



Vanessa Nina Borsan

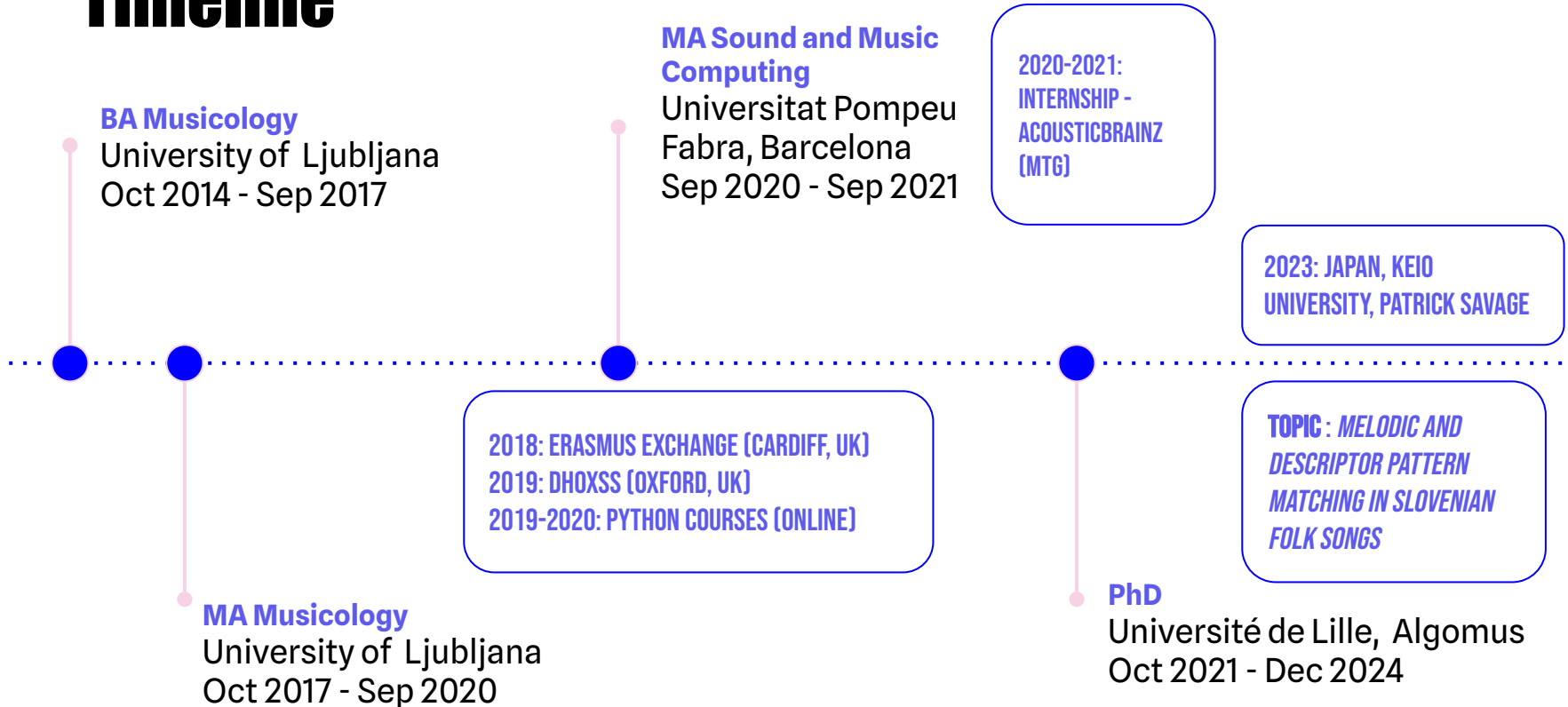
Research in Computational Musicology

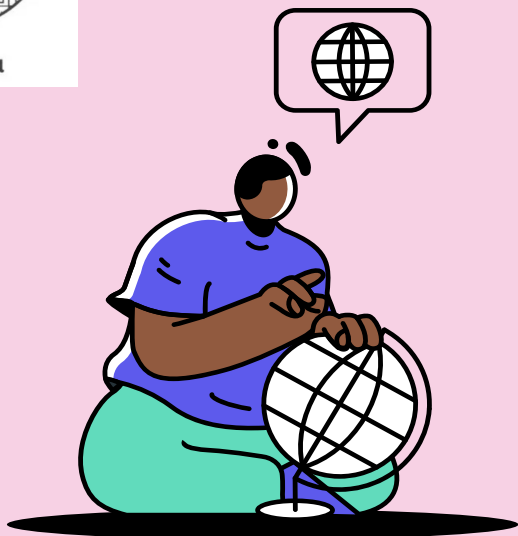
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Overview

