CompMusic project: motivation, results, reflections

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Universitat Pompeu Fabra, Barcelona

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upf. Universitat Pompeu Fabra Barcelona

MTG Music Technology Group

Latest news

PhD thesis proposal defences

The EyeHarp participates to Falling Walls Lab Barcelona

Universos a la mà

Research

The research of the MTG is quite close to the core of the Sound and Music Computing interdisciplinarity, being especially active on topics such as audio signal processing, music information retrieval, musical interfaces, and computational musicology. The MTG is organized into four labs, each one led by a faculty member. Most of the research is carried out within projects supported from a variety of funding sources. The research results into publications and software & datasets, while also emphasizing results of relevance in technology transfer and outreach initiatives.

Labs

Projects

Software & Datasets

Funding sources

Tech transfer

A mission of the MTG is to transfer its research results to society, both through technology transfer and by outreach activities. The technology transfer is done by licensing technologies, through specific industrial collaborations, and by creating spin-offs. If you are a company interested in the work of the MTG, please contact us to know more about how to collaborate.

The MTG has been recognized as a TECNIO center, a quality accreditation granted by the Catalan government that identifies the best R&D groups that offer innovative technologies to companies.

Technologies for licensing

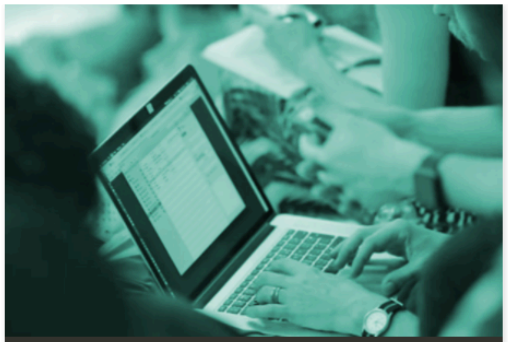
Industrial collaborations

Spin-offs and industrial partners

Education & Outreach

The MTG is engaged in education and outreach activities targeting a wide variety of publics, from young children interested in music to students wanting to become researchers in our field. Formal education is mainly done through the various undergraduate and graduate programs of the UPF. More general outreach activities are done through a number of cultural programs and research dissemination activities. The MTG also maintains a number of community resources of interest to the research and music communities.

Education



Community resources

Cultural & creative activities

Research dissemination

Motivation

India 2010

amazon
Your Amazon.com | Today's Deals | Gift Cards | Help
Shop by Department
Search
Music
Go
Your Amazon.com | Your Browsing History | Recommended For You | Amazon Betterizer | Improve Your Recommendation
Your Amazon.com > Recommended for You > Music
Just For Today
Browse Recommended
Recommendations
Music
Alternative Rock
Blues
Box Sets
Broadway & Vocalists
Children's Music
Returning customer?
Sign in to get your personalized recommendations.
New customer?
Make Recommended for You just for you!
It's free and easy and requires no credit card or personal informat
Top Sellers
1.
LIVING THINGS
~ Linkin Park (June 26, 2012)
amazon.fr
Bonjour. Identifiez-vous pour découvrir nos conseils personnalisés. Nouveau client ? Commencez ici.
Soldes d'été et promotions
Chez vous | Promotions | Chèques-cadeaux | Listes et idées cadeaux
Votre compte | Aide
Toutes nos boutiques
Rechercher
Musique
Panier
Liste d'envies
Musique
Recherche détaillée | Téléchargements MP3 | Nouveautés | Meilleures ventes | Promotions | Nos rubriques | Coffrets | DVD musicaux | Musique d'occasion
Nouveautés
Depuis 1 mois (12 898)
Depuis 3 mois (32 328)
Dans les 3 mois à venir (6 002)
Boutique
Musique
Classique (345 968)
Jazz (185 586)
Chanson française (62 279)
Pop (1 539 809)
Rock (352 823)
Musique
Résultats 1 - 12 sur 4 369 848
Trier par Popularité
1.
Living Things de Linkin Park (CD - 2012)
Acheter neuf: EUR 16,15
26 neufs à partir de EUR 11,42 1 d'occasion à partir de EUR 18,07
Télécharger un album: EUR 9,99
Recevez votre article le vendredi 29 juin, si vous commandez dans les 2 heures et choisissez la livraison en 1 jour ouvré.
(5)
Livraison gratuite possible (voir fiche produit) et 1 promotion supplémentaire
21 de Adele (CD - 2011)
Acheter neuf: EUR 11,96 EUR 10,00
44 neufs à partir de EUR 5,99 4 d'occasion à partir de EUR 4,47
Télécharger un album: EUR 9,99
Recevez votre article le vendredi 29 juin, si vous commandez dans les 2 heures et choisissez la livraison en 1 jour ouvré.
(145)
Livraison gratuite possible (voir fiche produit) et 1 promotion supplémentaire
The Absence de Melody Gardot (CD - 2012)
Acheter neuf: EUR 14,99
亚马逊 amazon.cn
您好, 请登录以获取为您订制的推荐. 新客户? 点这里注册.
Z.cn直达亚马逊, 购物满29元免运费!了解详情>>
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类别
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古典 (9718)
休闲音乐 (8094)
乡村音乐 (953)
民族民间音乐 (5834)
民谣 (282)
摇滚 (546)
爵士 (567)
Rap & Hip-Hop (109)
Blues (150)
R&B (47)
舞曲,DJ (2021)
影视音乐 (1424)
音乐影音 (9589)
电子音乐 (64)
军旅音乐 (143)
礼仪音乐 (450)
宗教音乐 (416)
音乐
显示: 1-12条, 共56069条
排序: 人气
客户评分
5星级 (4632)
4星及以上 (14144)
1.
音乐无极限:汽车音乐
¥268.00 ¥99.00
预售商品：暂无上市时间
(7)
2.
小喇叭经典儿童广播
¥80.00 ¥39.00
现在有货
部分地区明天即可送达。
(407)
amazon.co.jp
こんにちは。 おすすめ商品を見るにはサインインしてください。 初めての方はこちら。
ANGFA 薬用スカルプD 配送料無料! 今すぐチェック
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アカウントサービス | ヘルプ
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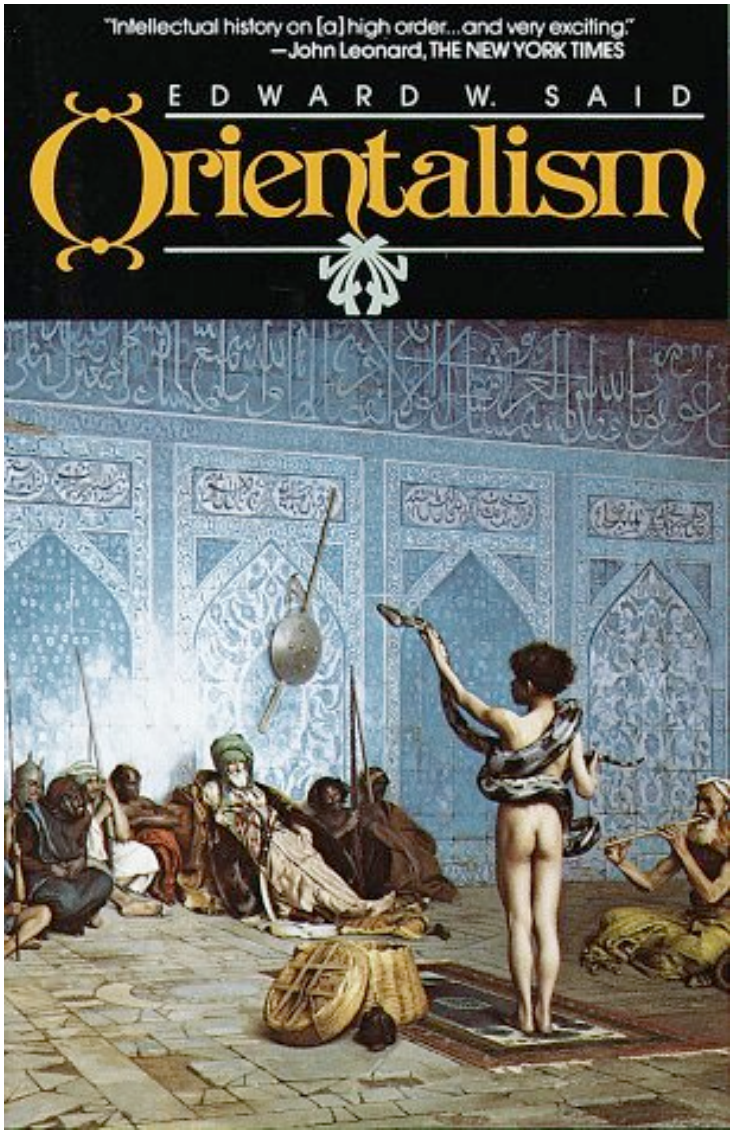
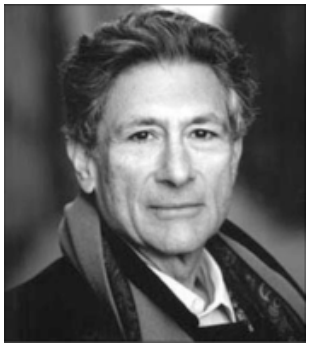
カートを見る
ほしい物リスト
ミュージック
詳細検索 | ジャンル一覧 | ニューリリース・予約 | ベストセラー | ミュージックDVD | 輸入盤ストア | バーゲン | 中古CD | MP3ダウンロード
カテゴリー
ミュージック
J-POP (186,386)
アジアンポップ (11,094)
ポップス (296,894)
ロック (383,188)
ハードロック・ヘヴィーメタル (158,054)
ブルース・カントリー (111,144)
ソウル・R&B (153,045)
ヒップホップ (87,451)
ダンス・エレクトロニカ (155,507)
ジャズ・フュージョン (201,466)
クラシック (324,648)
ワールド (340,269)
サウンドトラック (43,592)
ヒーリング・ニューエイジ (95,943)
アニメ・ゲーム (44,285)
キッズ・ファミリー (29,961)
歌謡曲・演歌 (49,166)
ミュージック
検索結果3,035,086件中1件から12件までを表示
並べ替え: 人気度
1.
Spending all my time (初回限定盤)(DVD付) Perfume (CD - 2012)
新品: ￥ 1,780
近日発売 予約可。 この商品は2012/8/15に発売予定です。
通常配送無料 および その他キャンペーン
2.
Uncontrolled(MV11曲入りDVD付)(特典ポスター無) [CD+DVD] 安室奈美恵 (CD - 2012)
新品: ￥ 3,990 ￥ 3,281
21 新品 ￥ 3,281より 3 中古品 ￥ 3,200より
11時間 以内に「お急ぎ便」でご注文いただくと、2012/6/29 金曜日 までにお届けします。
(43)
通常配送無料
3.
ER【イベント応募券付】(初回限定盤A)(DVD付) エイトレンジャー (CD - 2012)
新品: ￥ 1,470 ￥ 1,323


"Intellectual history on [a] high order...and very exciting."
—John Leonard, THE NEW YORK TIMES
EDWARD W. SAID
Orientalism



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Raga

From Wikipedia, the free encyclopedia

This article is about melodic modes used in Indian music. It is not to be confused with Ragga. "Ragam" and "Ragini" redirect here. For the Indian actress, see Ragini (actress). For other uses, see Raga (disambiguation) and Ragam (disambiguation).

A **raga** or **raag** (literally "color, hue" but also "beauty, melody"; also spelled *raaga*, *ragam*; pronounced *rāga*, or *rāgam* or "raag")[1] is one of the melodic modes used in traditional South Asian music genres such as Indian classical music and qawwali.

A raga uses a series of five to nine musical notes upon which a melody is constructed.[2] However, the way the notes are approached and rendered in musical phrases and the mood they convey are more important in defining a raga than the notes themselves. In the Indian musical tradition, rāgas are associated with different ti
Indian classical music is always set in a rāga. Non-classical music such as popular Indian film s
use rāgas in their compositions.

