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Ethnic Music Analysis

Challenges & Opportunities

Tarsos as a case study

OUTLINE

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  - Dataset
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- Methodology
- Tarsos
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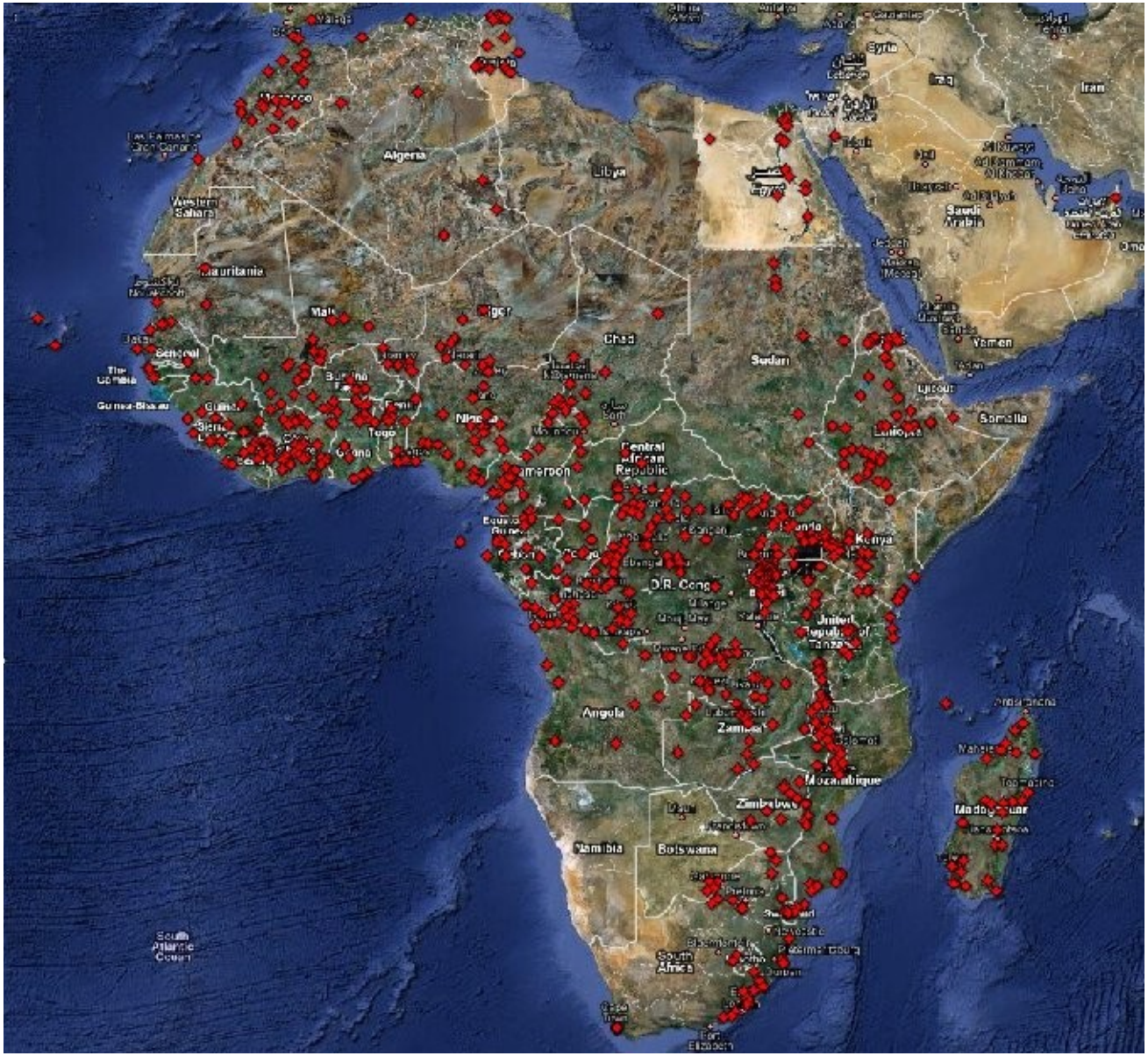
INTRODUCTION BACKGROUND

Research 'team' based at the School of Arts Ghent in Belgium:

- **Joren Six**, Computer Scientist
- Olmo Cornelis, Musicologist & Composer

We work on African ethnic music doing Computational Ethnomusicology[1]

INTRODUCTION DATASET



INTRODUCTION DATASET

Digitization project “Digitization of the Ethnomusicological Sound Archive of the Royal Museum for Central Africa” resulted in:

- **Audio**: 50.000 sound recordings – 3.000 hours of music - 33.000 items digitized.
- **Contextual Meta-data** : 35.000 items digitized
- Development of a **website**: http://music.africamusem.be
- Preliminary exploration of **MIR**-techniques.