- 01** PRESENTATION & TIMELINE
- 02** EARLY PROJECTS
- 03** PHD PROJECT: MELODIC AND DESCRIPTOR PATTERN MATCHING
- 04** MANY VOICES PROJECT
- 05** CURRENT WORK

Timeline





2020-2021

MA Sound and Music Computing

Universitat Pompeu Fabra,
Barcelona, Spain

About

“MA in Sound and Music Computing”

- MA program's duration **1 or 2 years**
- Per year, they accept from 20 to 30 students
- Program initiator and head of department: **Xavier Serra** (leader of MTG research group)
- All courses are executed in **english language**
- <https://www.upf.edu/web/smc/academic-program>



Universitat
Pompeu Fabra
Barcelona

MTG
Music Technology
Group

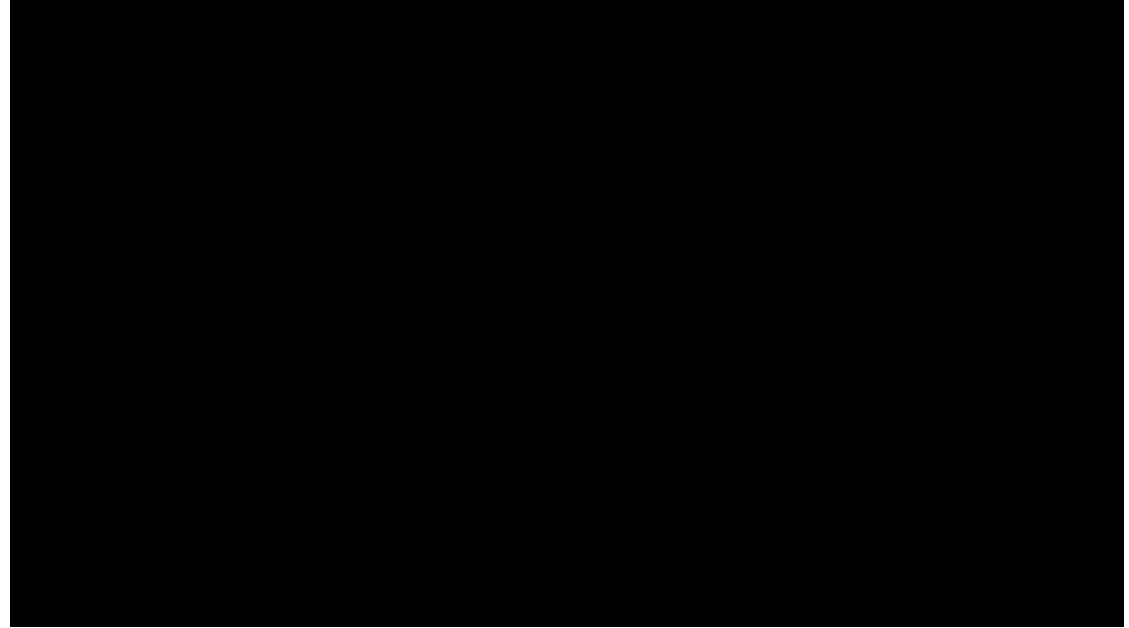
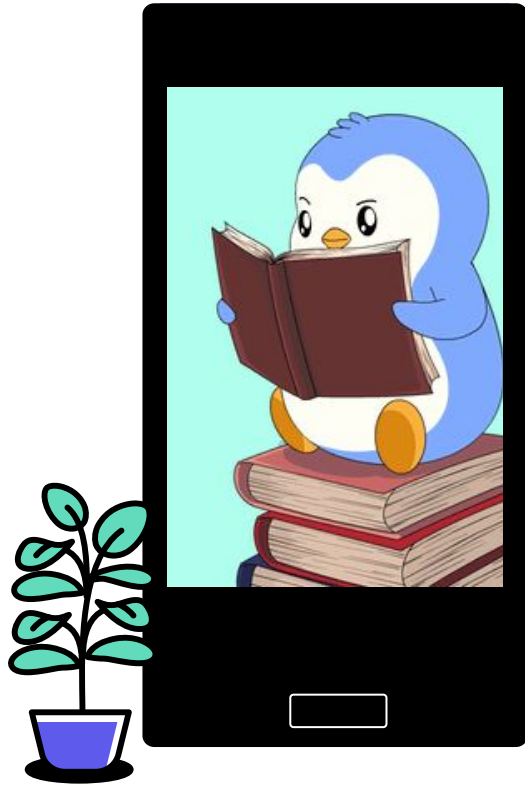