Joep Bor of the Rotterdam Conservatory of Music defined *Raga* as "tonal framework for compo
Nazir Jairazbhoy, chairman of UCLA's department of ethnomusicology, characterized ragas as
ascent and descent, transilience, emphasized notes and register, and intonation and ornament
meaning of Raga as "*love*".[2]

Contents [hide]

1 Terminology
2 Principal Ragas
3 Rāga-Rāgini system
4 Ragas and their seasons
5 Notations
6 Northern and southern differences

लॉग इन नहीं किया है वार्ता योगदान १←१ अंक परिवर्तन खाता बनाएँ लॉग इन
डिफ़ॉल्ट

विकिपीडिया
एक मुक्त ज्ञानकोश

मुखपृष्ठ
चौपाल
हाल में हुए परिवर्तन
हाल की घटनाएँ
समाज मुखपृष्ठ
निर्वाचित विषयवस्तु
यादृच्छिक लेख

योगदान
प्रयोगपृष्ठ
अनुवाद हेतु लेख
आयात अनुरोध
विशेषाधिकार निवेदन
दान

सहायता
सहायता
स्वशिक्षा
अक्सर पूछे जाने वाले प्रश्न
देवनागरी कैसे टाइप करें
त्वरितवार्ता (आई॰आर॰सी चैनल)
दूतावास (Embassy)

उपकरण
यहाँ क्या जुड़ता है
पृष्ठ से जुड़े बदलाव
फ़ाइल अपलोड करें
विशेष पृष्ठ
स्थायी कड़ी
इस पृष्ठ पर जानकारी
Wikidata प्रविष्टि

राग

https://hi.wikipedia.org/s/a1o

मुक्त ज्ञानकोश विकिपीडिया से

"रागिनी" यहां पुनर्निर्देश करता है। अन्य उपयोगों के लिए रागिनी (बहुविकल्पी) देखें।

राग सुरों के आरोहण और अवतरण का ऐसा नियम है जिससे संगीत की रचना की जाती है। पाश्चात्य संगीत में "improvisation" इसी प्रकार की पद्धति है।

अनुक्रम [छुपाएँ]

1 परिचय
2 शब्दावली
3 राग की प्रकृति
4 राग और ऋतु
5 रागमालिका ग्रंथ के चित्र
6 इन्हें भी देखें
7 बाहरी कड़ियाँ

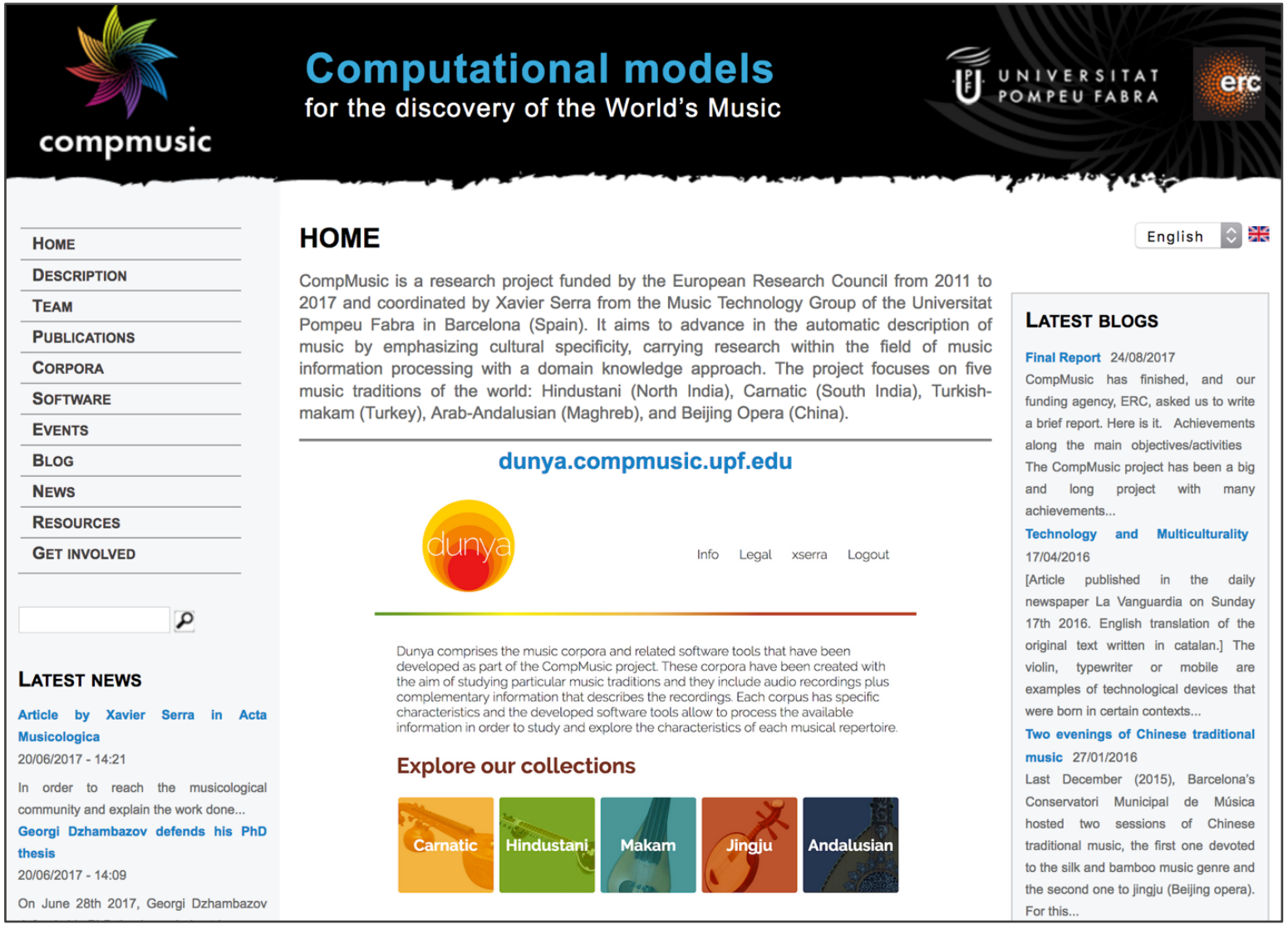
वसन्त रागिनी वसन्त का राग है। इस चित्र में कृष्ण गोपियों के साथ नृत्य करते दिख रहे हैं।

परिचय [संपादित करें]

'राग' शब्द संस्कृत की 'रंज्' धातु से बना है। रंज् का अर्थ है रंगना। जिस तरह एक चित्रकार तस्वीर में रंग भरकर उसे सुंदर बनाता है, उसी तरह संगीतज्ञ मन और शरीर को संगीत के सुरों से रंगता ही तो हैं। रंग में रंग जाना मुहावरे का अर्थ ही है कि सब कुछ भुलाकर मगन हो जाना या लीन हो जाना। संगीत का भी यही असर होता है। जो रचना मनुष्य के मन को आनंद के रंग से रंग दे वही राग कहलाती है।

हर राग का अपना एक रूप, एक व्यक्तित्व होता है जो उसमें लगने वाले स्वरों और लय पर निर्भर करता है। किसी राग की जाति इस बात से निर्धारित होती हैं कि उसमें कितने स्वर हैं। आरोह का अर्थ है चढना और अवरोह का उतरना। संगीत में स्वरों को क्रम उनकी ऊँचाई-निचाई के आधार पर तय किया गया है। 'सा' से ऊँची ध्वनि 'रे' की, 'रे' से ऊँची ध्वनि 'ग' की और 'नि' की ध्वनि सबसे अधिक ऊँची होती है। जिस तरह हम एक के बाद एक सीढ़ियाँ चढ़ते हुए किसी मकान की ऊपरी मंजिल तक पहुँचते हैं उसी तरह गायक सा-रे-ग-म-प-ध-नि-सां का सफर तय करते हैं। इसी को आरोह कहते हैं। इसके विपरीत ऊपर से नीचे आने को अवरोह कहते हैं। तब स्वरों का क्रम ऊँची ध्वनि से नीची ध्वनि की ओर होता है जैसे सां-नि-ध-प-म-ग-रे-सा। आरोह-अवरोह में सातों स्वर होने पर राग 'सम्पूर्ण जाति' का कहलाता

Results



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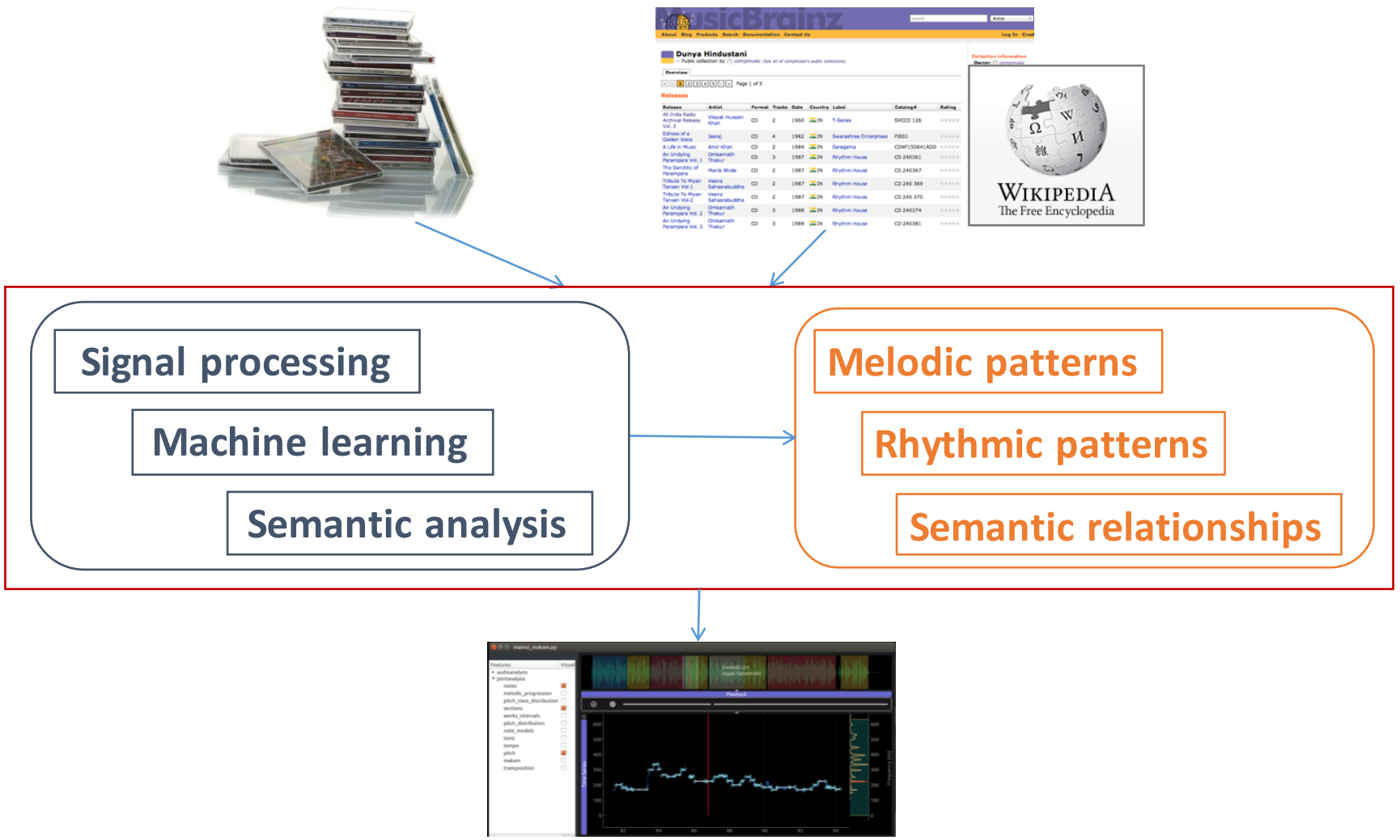
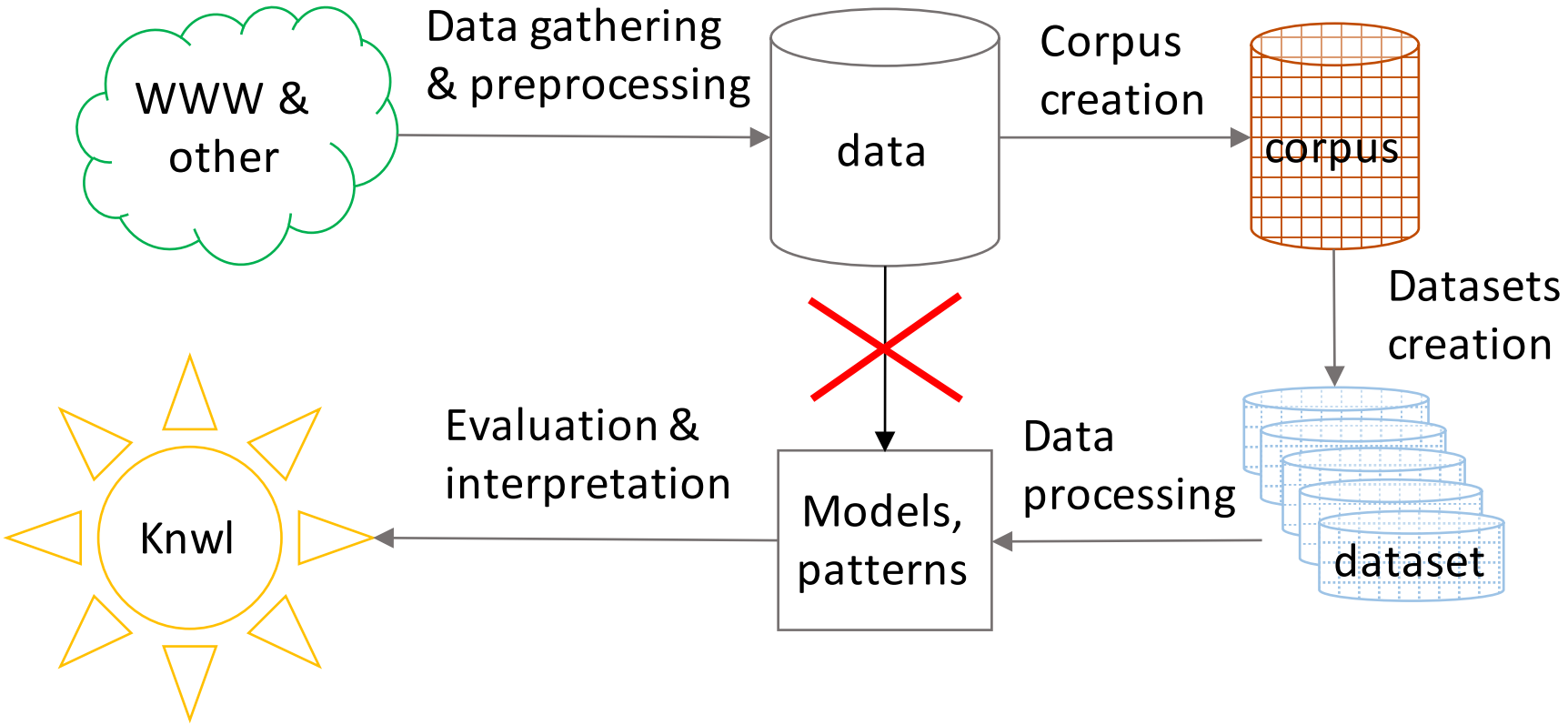
Arab-Andalusian
Turkish-makam
Hindustani
Carnatic
Beijing Opera
Ísland
Norge
Suomi
Sverige
Российская Федерация
United Kingdom
Беларусь
Polska
Deutschland
Україна
Қазақстан
Монгол улс
France
România
Italia
España
Ελλάδα
Türkiye
O'zbekiston
Türkmenistan
India
Niger
Tchad
Sudan
السودان
اليمن
Ködörösêse tî Bêafrîka
République Centrafricaine
ኢትዮጵያ Ethiopia
Soomaaliya
Kenya
République démocratique du Congo
Tanzania
ประเทศไทย
Philippines
Indonesia
Papua Niugini