INTRODUCTION CONTEXT ANALYSIS

Goal of our current research project:

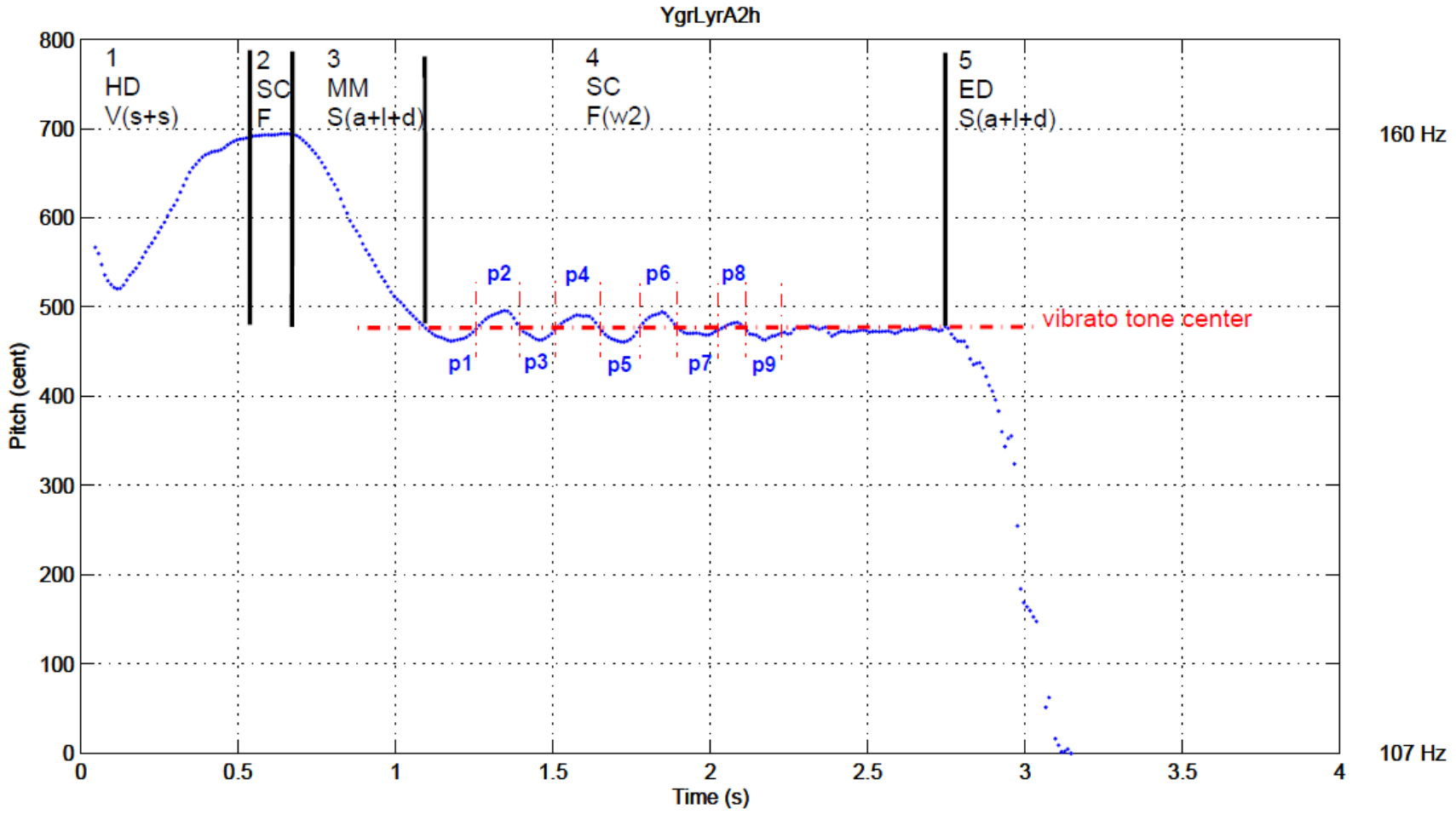
Provide culture independent access to archives with ethnic music that deal with a **large variability of musical content**, users, search intentions and expectations in a multidisciplinary approach, combining musicology and computational means.