https://www.youtube.com/watch?v=DgSPBFM9-bM&ab_channel=MusicTechnologyGroup

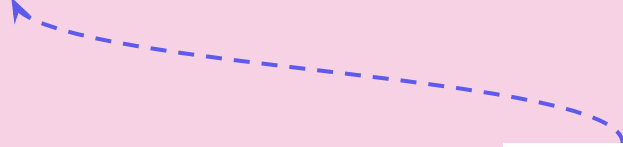
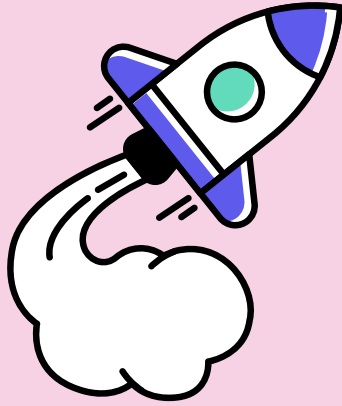
Master's project:

InterLied: Toolkit for Computational Music Analysis
<https://github.com/vnborsan/interlied?tab=readme-ov-file>

Supervisor: Rafael Caro Repetto



<https://github.com/vnborsan/interlied?tab=readme-ov-file>



2021-2024

PhD

Université de Lille, France

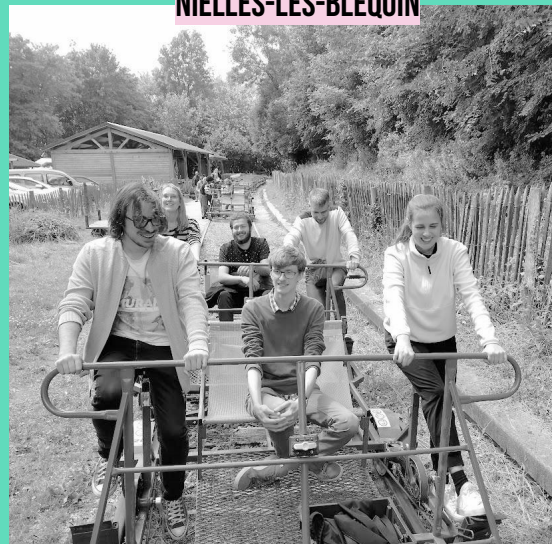
<https://algomus.fr>

<https://cristal.univ-lille.fr>

<https://edmadis.univ-lille.fr>

- **Duration:** 3 years
- **Where?** Université de Lille, Lille, France
- **Institution:** Univ Lille (ED MADIS): CRIStAL (Algomus)
- **Language:** english, french
- **Supervisors:** Mathieu Giraud, Thierry Lecroq, Richard Groult
- **Activities:**
 - Weekly meetings with supervisors, weekly meetings with lab members
 - Reading group and other seminars
 - Journées au vert (1 per year)
 - Occasional trips to Rouen
 - Conferences, courses, seminars, other events

NIELLES-LÈS-BLÉQUIN



RADIO CAMPUS LILLE

ALGOMUS

Computational Musicology

Music research, especially related to notational music analysis (orchestral music, sonatas, folk songs, jazz, and similar) and their representation in computational setting (verovio, lilypond, music21, etc).

Music Education

Creation of computational tools and adapted digital music representation for music education.



AI-Assisted Music Generation

They use machine learning and symbolic structures to explore co-creative music tasks like composition, arrangement, and improvisation. Their work featured in the AI Song Contest (2020, 2021) and The Call (2024–25) with Holly Herndon.