ISLAND



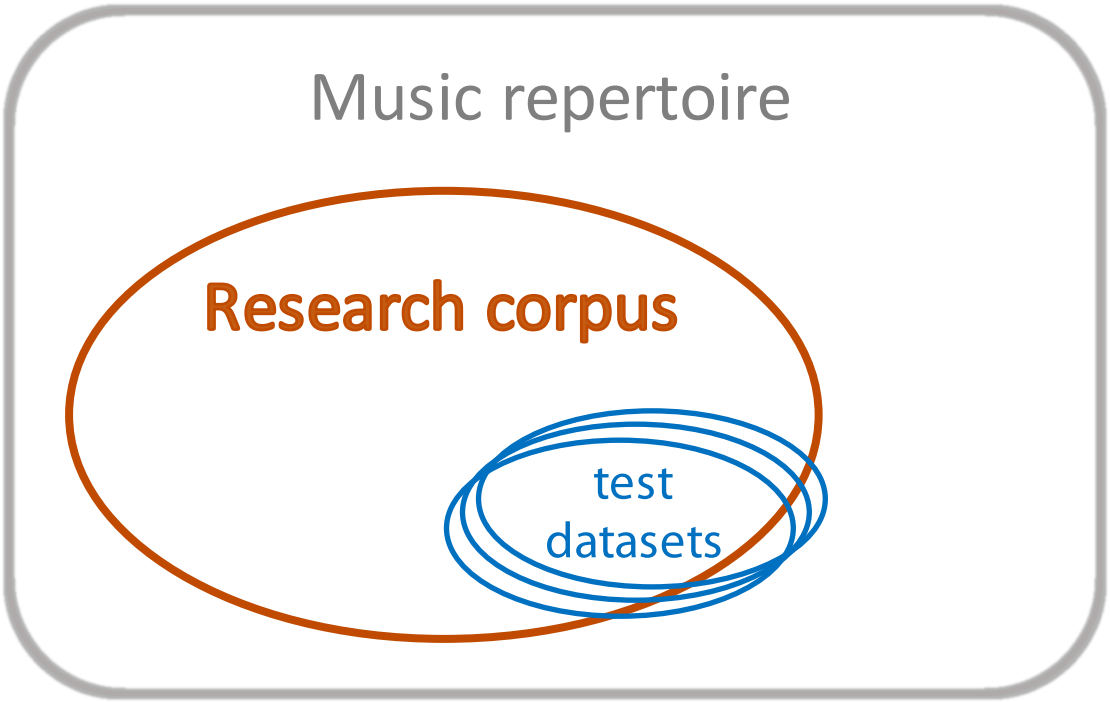
X. Serra. "A Multicultural Approach in Music Information Research." ISMIR 2011.

Corpus based research



X. Serra. "The computational study of a musical culture through its digital traces." Acta Musicologica 2017.

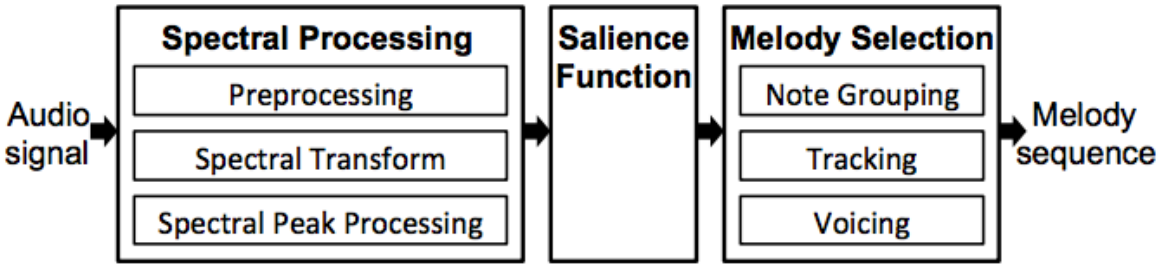
Corpora and datasets



- Purpose
- Coverage
- Completeness
- Quality
- Reusability

X. Serra. "Creating Research Corpora for the Computational Study of Music: the case of the CompMusic Project." AES Conference 2014.

Prominent pitch analysis



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PitchMelodia

standard mode | Pitch category

Inputs

- **signal** (*vector_real*) - the input signal

Outputs

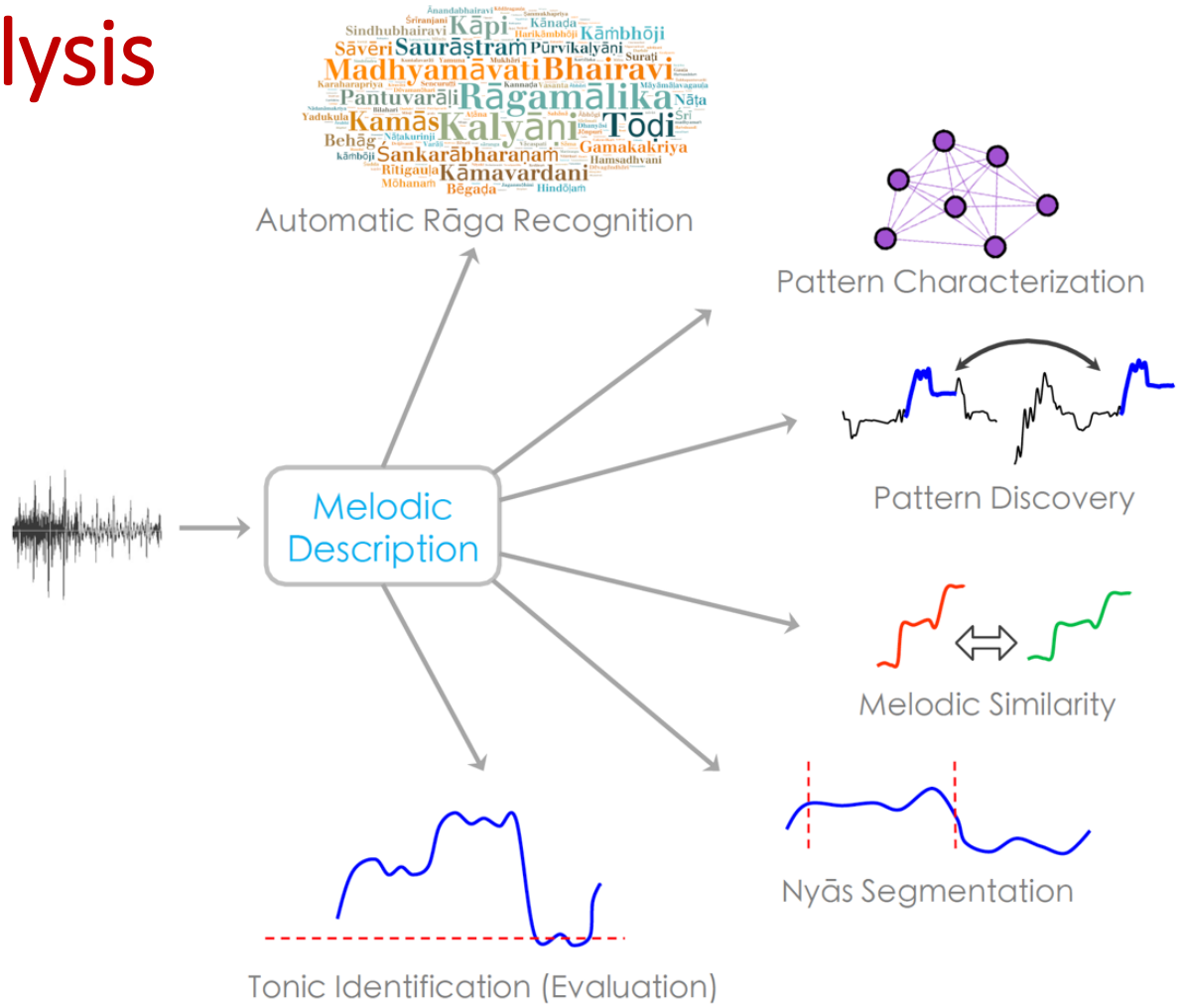
- **pitch** (*vector_real*) - the estimated pitch values [Hz]
- **pitchConfidence** (*vector_real*) - confidence with which the pitch was detected

Parameters

- **binResolution** (*real ∈ (0, ∞), default = 10*) :
  salience function bin resolution [cents]
- **filterIterations** (*integer ∈ [1, ∞), default = 3*) :
  number of iterations for the octave errors / pitch outlier filtering process
- **frameSize** (*integer ∈ (0, ∞), default = 2048*) :
  the frame size for computing pitch saliecnce
- **guessUnvoiced** (*bool ∈ {false, true}, default = false*) :
  estimate pitch for non-voiced segments by using non-salient contours when no salient ones are present in a frame
- **harmonicWeight** (*real ∈ (0, 1), default = 0.8*) :
  harmonic weighting parameter (weight decay ratio between two consequent harmonics, =1 for no decay)
- **hopSize** (*integer ∈ (0, ∞), default = 128*) :
  the hop size with which the pitch salience function was computed

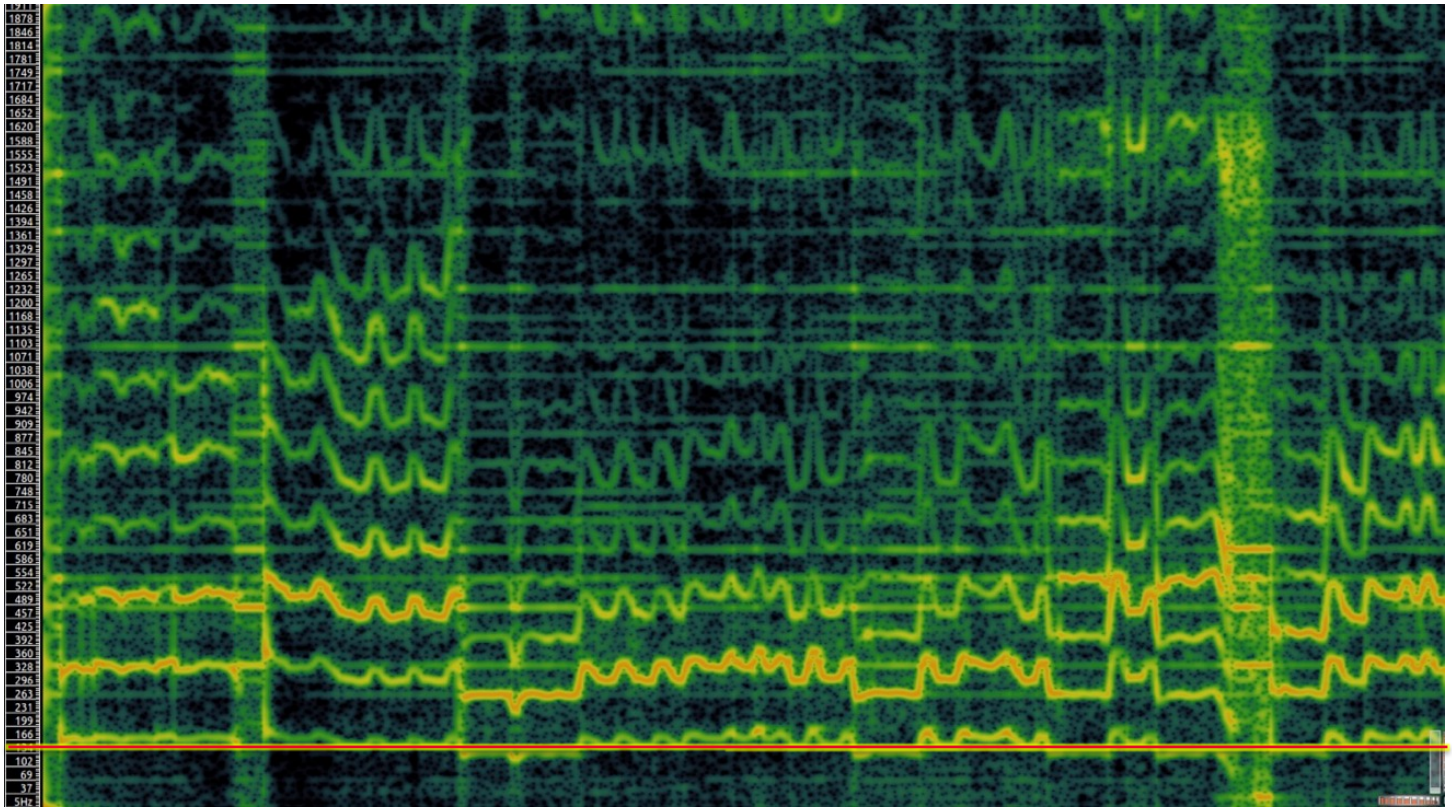
J. Salamon and E. Gómez, "Melody extraction from polyphonic music signals using pitch contour characteristics." IEEE TASLP 2012.

