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MEETING

Hello.

I'm the **Smarter** Library.



Translating the classics: An automated system for translating Dutch uniform classical music titles

INGMAR VROOMEN & CASPER KARREMAN, MUZIEKWEB



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Project manager



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Introducing Muziekweb

Muziekweb: a short introduction

- Founded in 1961 as Stichting Centrale Discotheek (CDR)









Collection 2018:

- ± 600.000 CD's
- 300.000 LP's
- 30.000 music DVD's
- Historical audio formats: wax cylinders, shellac, Pathé records, Edison Diamond Discs



Music library of the Netherlands

Deutsches
Musikarchiv



British Library
Sound Archive



Bibliothèque
nationale de
France



Muziekweb

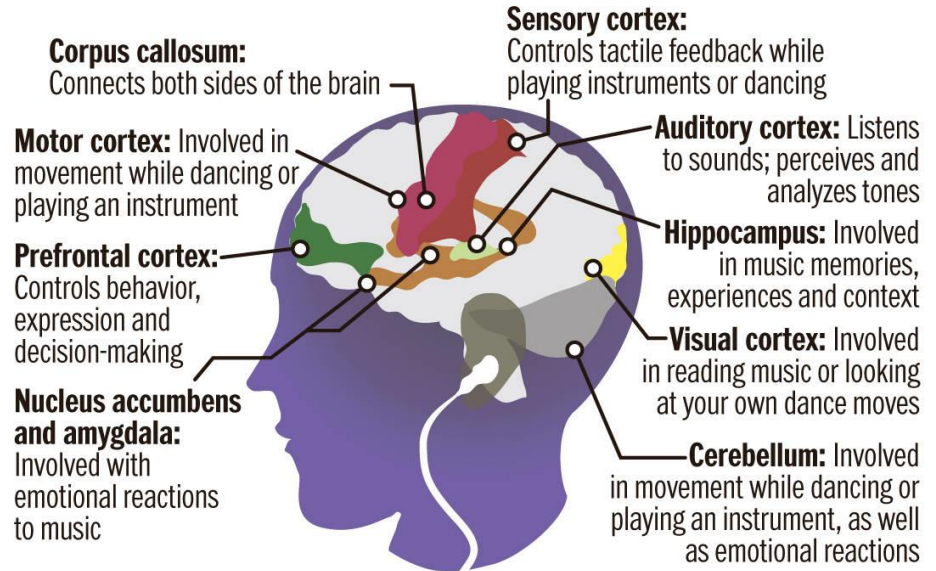


Projects

- Music and science
- Internationalisation

Music and the brain

Playing and listening to music works several areas of the brain



SOURCE: Music for Young Children

DESERET NEWS GRAPHIC

(International) Collaborations

- Scientific research: sharing data, contributing to research, e.g. with TU Delft or Utrecht University
- All public libraries in The Netherlands and Flanders
- Dutch Royal Library, national library of The Netherlands
- Foreign music libraries like DMA and BLSA → but all our data is in Dutch!

Project automated translation

Project: automated translation

- Translate our website muziekweb.nl for international visitors
- Share data with foreign (non-Dutch speaking) libraries
- Enable easier linking of our database to other international music services and databases