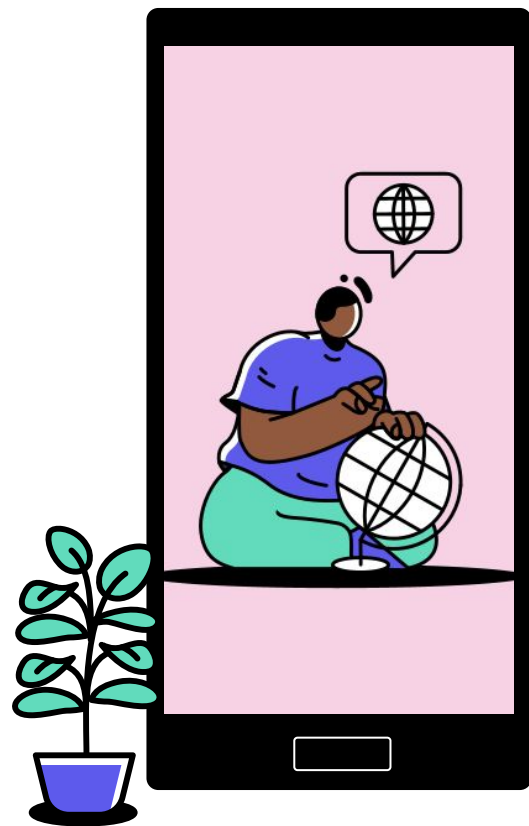


Music Archiving and Annotation

Dezrann is an open platform to hear, study, and annotate music on the web with intention to **share** and **analyze** music as scores, images, audio/video/waveforms, and annotations, with cross-modal synchronization. Dezrann's applications span music education, as well as corpus annotation and interaction for research in musicology.

Example 1: <https://dezrann.net/~weimar-jazz/0170?m=0>

Example 2: <https://dezrann.net/~schubert-winterreise/10?m=11>



Dezrann

Score (Vector)

1 2 3 4 5 6 7 8 9 10 11 12

A B C

M N N

9 9 9

Ta star pur-gar za mi-zo se - di jen pre - gle - du - je svo-je hčē-ri, jen pre - gle - du - je svo-je hčē-ri.

EDIT Type Tag Comment

+ CREATE

FILTER Start Duration Offset

HIDE

10

General Goals

1. **Bridge the gap** between computational methodologies and music research.
2. Introduce **a new digital corpus** adapted for computational music analysis.
3. Uncover new opportunities to **adapt existing computational approaches**, such as those found in bioinformatics (text algorithmics) to the exploration of music.

Steps

- 01** ***Research on Corpus, its Digitisation and Annotation***
Digitisation, Organisation, Curation, and Documentation of Slovenian Folk Song Ballads
- 02** ***Analysis Methodology***
Algorithms for Pattern Discovery
- 03** ***Evaluation & Case Studies***
Evaluating algorithm's performance, functionality, adaptability and usability
- 04** ***Critical Evaluation of Computational Approaches in MIR and Musicology***

The origin of SLP corpus



Source: "Slovenia in Europe" by NordNordWest, Wikimedia Commons, https://commons.wikimedia.org/wiki/File:Slovenia_in_Europe.svg



Source: "Map of Slovenia" from Geographic Guide.
www.geographicguide.com/europe-maps/slovenia.htm

402

Freely accessible scores with annotations and metadata

1500+

Indexed song phrases with annotations and metadata

20+

Available recordings

SONGS

Type	Variant	Additional_mark	SLP_Type_title_en	Region	Region_en	Transcriber_coll	Year_of_transcri	Singers_name	Time_signatur	Notes_Nr
237	3	nan	A father determines his daughter's fate	Gorenjska	Upper Carniola	Franc Kramar	1910	Neža Pirc	4/4	39
237	4	nan	A father determines his daughter's fate	Gorenjska	Upper Carniola	Franc Stele	1909	Marija Stele	3/4	22
237	5	nan	A father determines his daughter's fate	Notranjska	Inner Carniola	GNI (Valens Vod)	1961	Jerica Kranjc	3/8	28
239	1	A	Death of a bride before the wedding	Štajerska	Styria	Stanko Vraz	1839	Cigliaričeva	6/8	33