Melodic analysis



S. Gulati. Computational Approaches for Melodic Description in Indian Art Music Corpora. PhD Thesis 2016.

Tonic identification

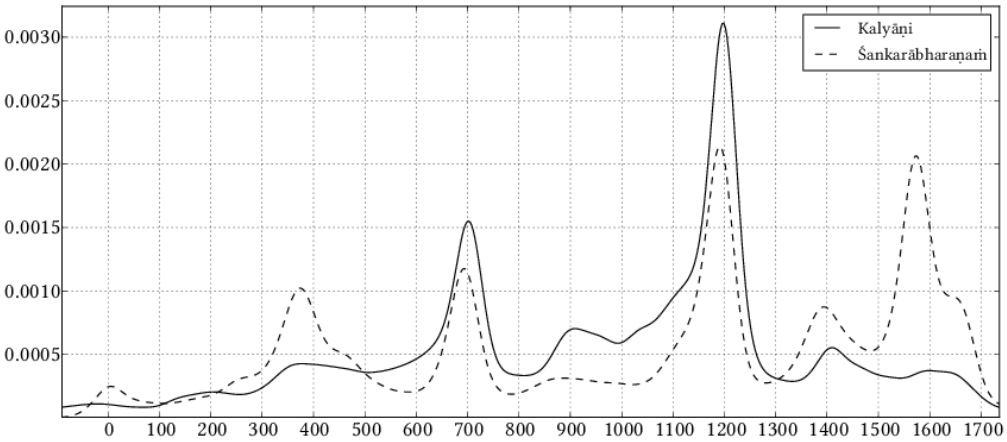


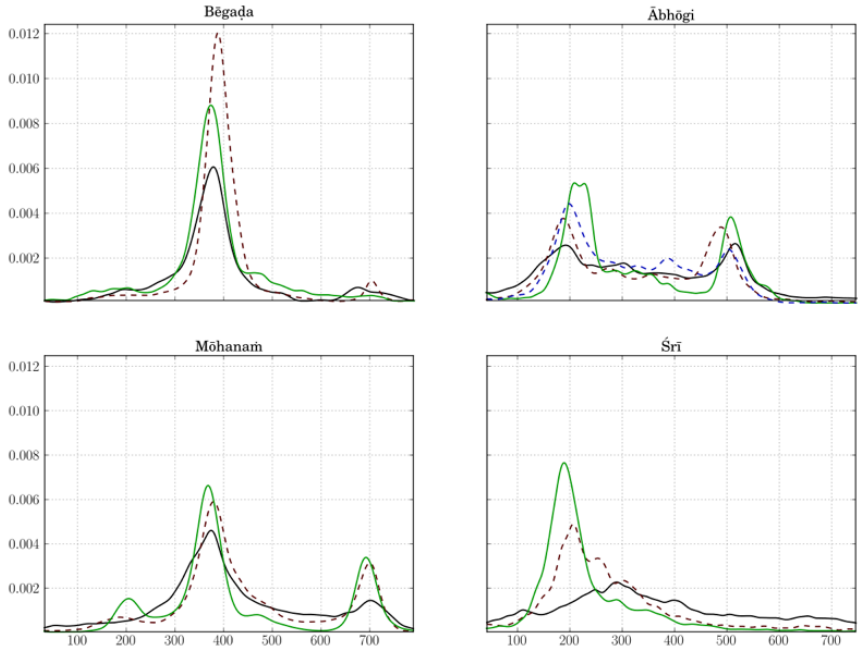
Vignesh Ishwar, Varnam

Tonic, C#

S. Gulati et al. "Automatic Tonic Identification in Indian Art Music: Approaches and Evaluation." JNMR 2014.

Intonation

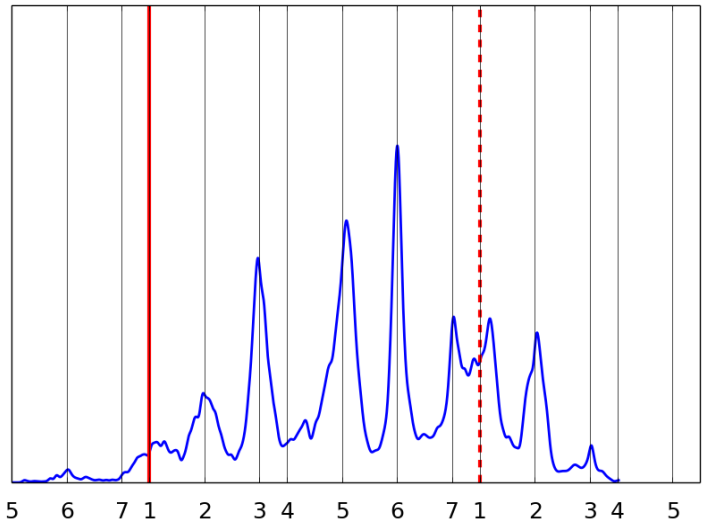




G. K. Koduri et al. "Intonation analysis of rāgas in Carnatic music." JNMR 2014.

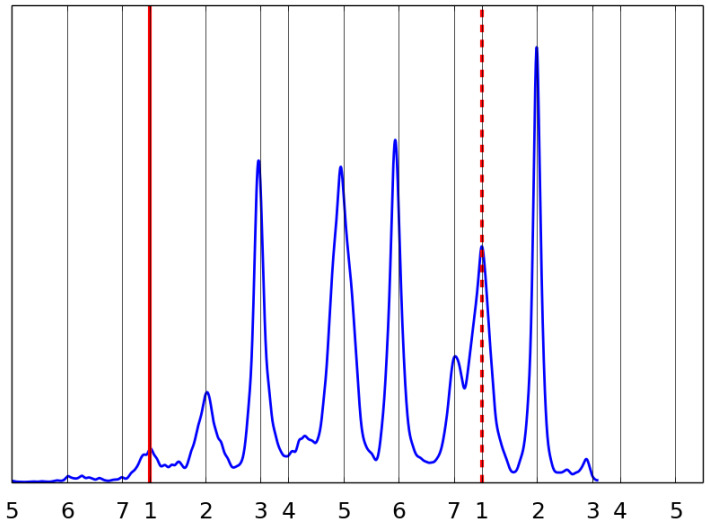
Intonation

Mei school



1 = 332.56 Hz (E4 + 15.33 cents)

Cheng school

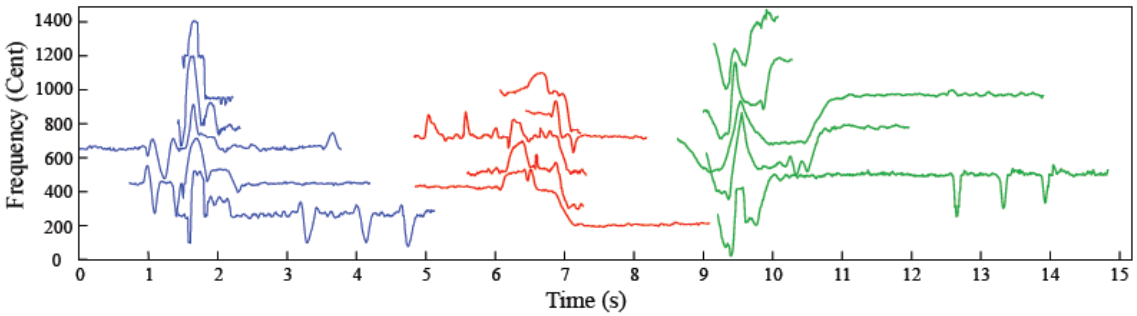


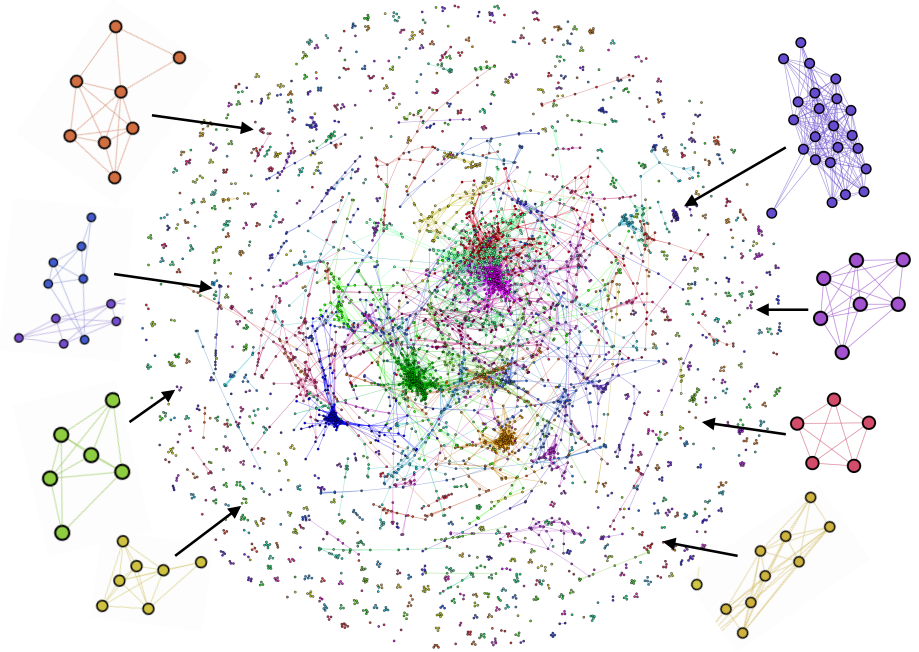
1 = 326.80 Hz (E4 - 14.92 cents)