Translating 1000 titles by hand

ENGELS	FRANS	DUITS
@Symphony/2orchestra/3no.1, op.67/4c minor "Fate"	@Symphonie/2orchestre/3no.5, op.67/4do mineur	@Sinfonie/2Orchester/3Nr.5, Op.67/4c-Moll "Schicksal"
@Data track	@Data track	@Data track
@Symphony/2orchestra/3no.3, op.55/4E flat major "Eroica"	@Symphonie/2orchestre/3no.3, op.55/4mi bémol majeur	@Sinfonie/2Orchester/3Nr.3, Op.55/4Es-Dur "Eroica"
@Cantata/2soloists [4], choir, orchestra/3BWW.147 "Herz und Mund und Tat und Leben"; Je	@Cantate/2solistes [4], chœur, orchestre/3BWW.147 "Herz und Mund und Tat und L	@Kantate/2Solisten [4], Chor, Orchester/3BWW.147 "Herz und
@Symphony/2orchestra/3no.7, op.92/4A major	@Symphonie/2orchestre/3no.7, op.92/4la majeur	@Sinfonie/Orchester/3Nr.7, Op.92/4A-Dur
@Concerto/2piano, orchestra/3no.5, op.73/4E flat major "Emperor"	@Concerto/2piano, orchestre/3no.5, op.73/4mi bémol majeur "Empereur"	@Konzert/2Klavier, Orchester/3Nr.5, Op.73/4Es-Dur "Empero
@Symphony/2soloists [4], choir, orchestra/3no.9, op.125/4d minor	@Symphonie/2solistes [4], chœur, orchestre/3no.9, op.125/4ré mineur	@Sinfonie/2Solisten [4], Chor, Orchester/3Nr.9, Op.125/4d-M
@Concerto/2piano, orchestra/3no.4, op.58/4G major	@Concerto/2piano, orchestre/3no.4, op.58/4sol majeur	@Konzert/2Klavier, Orchester/3Nr.4, Op.58/4G-Dur
@Symphony/2orchestra/3no.6, op.68/4F major "Pastoral"	@Symphonie/2orchestre/3no.6, op.68/4fa majeur "Pastorale"	@Sinfonie/2Orchester/3Nr.6, Op.68/4G-dur "Pastorale"
@Tosca ; E lucevan le stelle	@Tosca ; E lucevan le stelle	@Tosca ; E lucevan le stelle
@Toccat and fugue/2organ/3BWW.565/4d minor	@Toccat et fugue/2orgue/3BWW.565/4ré mineur	@Toccat und Fuge/2Orgel/3BWW.565/4d-Moll
@Vocalise/2voice, piano/3op.34, no.14 \$ Arr.	@Vocalise/2voix, piano/3op.34, no.14 \$ Arr.	@Vocalise/2Stimme, Klavier/3Op.34, Nr.14 \$ Arr.
@Polonaise/2piano/3op.53/4A flat major "Heroic"	@Polonaise/2piano/3op.53/4la bémol majeur "Héroïque"	@Polonaise/2Klavier/3Op.53/4As-Dur
@Barcarolle/2piano/3op.60/4F sharp major	@Barcarolle/2piano/3op.60/4fa dièse majeur	@Barcarolle/2Klavier/3Op.60/4Fis-Dur
@Pavane pour une infante défunte	@Pavane pour une infante défunte	@Pavane pour une infante défunte
@Sonata/2piano/3no.23, op.57/4f minor "Appassionata"	@Sonate/2piano/3no.23, op.57/4fa mineur "Appassionata"	@Sonate/2Klavier/3Nr.23, Op.57/4f-Moll "Appassionata"
@Ballade/2piano/3no.1, op.23/4g minor	@Ballade/2piano/3no.1, op.23/4sol mineur	@Ballade/2Klavier/3Nr.1, Op.23/4g-Moll
@Symphony/2orchestra/3no.1, op.68/4c minor	@Symphonie/2orchestre/3no.1, op.68/4do mineur	@Sinfonie/2Orchester/3Nr.1, Op.68/4c-Moll
@Sonata/2piano/3no.14, op.27, no.2/4c sharp minor "Moonlight"	@Sonate/2piano/3no.14, op.27, no.2/4do dièse mineur "Clair de lune"	@Sonate/2Klavier/3Nr.14, Op.27, Nr.2/4cis-Moll
@Sonata/2piano/3S.178/4b minor	@Sonate/2piano/3S.178/4si mineur	@Sonate/2Klavier/3S.178/4h-Moll
@Concerto/2piano, orchestra/3no.1, op.23/4b flat minor	@Concerto/2piano, orchestre/3no.1, op.23/4si bémol mineur	@Konzert/2Klavier, Orchester/3Nr.1, Op.23/4b-Moll
@Concerto/2piano, orchestra/3op.54/4a minor	@Concerto/2piano, orchestre/3op.54/4la mineur	@Konzert/2Klavier, Orchester/3Op.54/4a-Moll
The @rite of spring	Le @sacre du printemps	Le @sacre du printemps
@Symphony/2orchestra/3no.8, op.93/4F major	@Symphonie/2orchestre/3no.8, op.93/4fa majeur	@Sinfonie/2Orchester/3Nr.8, Op.93/4F-Dur
@Concerto/2piano, orchestra/3no.3, op.37/4c minor	@Concerto/2piano, orchestre/3no.3, op.37/4do mineur	@Konzert/2Klavier, Orchester/3Nr.3, Op.37/4c-Moll
@Sonata/2piano/3no.32, op.111/4c minor	@Sonate/2piano/3no.32, op.111/4do mineur	@Sonate/2Klavier/3Nr.32, Op.111/4c-Moll
@Symphony/2orchestra/3no.6, op.74/4b minor "Pathétique"	@Symphonie/2orchestre/2no.6, op.74/4si mineur "Pathétique"	@Sinfonie/2Orchester/3Nr.6, Op.74/4h-Moll "Pathétique"
@Berceuse/2piano/3op.57/4D flat major	@Berceuse/2piano/3op.57/4ré bémol majeur	@Berceuse/2Klavier/3Op.57/4Des-Dur
@Suite/2orchestra/3no.3, BWV.1068/4D major ; Air \$ Arr.	@Suite/2orchestre/3no.3, BWV.1068/4ré majeur ; Air \$ Arr.	@Suite/2Orchester/3Nr.3, BWV.1068/4D-Dur ; Air \$ Arr.