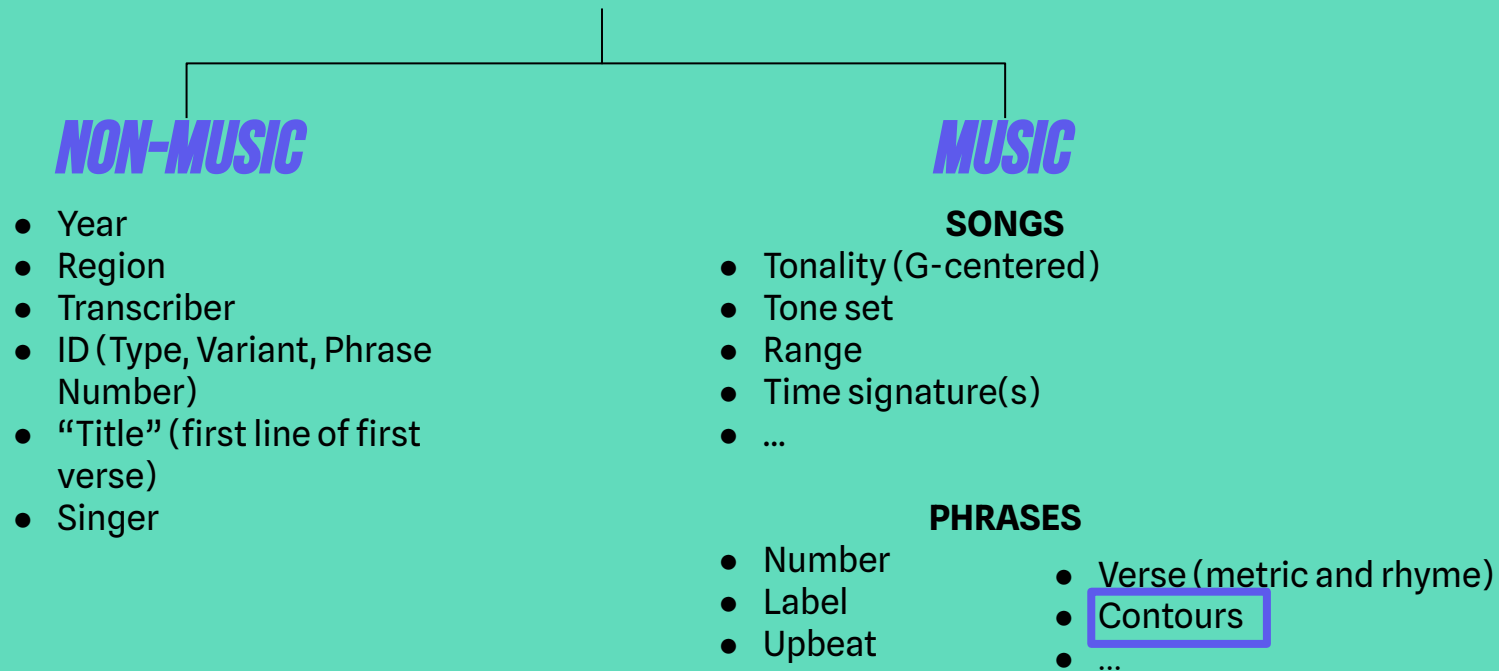
PHRASES

Type	Variant	Additio	Ambitus	Phrase_nr	Phrase_position	Phrases	Label	Contours
237		3 nan	m7	1	F	D4 B4 B4 A4 C5 B4 A4 G4 A4	A	CVX
237		3 nan	m7	2	M	D4 A4 A4 G4 A4 B4 C5 E4 F#4 G4	B	CVX
237		3 nan	m7	3	M	D4 C5 B4 A4 B4 C5 B4 A4 G4 A4	A	CVX
237		3 nan	m7	4	L	D4 A4 A4 G4 A4 C5 C5 E4 F#4 G4	B	CVX
237		4 nan	m9	1	F	D5 E5 F#5 G5 E5 G5 E5 D5	A	CVX
237		4 nan	m9	2	L	C5 A4 E5 D5 B4 B4 C5 F#4 F#4 G4	B	DESC

AVAILABLE ON >> [HTTPS://ALGOMUS.FR/DATA/](https://algomus.fr/data/)

<<

ANNOTATIONS & DESCRIPTORS



CONTOURS

(David Huron: Melodic Arches)

DESCENDING (DESC)

237.5.4

jen pre - gle - du - je svo - je hče - ri.