R. Caro Repetto et al. "Comparison of the singing style of two jingju schools." ISMIR 2015.

Musical similarity measures

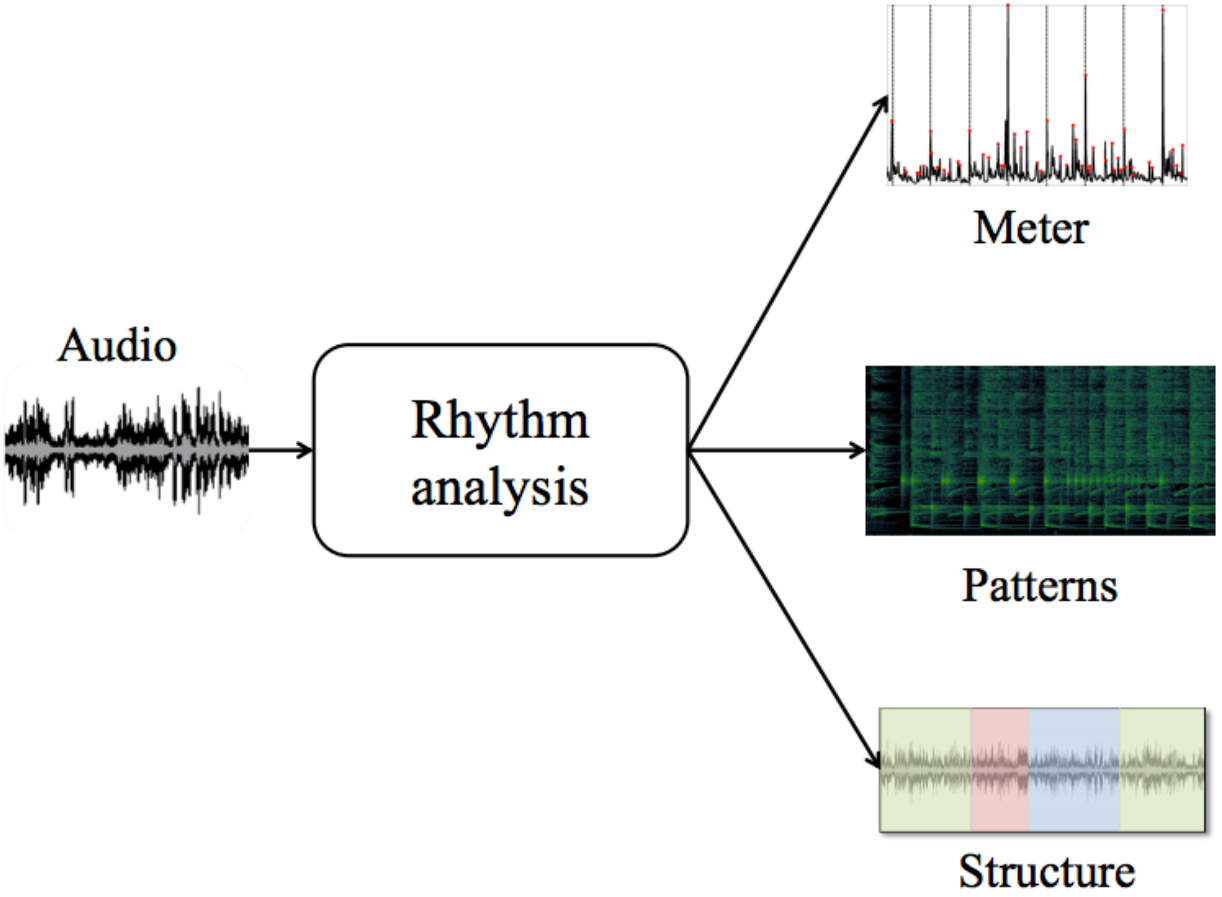
Original: **Similar 1:** **Similar 2:**



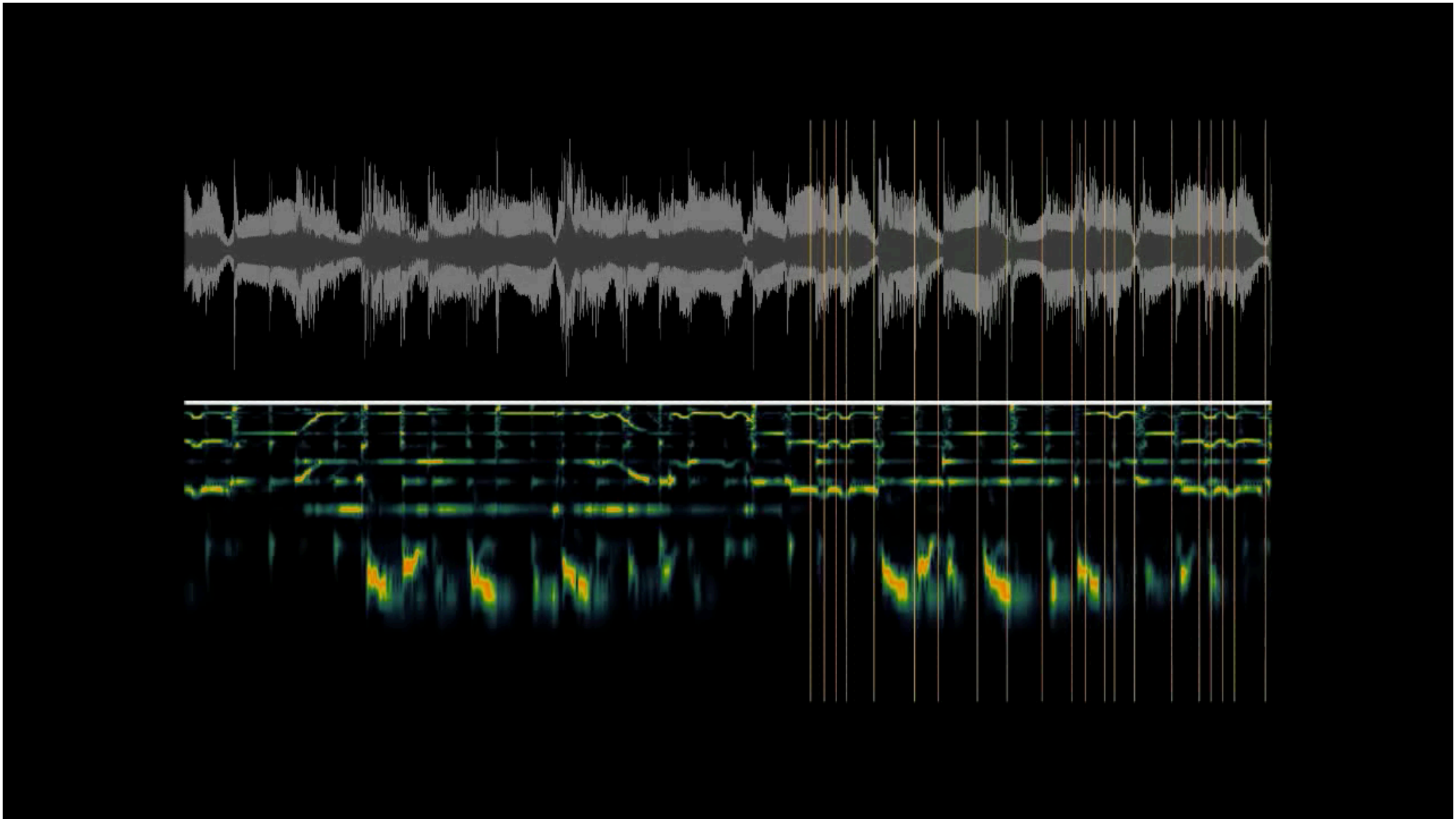


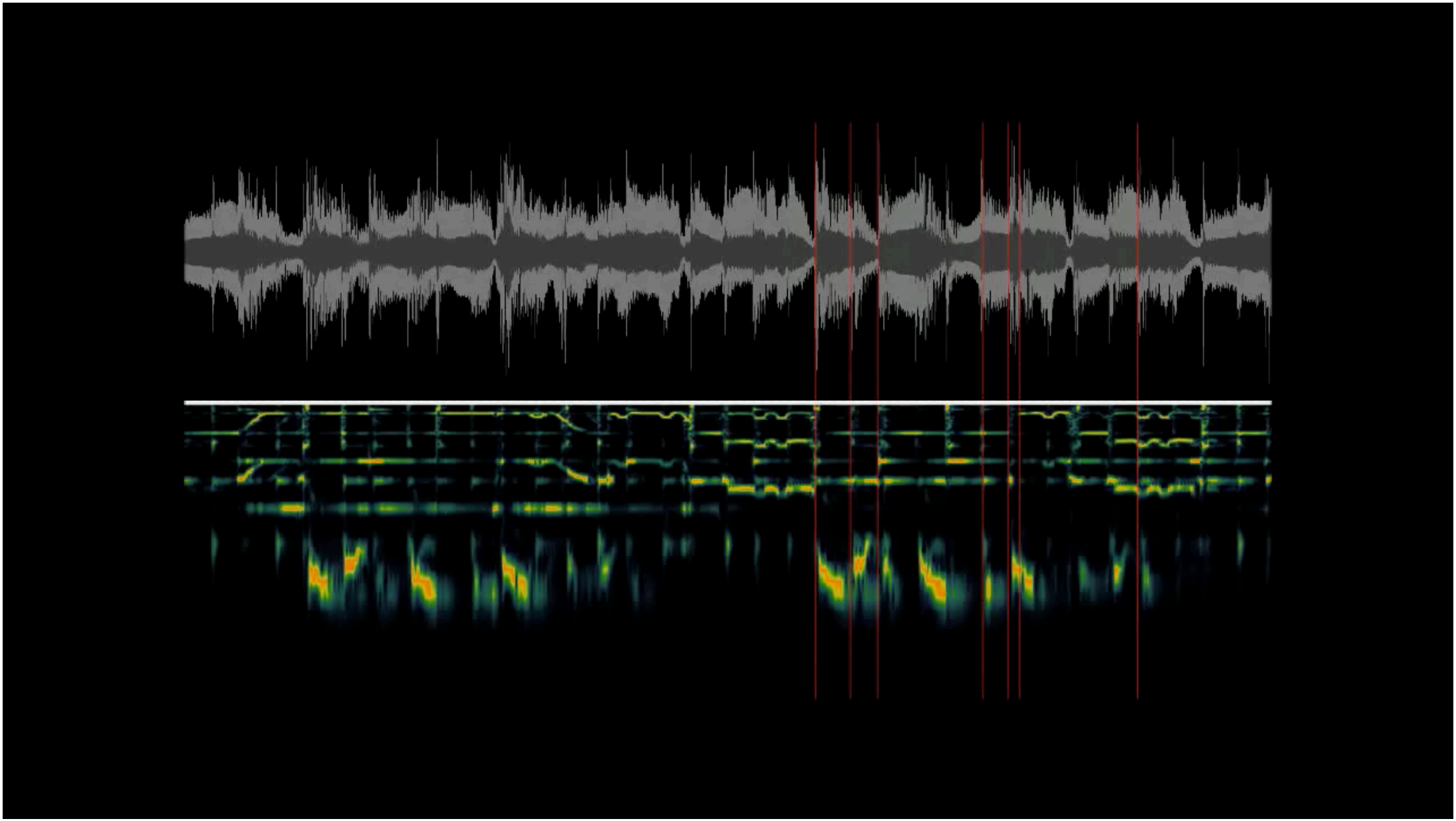
S. Gulati et al. "Improving Melodic Similarity in Indian Art Music using Culture-Specific Melodic Characteristics." ISMIR 2015.

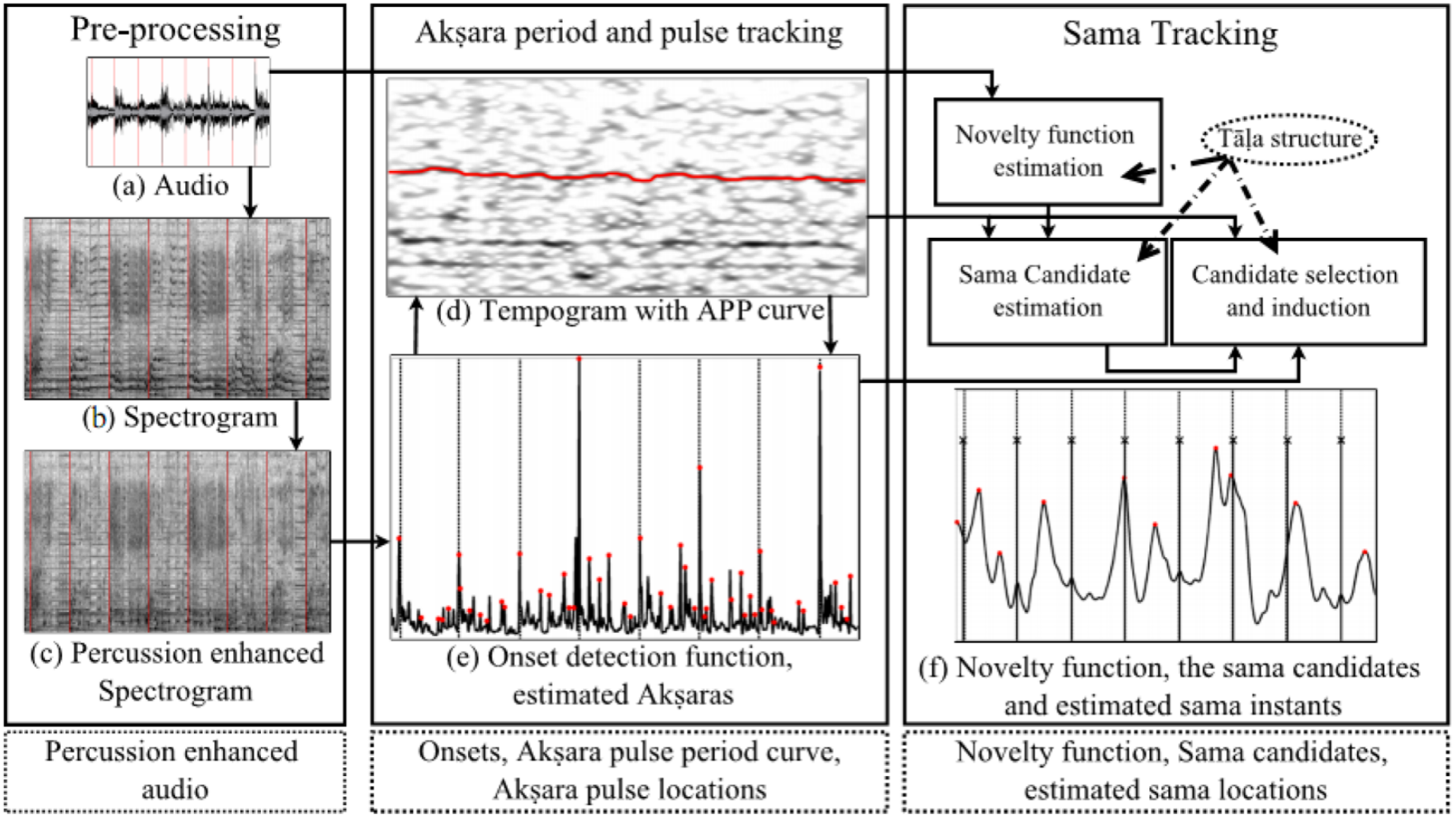
Rhythm analysis



A. Srinivasamurthy. A Data-driven Bayesian Approach to Automatic Rhythm Analysis of Indian Art Music. PhD Thesis 2016.

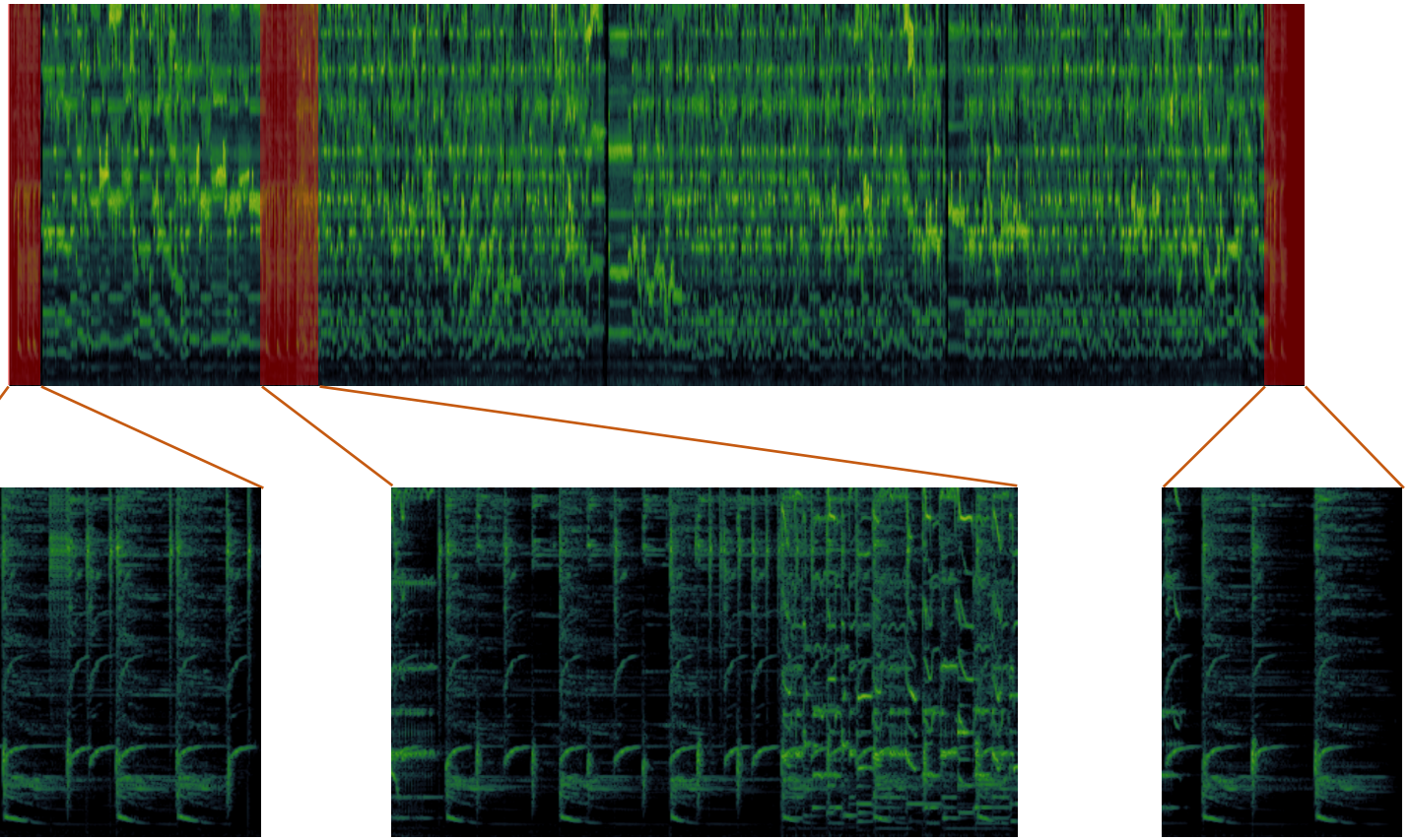






Srinivasamurthy, A. et al. "A Supervised Approach to Hierarchical Metrical Cycle Tracking from Audio Music Recordings." ICASSP 2014.