Challenges

- Ground Truth
- Music Theory Model
- Symbolic notation
- Conflicting terminology
  - Instrument names
  - Geographical information
  - What is a Note?

INTRODUCTION CONTEXT ANALYSIS

Challenge: What is a note?



Opportunities

- Document musical diversity
- Spot trends and influences
- Use interesting features in new compositions

METHODOLOGY

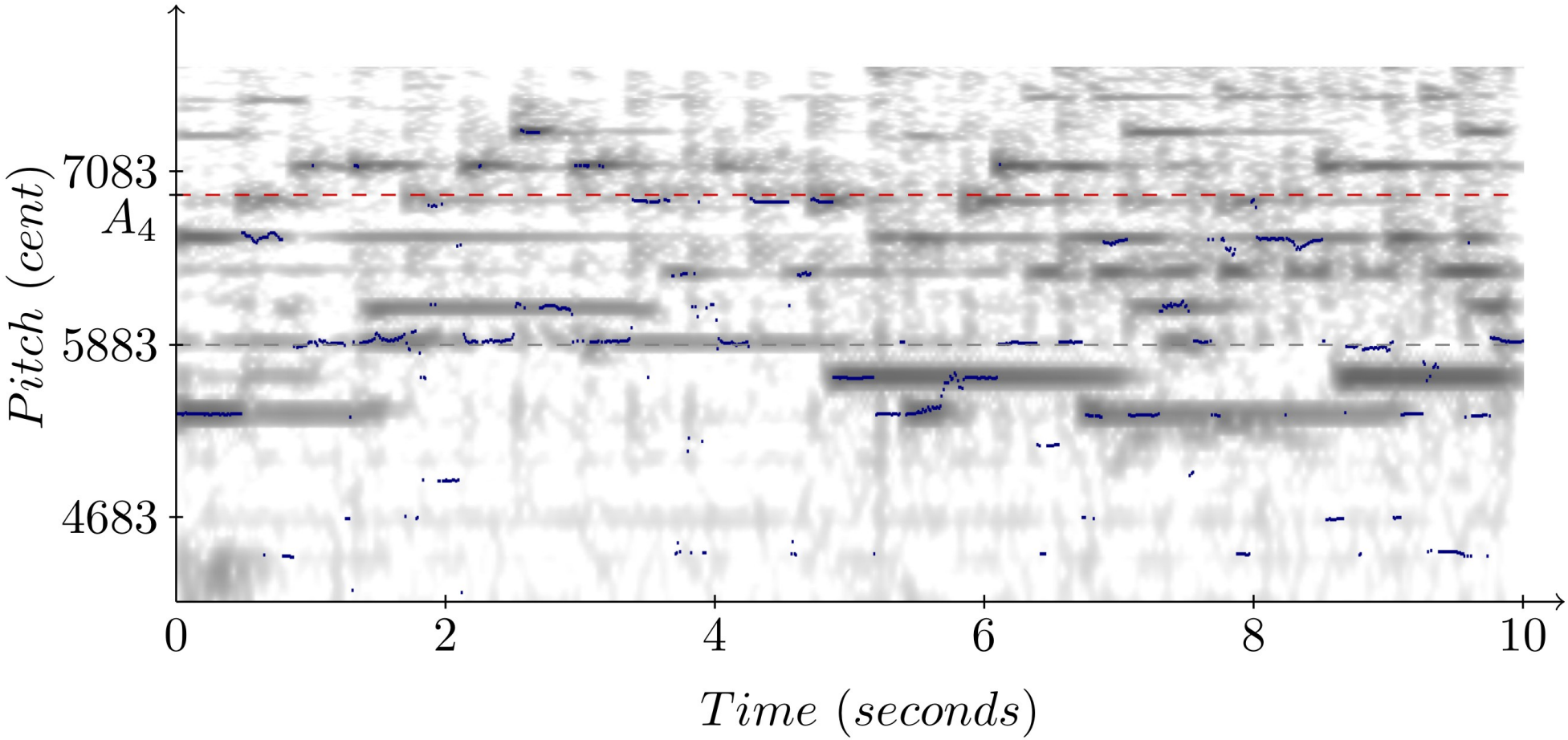
Develop a method yielding **culture independent** views on musical parameters by using or adapting existing signal processing MIR-techniques.

This idea is implemented in the software package **Tarsos**[5]: An easy to use, open system to extract and explore **pitch organization** in musical audio for scientific, educational and artistic purposes.

