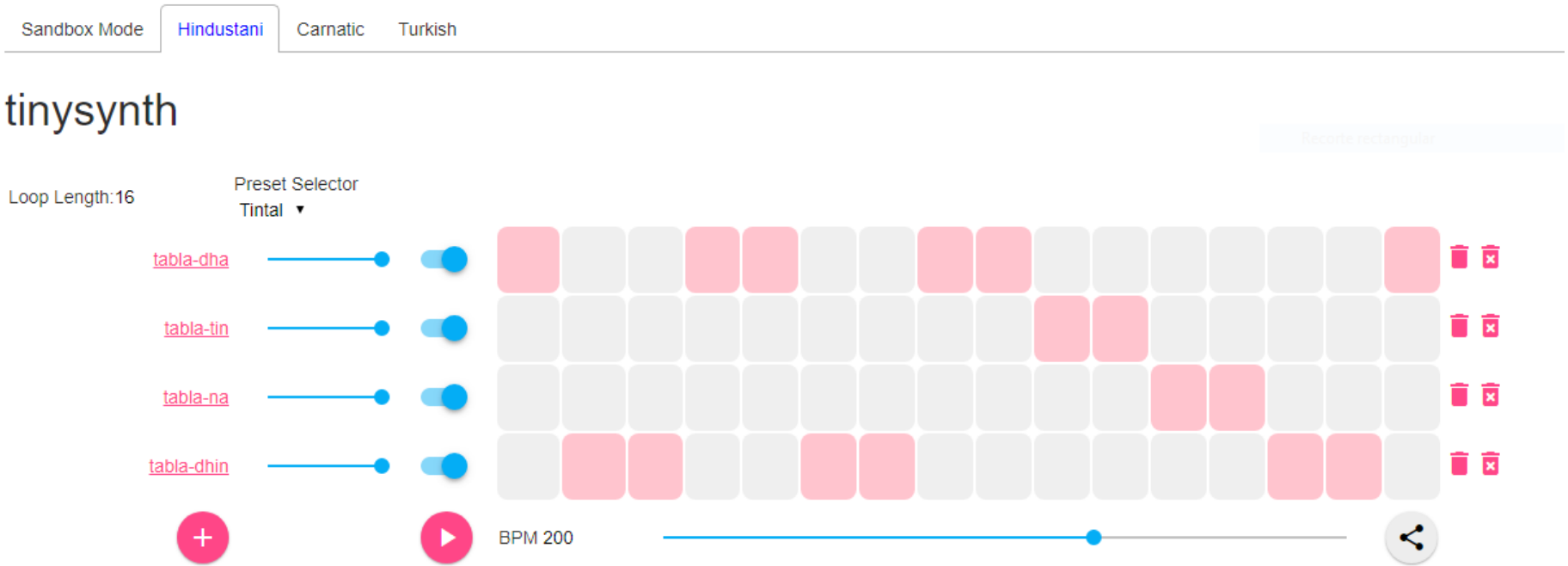
https://rafael-caro.github.io/jingju-melodies-comparison/

Case overview: Hindustani art music

	“*Sa*-ng along”	**Tāla**	**Rāga**
isolated	Sing *sa* from tanpura (Data: Freesound acoustic and electronic tanpura packs)	Clap/wave along a generated cycle ***Tinysinth****	
in performance	Sing *sa* from recroding (Data: manual *sa* annotations for 108 recordings)		

* https://bpugnaire.github.io/mtg-synth-project/

Case overview: Hindustani art music



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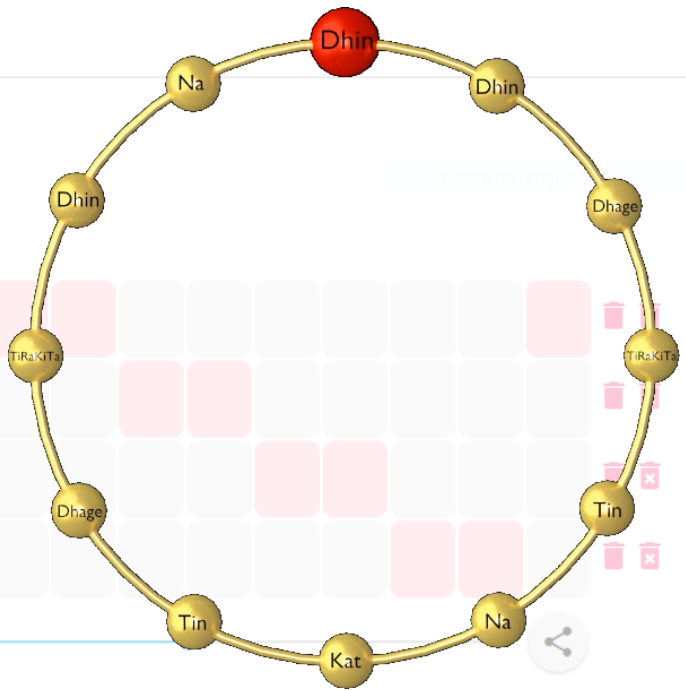

Case overview: Hindustani art music

	“*Sa*-ng along”	**Tāla**	**Rāga**
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in performance	Sing *sa* from recroding (Data: manual *sa* annotations for 108 recordings)	Clap/wave along a recording (Data: manual *sam* annotations for 108 recordings)	(Scale annotated pitch track?) (*Dunya*)

* https://bpugnaire.github.io/mtg-synth-project/

Conclusions

Potential

- Bridge the gap between theory and sound by visualization
- Interactivity and self-pacing, hopefully engaged listening
- Availability of data and tools

Challenges, future work

- Not satisfactory results of state of the art MIR technologies
- Design a methodology for evaluation
  - MusicCritic *
  - Gamification

https://musiccritic.upf.edu/demo/

Computational tools for assisting teaching of alien music traditions

The Musical Bridges project

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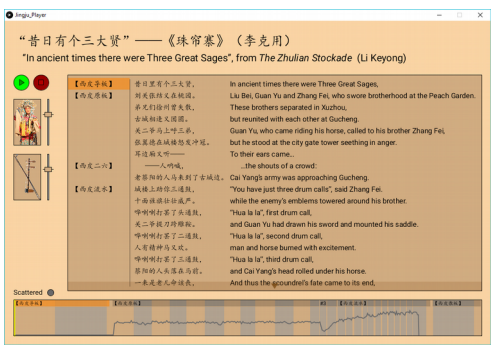
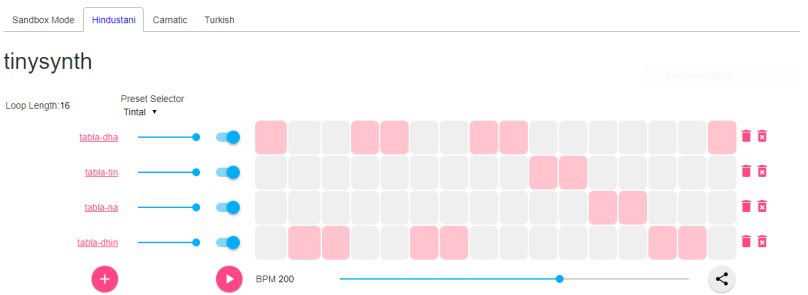
MusicalBridges





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