Percussion patterns analysis (beijing opera)



daoban tou
【导板头】

man changchui
【慢长锤】

zhu tou
【住头】

Percussion patterns analysis (beijing opera)

- Search in corpus:

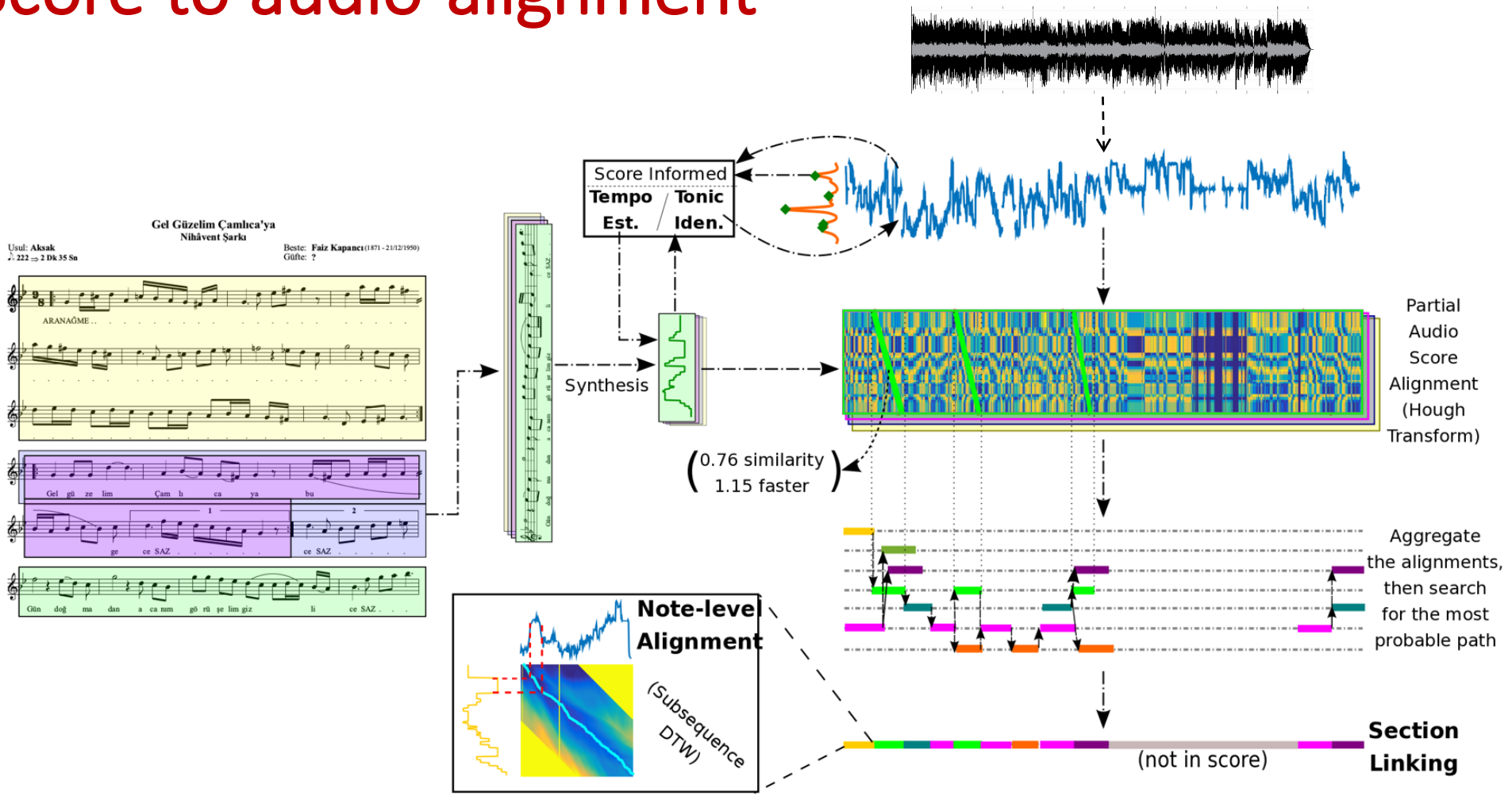
《京剧之星

Pattern	No.
【导板头】	234
【慢长锤】	154
【夺头】	30
【小锣夺头】	66
【闪锤】	53

Album / Track	Ini.	Dur.
京剧之星：包飞专辑/10玉门关：说什么敌众我寡难取胜	0.00	5.75
京剧之星：包飞专辑/10玉门关：说什么敌众我寡难取胜	182.75	11.25
京剧之星：安平专辑/04赤桑镇：恨包勉初为官贪赃枉上	149.75	4.75
京剧之星：安平专辑/06将相和：在金殿定官职是非难辨	258.00	5.5
京剧之星：安平专辑/14姚期：老臣年迈如霜降	0.00	4.75
京剧之星：宋小川专辑/04柳荫记：我好似万箭穿心	0.00	9.25
京剧之星：宋小川专辑/07罗成叫关：勒马停蹄站城道	644.75	5.50
京剧之星：张克专辑/04李逵碑：叹杨家秉衷心大宋扶保	750.00	3.50
京剧之星：张克专辑/06空城计：我正在城楼观山景	0.00	9.00
京剧之星：李军专辑/02珠帘寨：太保推杯换大斗	0.00	4.00
京剧之星：李军专辑/06秦琼卖马：站立店中用目洒	0.00	4.25
京剧之星：李宏图专辑/11白门楼：某一见貂蝉女心如烈火	0.00	8.00
京剧之星：李海燕专辑/05英台抗婚：（祝英台）纸钱飞香烟袅珠泪盈盈	0.00	5.50
京剧之星：李海燕专辑/06龙凤呈祥：（孙尚香）昔日里梁鸿配孟光	7.00	4.25
京剧之星：杜镇杰专辑/02李陵碑：叹杨家秉忠心大宋扶保	802.00	5.00
剧之星：江其虎专辑/06罗成托兆：黑暗暗雾沉沉随风飘荡	132.75	4.00
京剧之星：王珮瑜专辑/01捉放曹：听他言吓得我心惊胆怕	0.00	8.25
京剧之星：王珮瑜专辑/07搜孤救孤：白虎大堂奉了命	66.25	3.00
京剧之星：王珮瑜专辑/11珠帘寨：昔日有个三大贤	31.75	3.50
京剧之星：耿巧云专辑/10春草闯堂：好话说了千千万	0.00	3.75
京剧之星：袁慧琴专辑/01对花枪：我的家祖居南阳地	948.50	6.50
京剧之星：赵秀君专辑/06楚宫恨：费无极说话太无赖	73.25	3.25
剧之星：迟小秋专辑/06锁麟囊：一霎时把七情俱已昧尽	641.00	4.50
京剧之星：郑子茹专辑/03对花枪：空盼望气难忍我好心伤	124.50	3.50
京剧之星：陈俊杰专辑/03铙期：老臣年迈如霜降	0.00	4.25
京剧之星：陈俊杰专辑/05将相和：在金殿定官职是非难辨	210.00	6.50
京剧之星：靳学斌专辑/05周仁献嫂：一霎时心儿内横穿万箭	0.00	4.50
京剧之星：黄炳强专辑/04海瑞背纤：与国公替万岁算一算清帐	0.00	4.50
京剧之行：管波专辑/16诓妻嫁妹：素秋女只哭得泪如雨降	372.00	4.50
京剧之行：管波专辑/17诓妻嫁妹：事事万般难猜想	0.00	5.25

A. Srinivasamurthy. "Transcription and Recognition of Syllable based Percussion Patterns: The Case of Beijing Opera". ISMIR 2014.

Score to audio alignment



S. Şentürk et al. "Towards Alignment of Score and Audio Recordings of Ottoman-Turkish Makam Music." FMA 2014.

Funded by the
European Research Council

Hüseyni Peşrev
by Ahmet Kadri Rizeli

Album

Rum Bestekârlar
(Various Artists)

Compositions

Hüseyni Peşrev

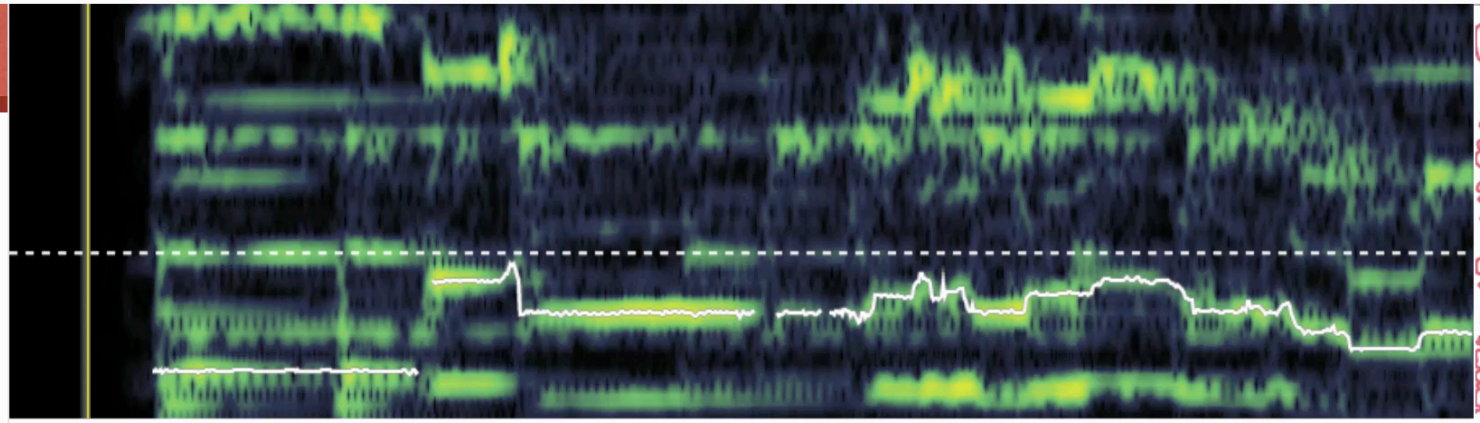
Performers

[unknown]
(Tanbur)

[unknown] (Ney)

[unknown]
(Kanun)

[unknown]
(Percussion)



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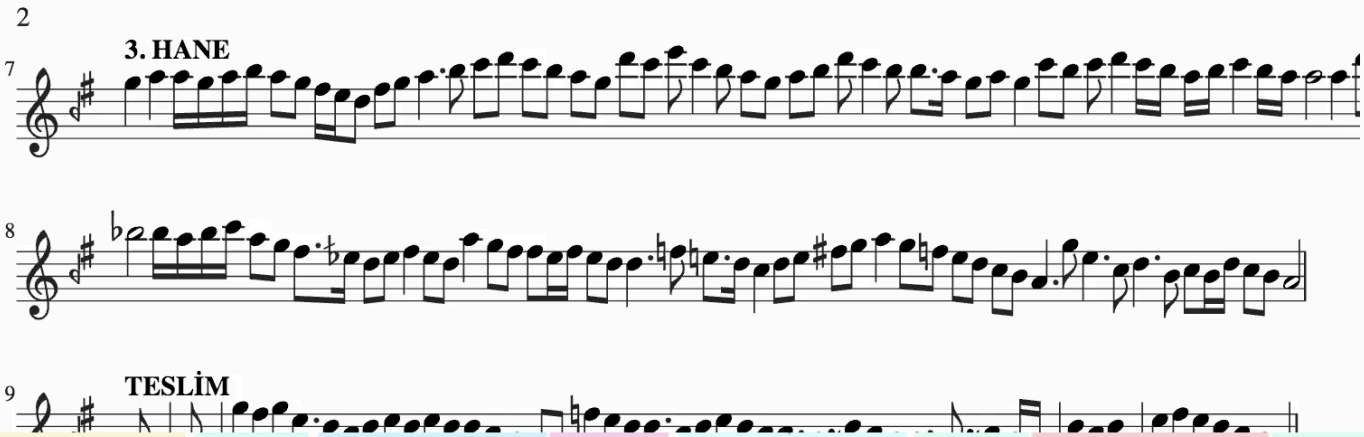
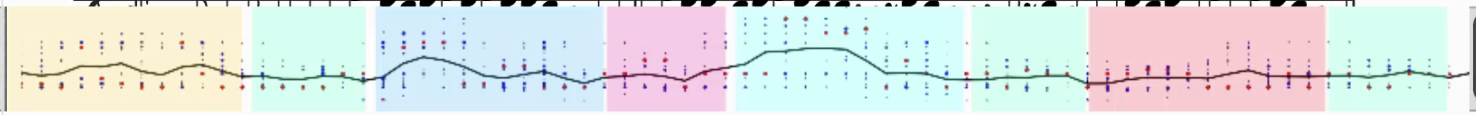
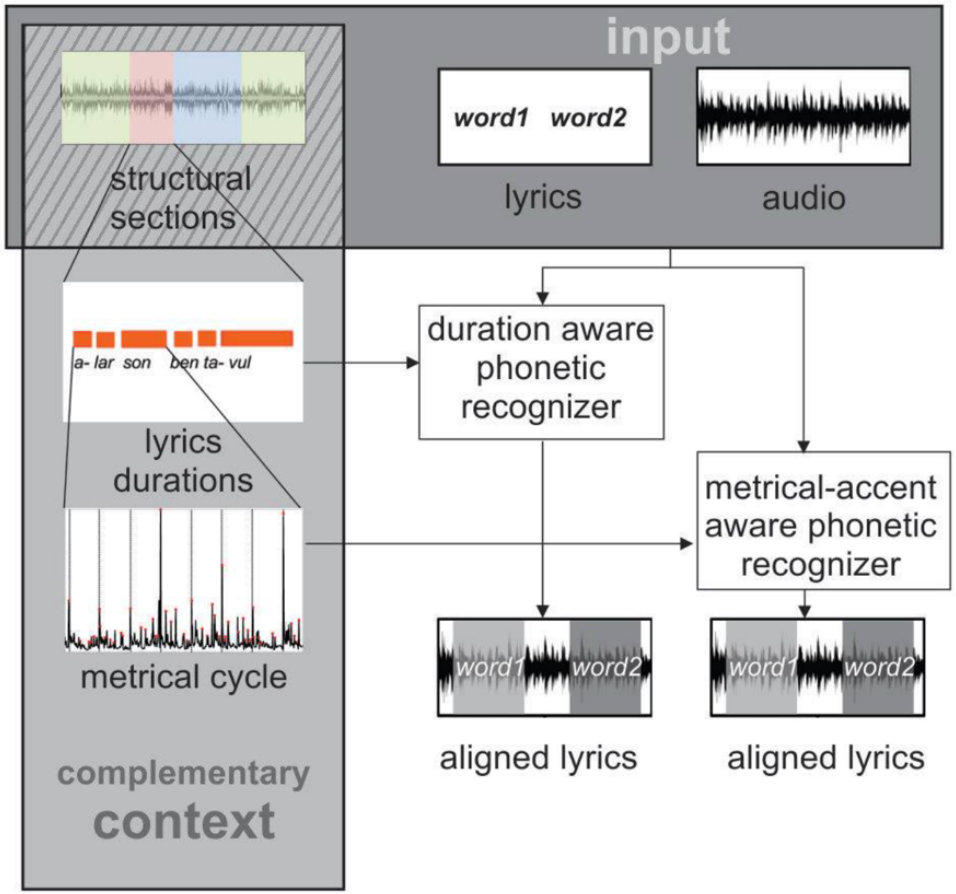