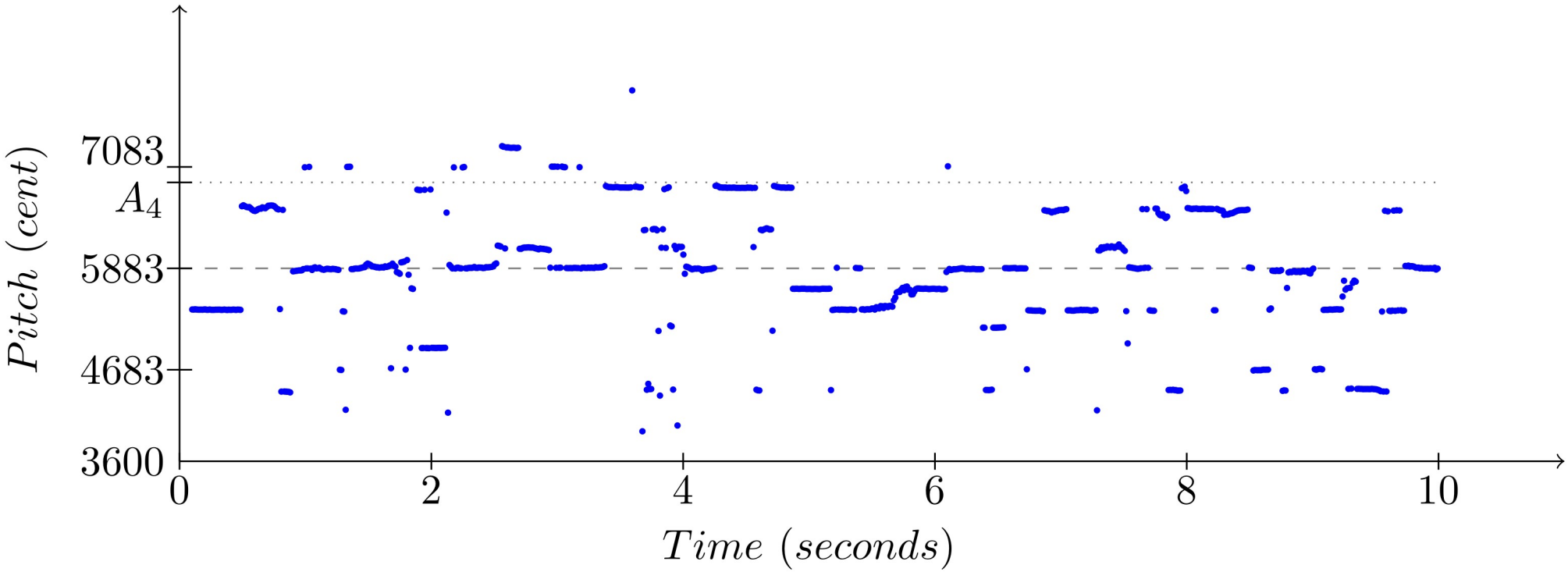
Temporal and timbral features follow

TARSOS DEMO

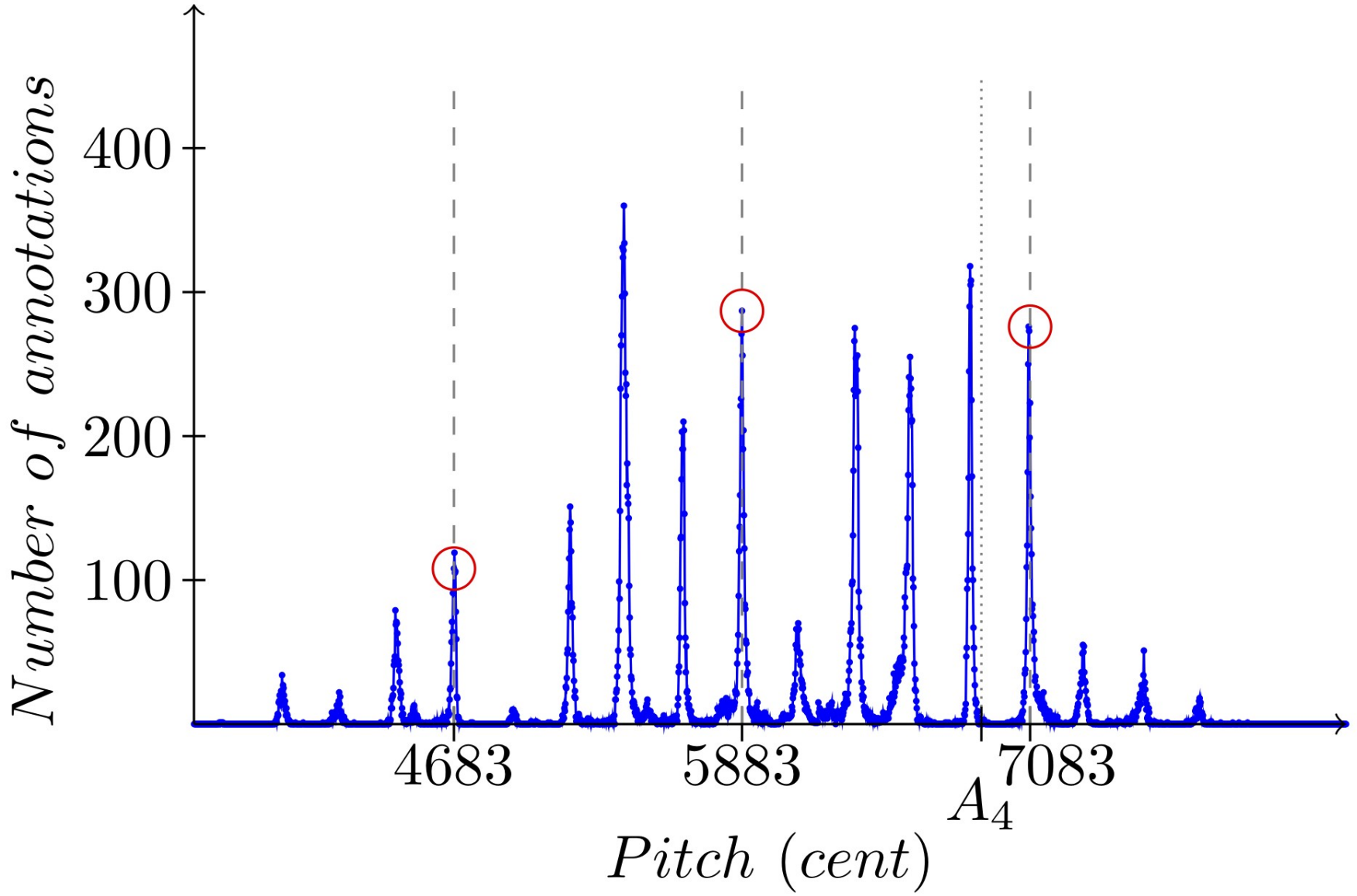
TARSOS INNER WORKINGS



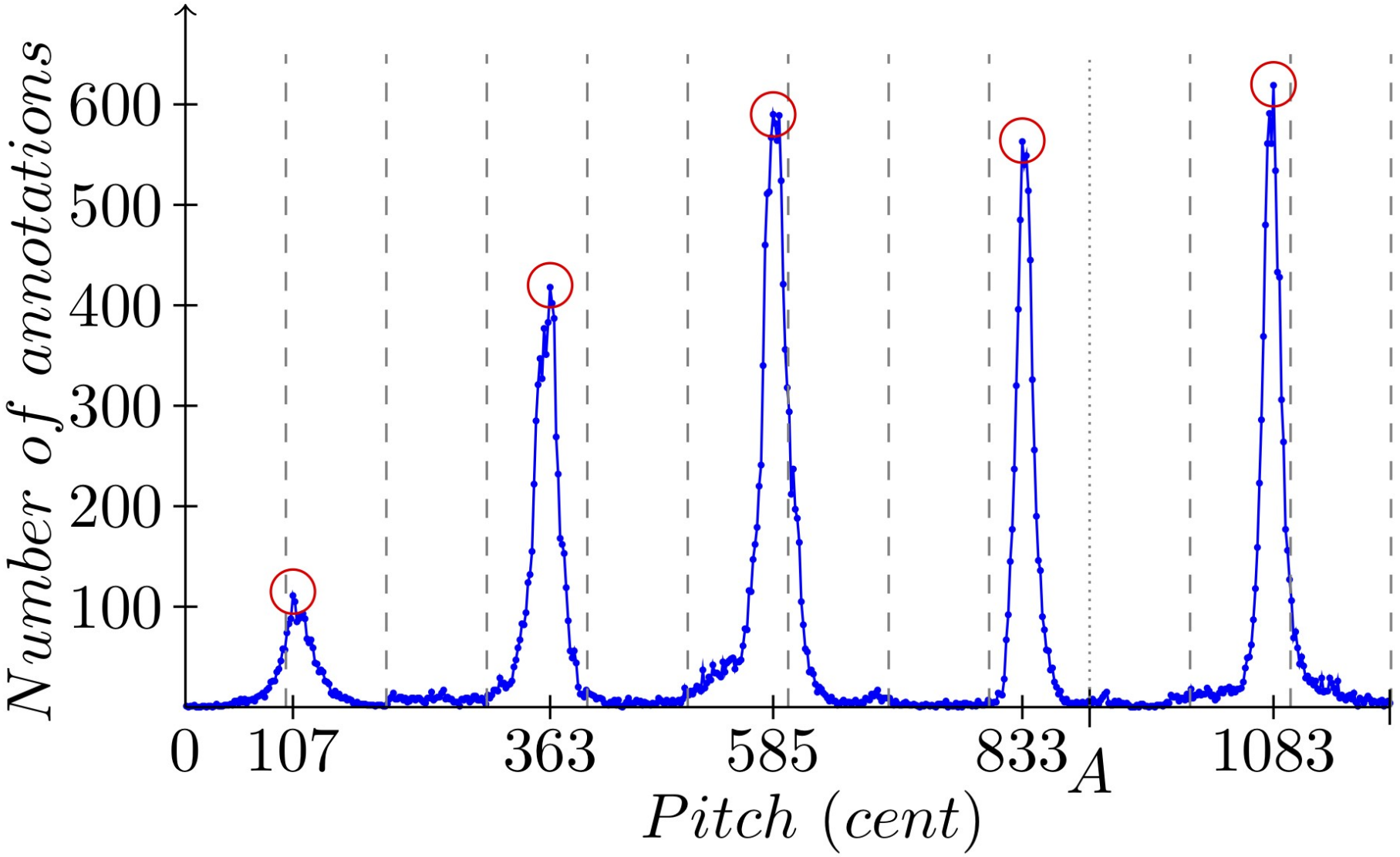
TARSOS INNER WORKINGS



TARSOS INNER WORKINGS



TARSOS INNER WORKINGS



TARSOS INNER WORKINGS

Pitch Class (cent)	Interval (cent)
107	
	255
363	478
	222 725
585	470 976
	248 720
833	498
	251
1083	

TARSOS API

Scripting API:

- Search for pitch intervals
- Tone scale (makam, raga) recognition
- Audio fingerprinting [4]
- Automatically transcoding audio

Scripting possible with any JVM language:

- Scala
- Groovy
- Jython
- ...

CONCLUSIONS

Tarsos delivers:

- Scientific data
  - Historical temperaments.
  - African tone scales are becoming more western like[3]

- Artistic input e.g. experimentation with microtonal compositions.