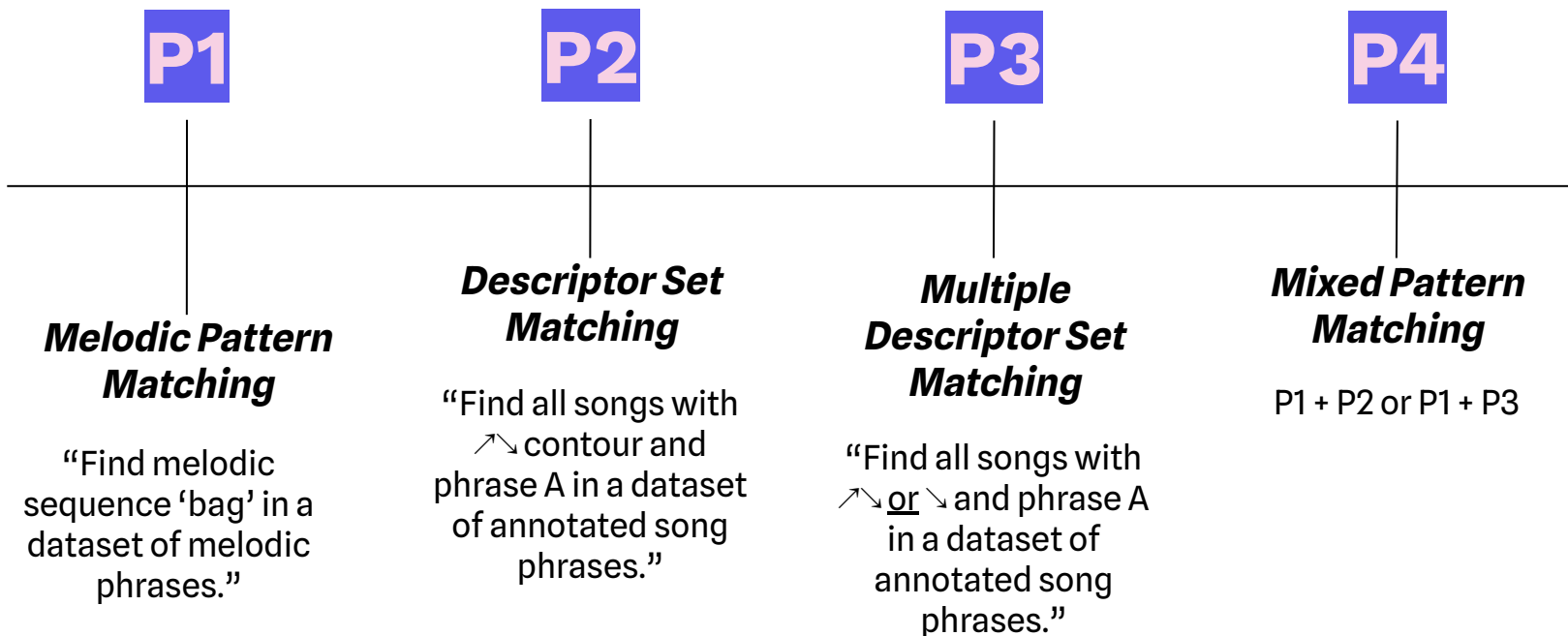
74 76 72 74 71 72 71 69 67

72



Adapted after David Huron. "The Melodic Arch in Western Folksongs". In: *Computing in Musicology* 10 (1996), pp. 3–23.

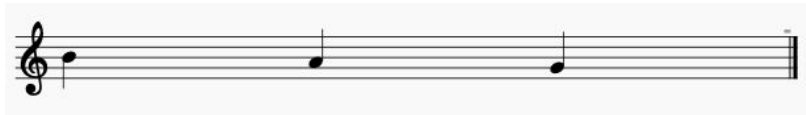
Pattern Matching Tasks Overview



Example »

⇒ Find all songs t with melodic pattern p , where p = “bag”.

pattern p :

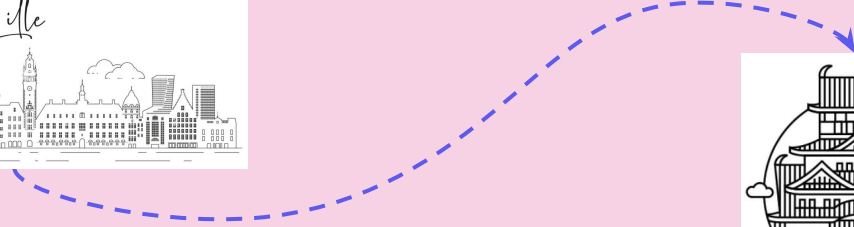
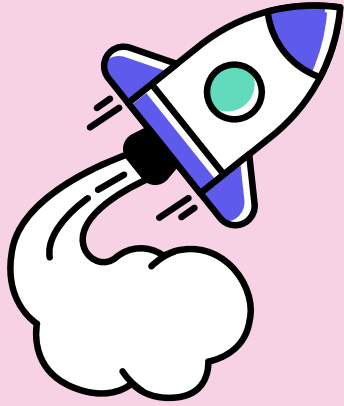


song (or “text”) t :



⇒ Find all songs t with melodic pattern p in *first phrase*, where p = “bag”.