00:00
06:05

Lyrics to audio alignment



G. Dzhambazov. Knowledge-based Probabilistic Modeling for Tracking Lyrics in Music Audio Signals. PhD thesis 2017.

Funded by the
European Research Council

Gel Güzelim Çamlıca'ya
by Münir Nurettin Selçuk

Return to scores player

Album

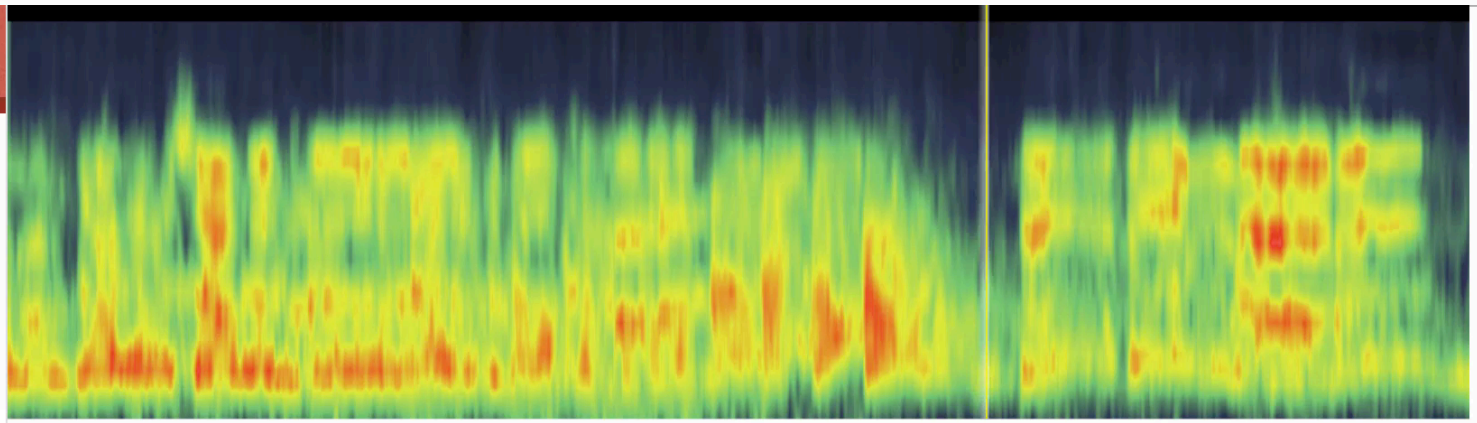
Geçmişten Günümüze Türk Müziği - Kalplerden Dudaklara (Various Artists)

Compositions

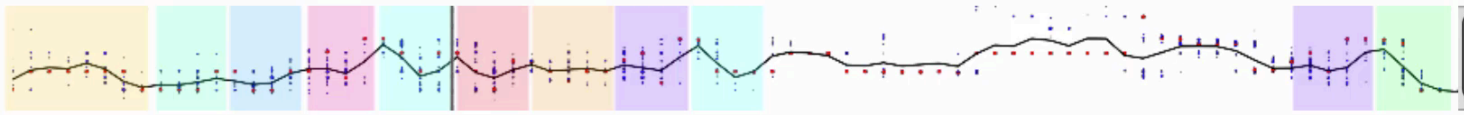
Gel Güzelim Çamlıca'ya

Performers

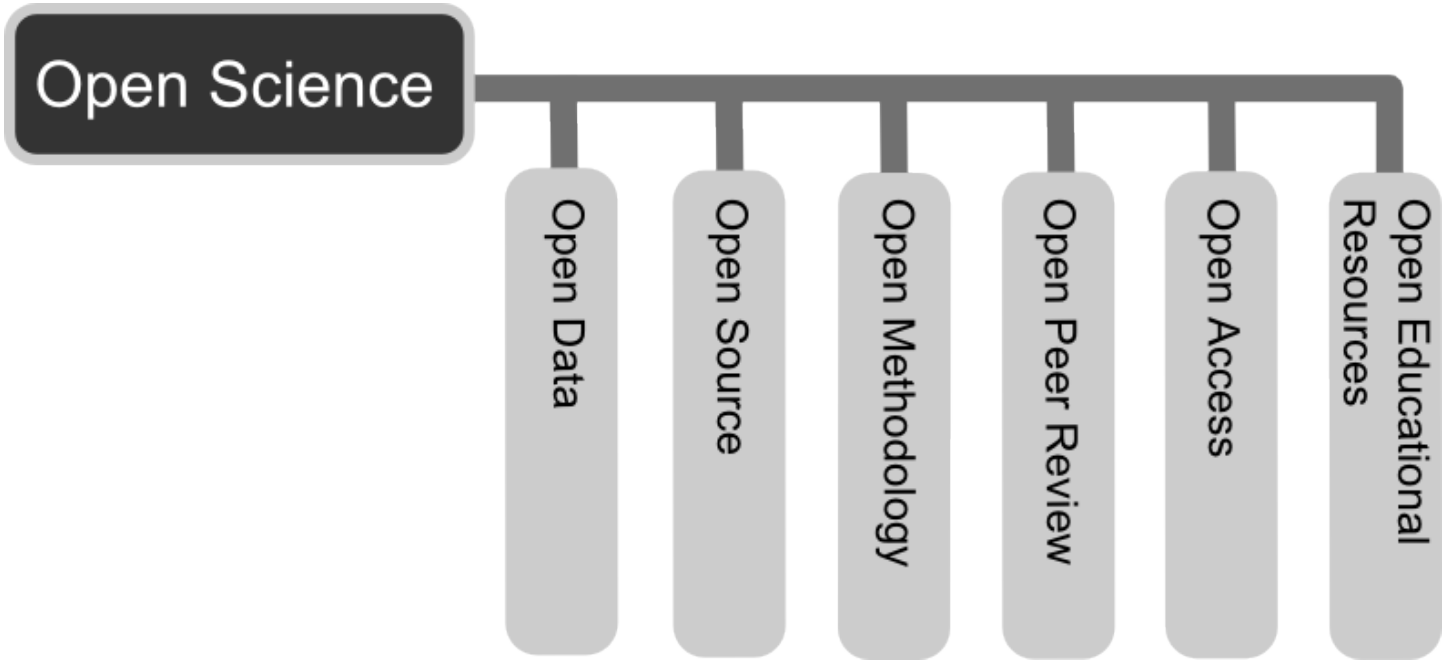
Münir Nurettin Selçuk(Voice)



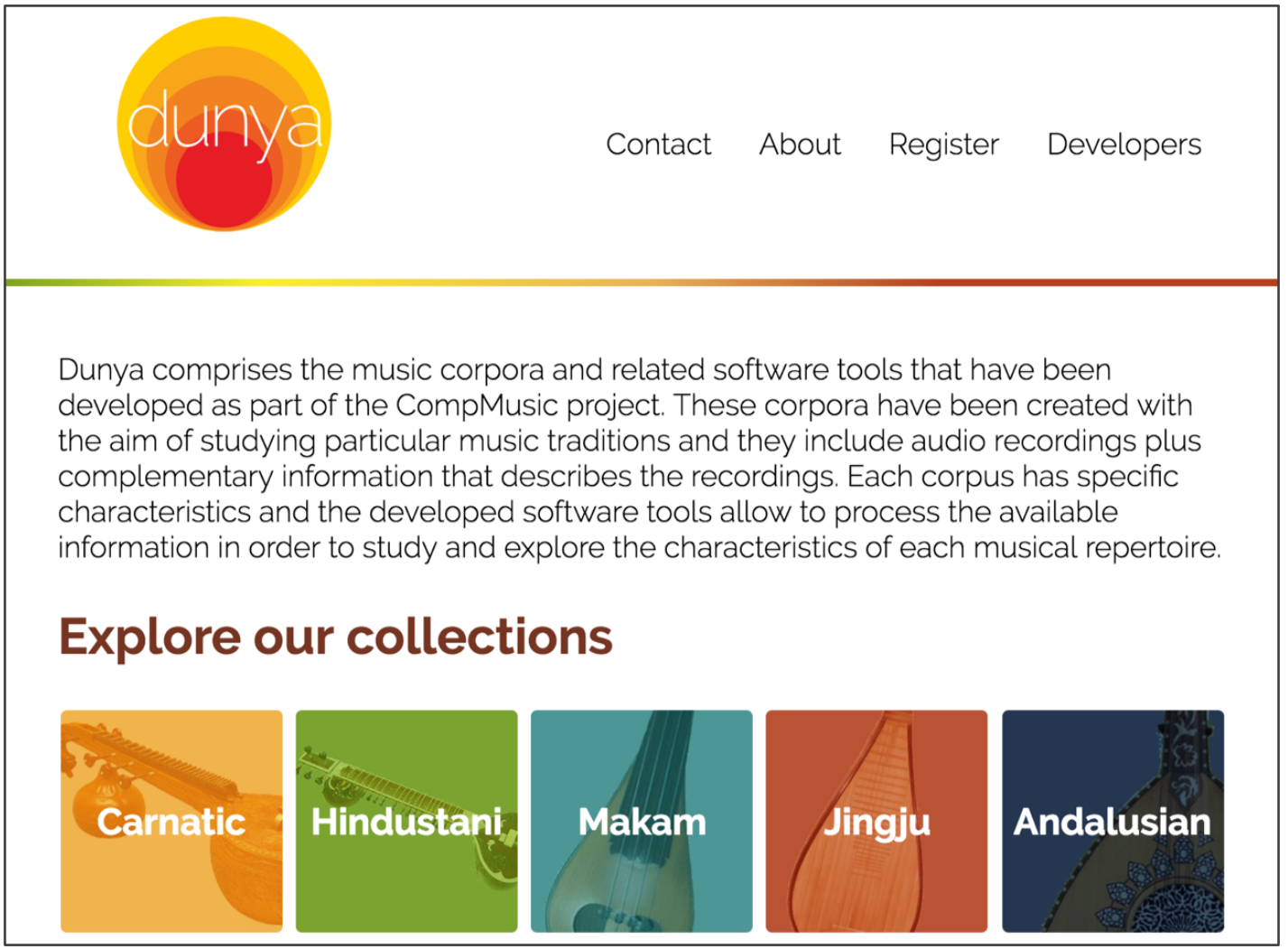
Gel güzelim Çamlıcaya bu gece
Gel güzelim Çamlıcaya bu gece
Gün doğmadan a canım görüşelim gizlice
Gün doğmadan a canım görüşelim gizlice
Bülbüllerin efganını dinleyelim yanyana
Bülbüllerin efganını dinleyelim yanyana
Kumru gibi a canım sevişelim can cana
Kumru gibi a canım sevişelim can cana



Open Science (plus reproducibility)