The need for an automated solution



An Automated
Language
Translation System
for Classical Music
Titles

M.J.C. Dingjan
R.W. Kapel
M.P. Sijm

 TU Delft
 muziekweb



Steps in the translation process

- What do we translate?



- Generic title or identifying name
- Instruments and voices
- Identifying opus or catalogue number
- Key (A major, d minor)

Steps in the translation process

- What do we translate?

Wolfgang Amadeus Mozart,
Requiem voor soli [4], koor en orkest KV.626 in d kl.t.



Wolfgang Amadeus Mozart,
Requiem for soloists [4], choir, orchestra KV.626 in d minor

Steps in the translation process

- What do we translate?

Pjotr Iljitsj Tsjaikovski,
Schoppenvrouw, op.68



English

French

German

Google:

Spade woman

Pelle femme

Spaten Frau



Muziekweb:

Queen of spades

Dame de pique

Pique dame

Steps in the translation process

- What do we translate?
- Research for other datasets

Research for other datasets

ISNI for names of creators / collaborators

WorldCat for library collections

DDEX for music distribution

None focus on the musical composition

Research for other datasets

Find datasets with overlapping content in different languages

- **Cantorion** - Focus on classical music, concerts and sheet music
- **MusicBrainz** - Open music encyclopedia
- **Wikidata** – Open structured dataset, interacts well with machines and humans

Steps in the translation process

- What do we translate?
- Research for other datasets
- Analyze the data

Analyze the data

- Find out how our subject is addressed
- What information is in the data; **data is not information!**
- Each dataset contains different information and presentations

Analyze the data

Cantorion example

Cantorion
Free sheet music, scores & concert listings

Search

English

Home Sheet music Anthems Exams Concerts Listen Quizzes Community

All music ▶ Mozart, W A ▶ Requiem Mass ▶ Vocal score

Requiem Mass

Vocal score

Download

Composer	W A Mozart	Opus	K 626
Tonality	D minor	Pages	79
Arranger	Friedrich Ferdinand Brissler	Instruments	Voice, Piano
Type	Classic	Licence	Public domain
Uploaded by	Music Library	Filesize	5.84 MB

Like 6 people like this. Be the first of your friends.

G+

No. 1. Requiem.
Wolfgang Amadeus Mozart
KV 626

Adagio. Corali di Bassetto

PIANO.

Soprano. A

Alto.

Tenore. Tutti.

Re .