2023

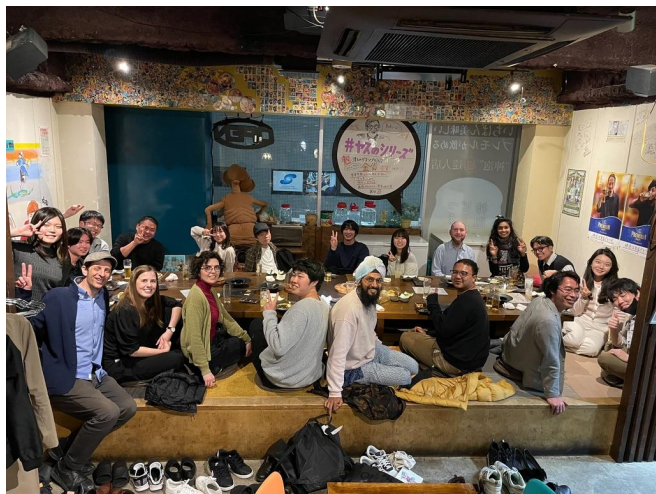
Keio University

Shonan Fujisawa Kampus

PROJECT >> MANY VOICES



[HTTPS://WWW.YOUTUBE.COM/WATCH?V=A4ENNRDCFDm&t=1s&ab_channel=PATSA](https://www.youtube.com/watch?v=A4ENNRDCFDm&t=1s&ab_channel=PATSA)
VAGE



<https://www.science.org/doi/10.1126/sciadv.adm9797>

ACADEMIC

- University of Ljubljana, Faculty of Arts (Department of Musicology)
- Curating a dataset (educational and musicological purposes)
- Computational music analysis tasks and annotation
- Research on annotation models for various types of music data
- Other line of work: *Identification of Slovenian Music Since 1991*,
 - First Music Awards 1991-1995

NON-ACADEMIC

- Program Editor of Asian Music Channel (Music Box)
- Manager work for an Asian singer Zoe

Current Work



[HTTPS://MUZIKOLOGIJA.FF.UNI-LJ.SI/](https://muzikologija.ff.uni-lj.si/)

[HTTPS://KORPUSI.MUSICLAB.SI/](https://korpusi.musiclab.si/)

[HTTP://MUZIKOLOGIJAFF.SI/ISGP01991/](http://muzikologijaff.si/isgp01991/)

Metadata

Search by metadata

Choose fields: Title, Composer, Lyricist

Corpus: Cicibani

Basic filters

Ambitus

Patterns and n-grams

SEARCH RESET

Sheet music Audio recordings

PROJECTS

Polifonia:

<https://polifonia-project.eu/>

MUSAiC

<https://www.kth.se/is/tmh/projects/musaic-1.950539>

DHOxSS:

<https://digital.humanities.ox.ac.uk/digital-humanities-oxford-summer-school>

Wagner, *Lohengrin*:

<https://lohengrin.linkedmusic.org/>

Baudelaire Song Project:

<https://visualisebaudelaire song.bham.ac.uk/#visualisation=people-country>

Every Noise:

<https://everynoise.com/>

AI Song Contest:

<https://www.aisongcontest.com/>

TOOLS FOR MUSIC ANALYSIS

Dezrann:

<http://www.dezrann.net/~~/bwv847?analysis=filters.dez>

Sonic Visualizer:

<https://www.sonicvisualiser.org/>

music21:

<https://web.mit.edu/music21/>

Pure Data:

<https://puredata.info/>

LilyPond:

<http://lilypond.org/>

MEI:

<https://music-encoding.org/>

CONFERENCES

SYSMUS (june 2025):

<https://www.uio.no/ritmo/english/news-and-events/events/conferences/2025/sysmus25/>

SMC (july 2025):

<https://smc25.iem.at/>

DLfM (september 2025):

<https://dlfm.web.ox.ac.uk/>

ISMIR (september 2025):

<https://ismir2025.ismir.net/>

AMIC (september 2025):

<https://aimusiccreativity.org/2025/>

FMA (october 2025):

<https://www.fma.org/vancouver>



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