- Educational opportunities: improve intonation.

CONCLUSIONS

Tarsos shows

- A method to handle diversity in music
- A way to suggest an analysis and let musicologists adapt that analysis
- How to get package existing methods in a hopefully user-friendly software package

DISCLAIMER

Audio alone might not be sufficient to describe and/or retrieve ethnic music:

What does it mean to search and retrieve music from a culture where the word “music” exists only in connection to body movement, smell, taste, colour.

The idea of separating sound from the rest of its physical environment (movement, smell, taste, colour) may well be a weird “invention” of the West.

We cannot understand ethnic music correct without its **social function and context**![2]

CONTACT

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http://tarsos.0110.be
http://music.africamuseum.be

References

[1] G. Tzanetakis, A. Kapur, W. A. Schloss, M. Wright. Computational Ethnomusicology. Journal of Interdisciplinary Music Studies, 2007.

[2] Access to ethnic music: Advances and perspectives in content-based music information retrieval - Cornelis, O., Lesaffre, M., Moelants, D. & Leman, M. Apr-2010 In : Signal Processing. 90, 4, p. 1008-1031. 24 p.

[3] Moelants,D.,Cornelis,O.,Leman,M.:Exploring african tone scales. Proceedings of 9th ISMIR Conference (2009)

[4] Six, J. & Cornelis O. A Robust Audio Fingerprinter Based on Pitch Class Histograms - Applications for Ethnic Music Archive, Proceedings Folk Music Analysis conference 2012

[5] Six, J. & Cornelis, O., Tarsos - a Platform to Explore Pitch Scales in Non-Western and Western Music, 24-Oct-2011 Proceedings of the 12th International Society for Music Information Retrieval Conference, ISMIR 2011.