Analyze the data

Wikidata example



- [Main page](#)
- [Community portal](#)
- [Project chat](#)
- [Create a new item](#)
- [Recent changes](#)
- [Random item](#)
- [Query Service](#)
- [Nearby](#)
- [Help](#)
- [Donate](#)

- Tools**
- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)

Item [Discussion](#)

Read [View history](#)

Mozart's Requiem (Q207875)

Mass composed by Wolfgang Amadeus Mozart in Vienna in 1791.
K. 626 | Requiem Mass in D minor

[In more languages](#) [Configure](#)

Language	Label	Description	Also known as
English	Mozart's Requiem	Mass composed by Wolfgang Amadeus Mozart in Vienna in 1791.	K. 626 Requiem Mass in D minor
Dutch	Requiem	requiem van Wolfgang Amadeus Mozart	
German	Requiem	Werk von Wolfgang Amadeus Mozart	Mozart Requiem Mozart-Requiem
French	Requiem de Mozart	Messe de Requiem en ré mineur (KV 626) composée par Wolfgang Amadeus Mozart en 1791.	Requiem Requiem K626

[All entered languages](#)

Analyze the data

Muziekweb



The screenshot shows the Muziekweb website interface. At the top, the logo 'muziekweb' is displayed in orange, with the tagline 'de muziekbibliotheek van nederland' below it. A navigation bar contains links for 'Home', 'Nieuw binnen', 'Muziekstijlen', 'Ontdek', 'Bijzondere collecties', 'Verlanglijst', and 'Over'. Below the navigation bar is a search bar with the placeholder text 'Zoeken...'. To the right of the search bar is a 'Vind' button with a magnifying glass icon. The search results are displayed in a light gray box, showing the title 'Requiem voor soli [4], koor en orkest KV.626 in d kl.t.' and the composer 'Wolfgang Amadeus Mozart (1756-1791)' in orange text.

Steps in the translation process

- What do we translate?
- Research for other datasets
- Analyze the data
- Query the datasets

Query the datasets

- Every resource has it's own interface
- Results rely on the question asked so ask the right questions

Query the datasets

Cantorian

brahms Symphonie nr.2, op.73 in D grt.

Search

Music search

We found 412 piece(s) of music matching your search.



Symphony No. 1 in C minor
Full Score
▶ Johannes Brahms
▶ Orchestra
▶ Op. 68



Symphony No. 2 Full Score
▶ Johannes Brahms
▶ Orchestra
▶ Op. 73



Symphony No. 3 in F major
Full Score
▶ Johannes Brahms
▶ Orchestra
▶ Op. 90



Symphony No. 4 in E minor
Full Score
▶ Johannes Brahms
▶ Orchestra
▶ Op. 98

Query the datasets

Wikidata



- Main page
- Community portal
- Project chat
- Create a new item
- Recent changes
- Random item
- Query Service

Special page

Search results

To search for Wikidata items by their title on a given site, use [Special:ItemByTitle](#). To search by [label](#) in a given language

Q brahms Sym r.2, op.73 in D gr.t.

Search

[Content pages](#) [Multimedia](#) [Translations](#) [Everything](#) [Advanced](#)

There were no results matching the query. You may [create a new item](#) for "brahms Symphonie nr.2, op.73 in D gr.t.".

Query Service

Nearby

Help

Donate

Tools

[Special pages](#)

[Printable version](#)

11 KB (155 words) - 23:03, 25 January 2018

[Violin Sonata No. 2 \(Q3490207\)](#)

10 KB (67 words) - 10:39, 29 January 2018

[Symphony No. 2 \(Q210469\)](#): work composed by Johannes Brahms

11 KB (139 words) - 22:53, 25 January 2018

[Piano Quartet No. 2 \(Q691140\)](#): musical composition by Johannes Brahms

9 KB (97 words) - 10:42, 29 January 2018

[Serenade nr. 2 \(Q16830251\)](#): music by Johannes Brahms

3 KB (19 words) - 16:37, 31 December 2017

Steps in the translation process

- What do we translate?
- Research for other datasets
- Analyze the data
- Query the datasets
- Rating the results / deciding when to translate

Rating the results / deciding when to translate

- Rate probability of matching results
- When more sources say the same it must be true