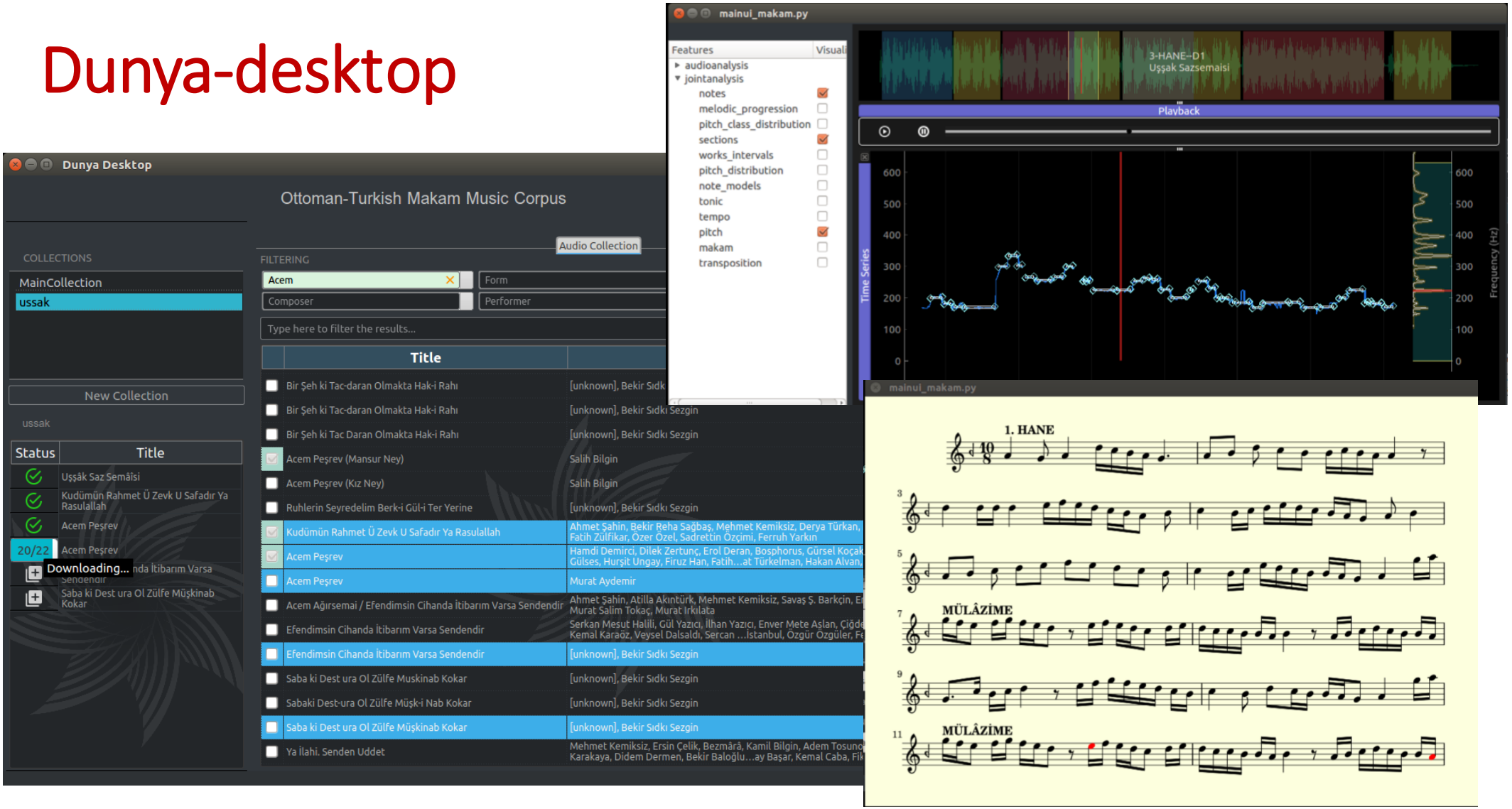


By Andreas E. Neuhold - Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=33542838



dunya.compmusic.upf.edu

Dunya-desktop



H. S. Atlı et al. "Synthesis of Turkish Makam Music Scores Using An Adaptive Tuning Approach." FMA 2017.

Reflections

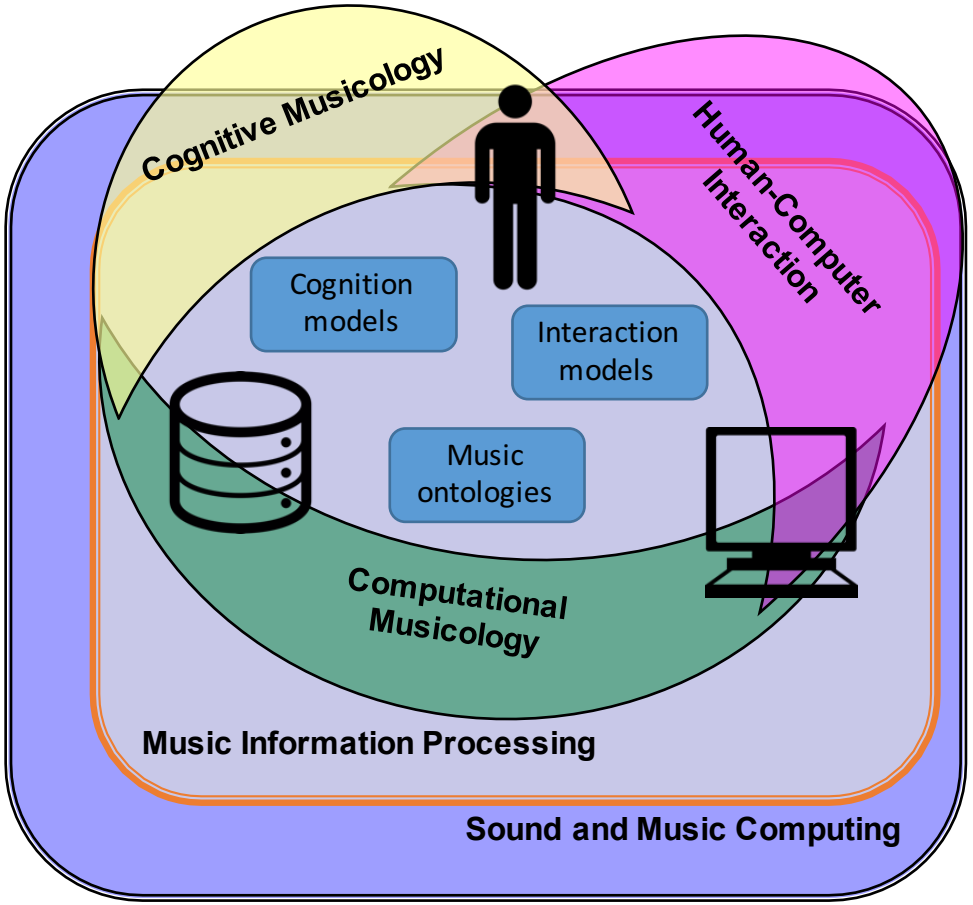
music research
can be
fun…

…and relevant…

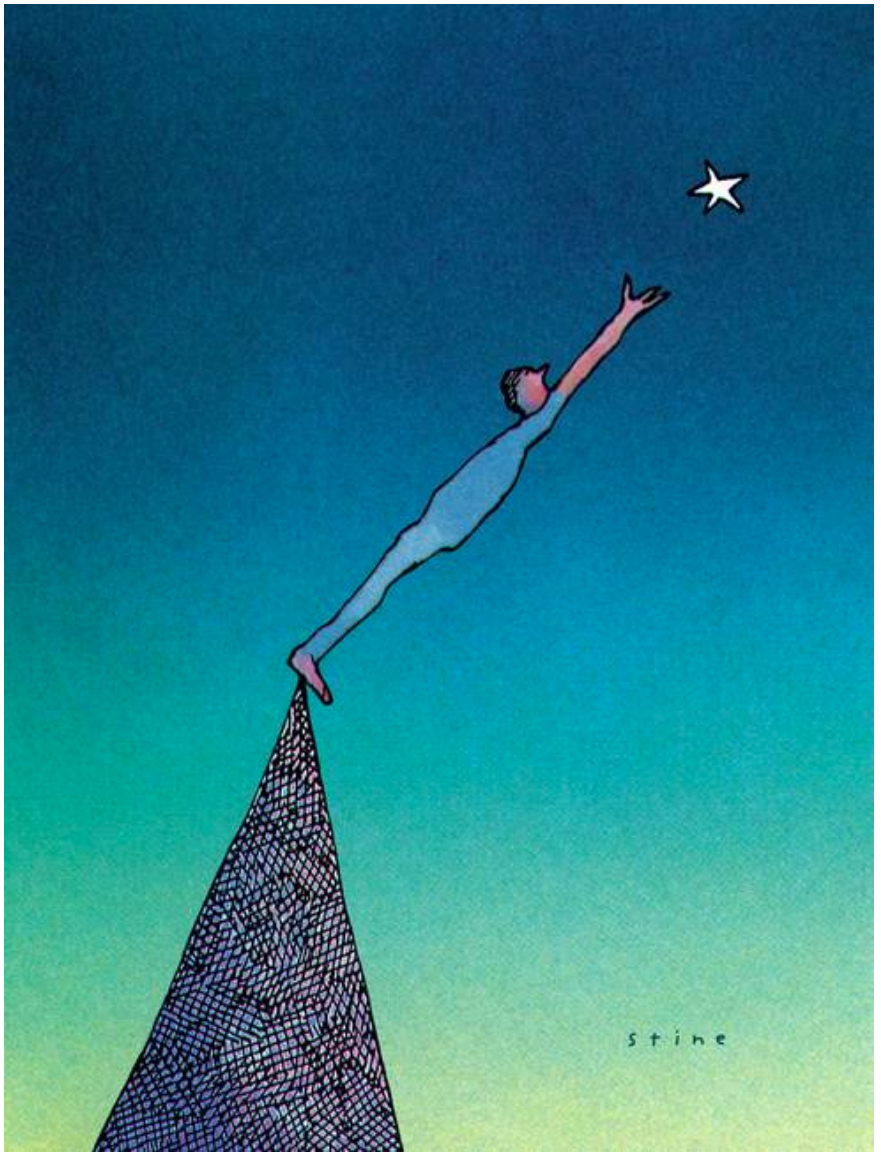
…and academically competitive

multiculturality

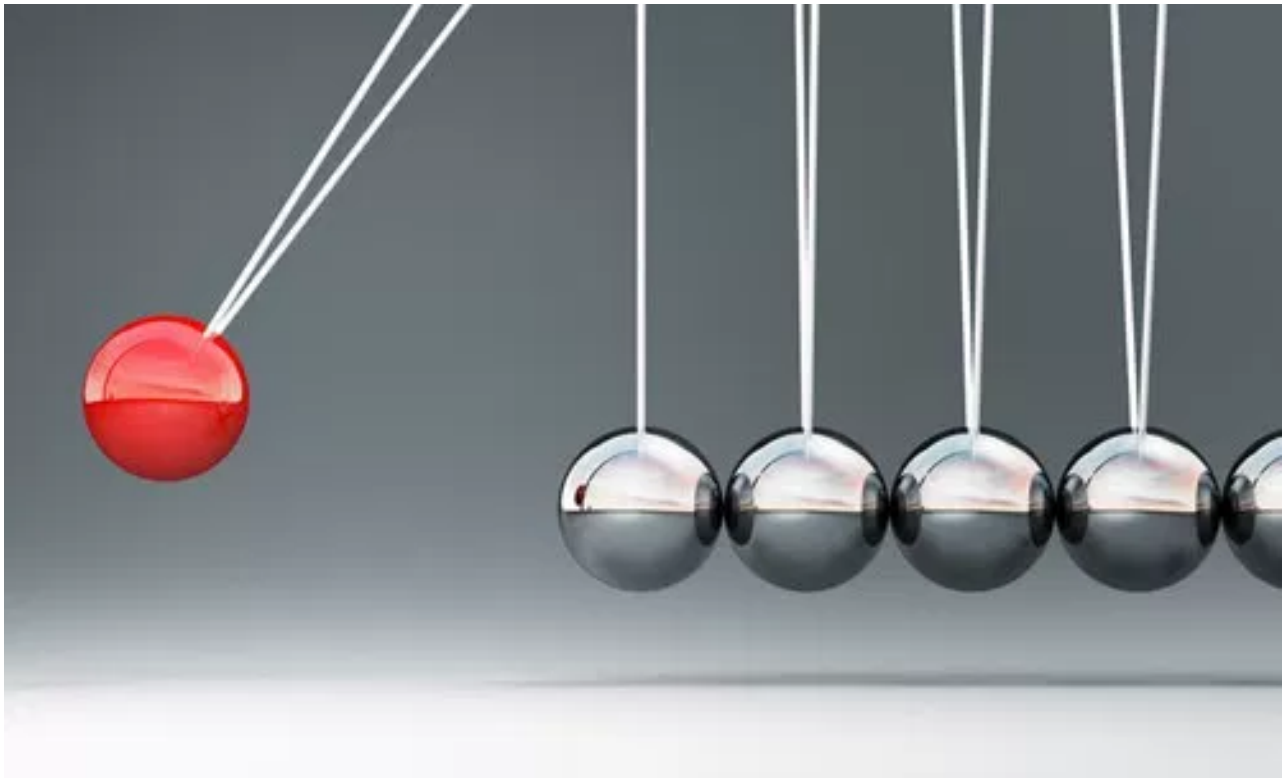
Interdisciplinarity



ambition



impact

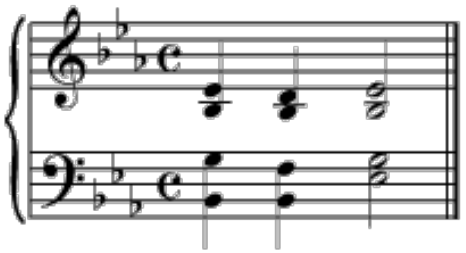


open science

continuity

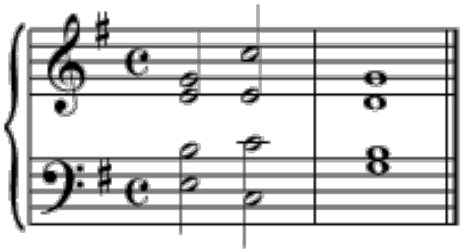
(Perfect) Authentic

in E flat major: I V I



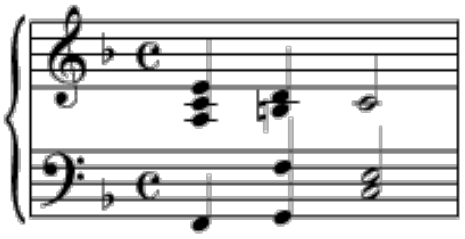
Plagal

in G major: vi IV I



Half-cadence

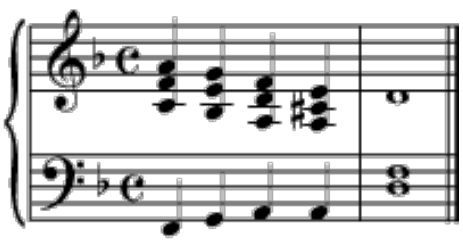
in F major: I M7 II7 V



in C major: IV M7 V7 I
(temporary modulation to V)

(Perfect) Authentic

in D minor: III ii° i V i



Thanks!!