Rating the results / deciding when to translate

Zwanenmeer, op.20

Pjotr Iljitsj Tsjaikovski (1840-1893)

Zwanenmeer (Q199786): ballet van Pjotr Iljitsj Tsjaikovski

24 kB (353 woorden) - 5 jan 2018 18:20



Zwanenmeer

Act 3, No. 22: Danse
Napolitaine - Piano &
Trumpet



▸ Pjotr Iljitsj
Tsjaikovski
▸ Piano, Trompet,
Percussion



▸ Op. 20
▸ Het zwanenmeer
(Frans: Le lac...
▸ ...ttyúk tava
nl:Zwanenmeer ja:
白鳥の湖 no:S...

Rating the results / deciding when to translate

Alle Musik ▶ Tsjaikowski, P I ▶ Schwanensee ▶ Act 3, No. 22: Danse Napo...

Schwanensee (Swan Lake)

Toutes les musiques ▶ Tchaïkovski, P I ▶ Le Lac des cygnes ▶ Act 3, No. 22: Danse Napo...

Le Lac des cygnes (Swan Lake)

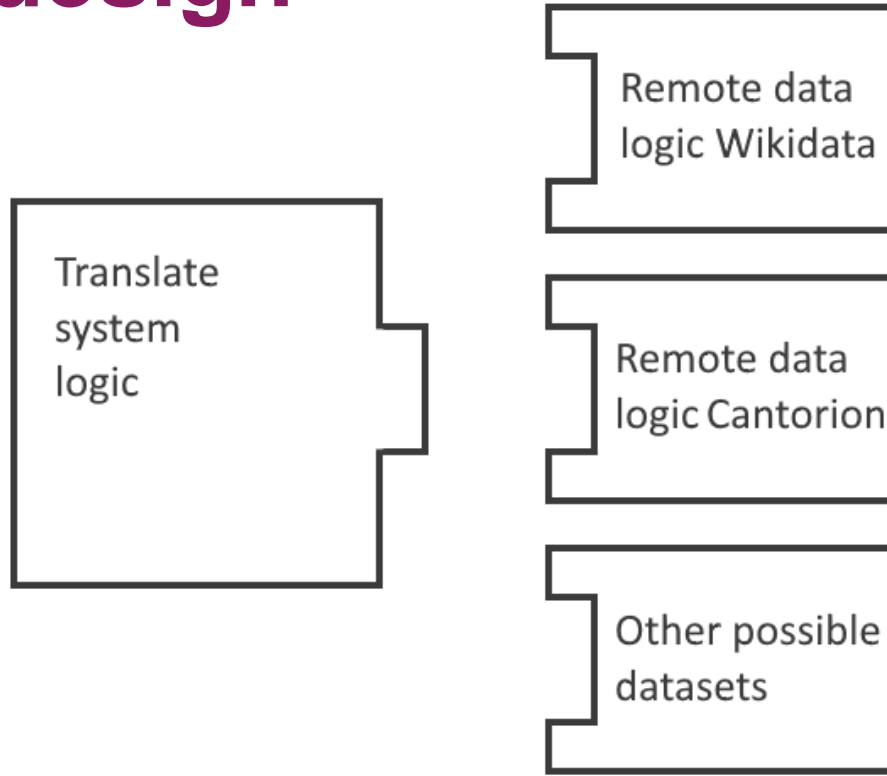
▼ In meer talen 11 talen

Taal	Label	Beschrijving
Nederlands	Zwanenmeer	ballet van Pjotr Iljitsj Tsjaikovski
Engels	Swan Lake	ballet by Pyotr Ilyich Tchaikovsky
<u>Duits</u>	<u>Schwanensee</u>	Ballett von Pjotr Iljitsch Tsjaikowski
<u>Frans</u>	<u>Le Lac des cygnes</u>	ballet de Tchaïkovski

Steps in the translation process

- What do we translate?
- Research for other datasets
- Analyze the data
- Query the datasets
- Rating the results / deciding when to translate
- Store proposed translation including decision attributes

System design



Results

- 10.000 most popular titles: 95% accuracy
- Translated in 16 hours to prevent exhaustion of the remote systems

Thank you

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