Content was King and Metadata Ruled

~20 years of Research and Development at
Netherlands Institute for Sound and Vision & Friends

Roeland Ordelman

BEELD EN GELUID

Content
is King
Bill Gates 1996

Retrieval

BEELDEN VOOR DE TOEKOMST

2007 – 20014 LARGE DIGITIZATION PROGRAM

IMAGES FOR THE FUTURE

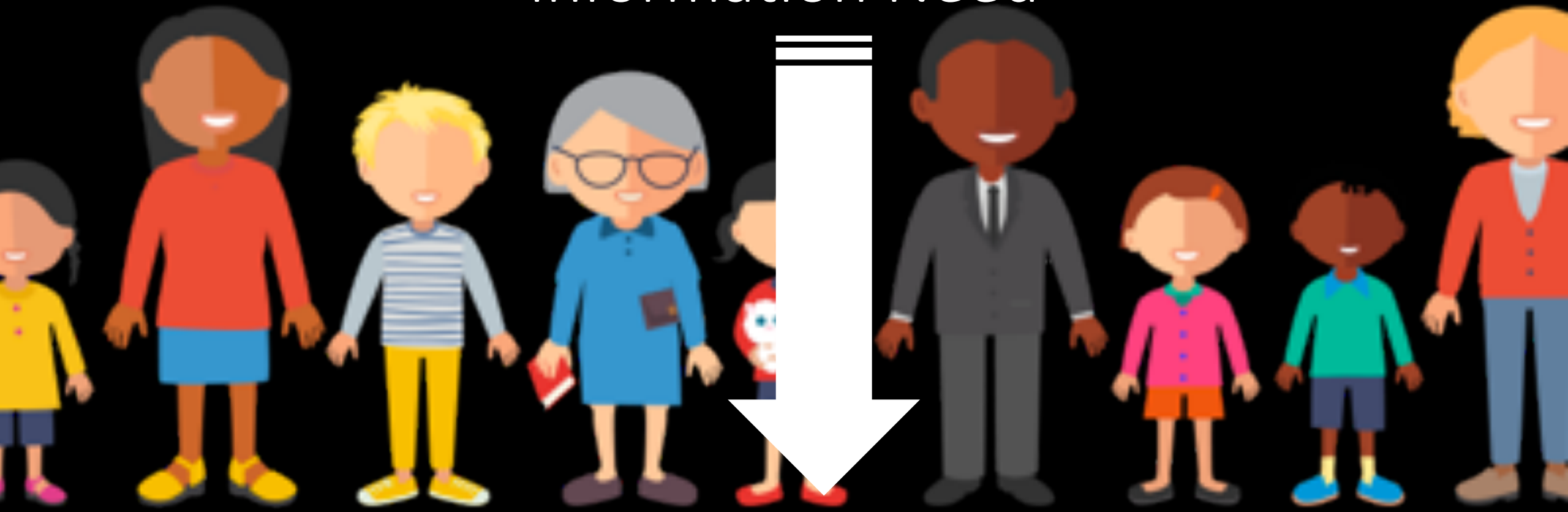
Millions of hours of audiovisual content in media archives

‘BIG DATA’

Find what you were (not) looking for
Search & Explore Recommendation

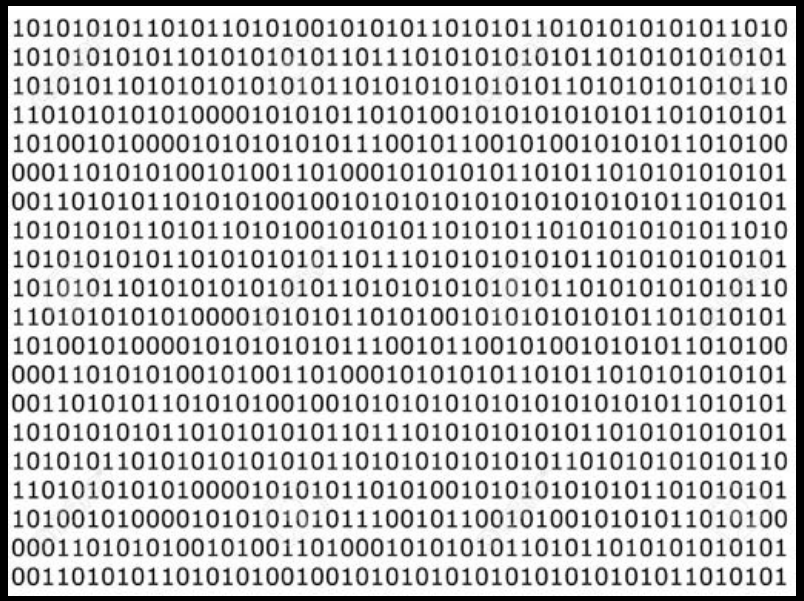
But Metadata Rules

Information Need



SEARCH: QUERY = semantics

Semantic Gap



(UN)STRUCTURED

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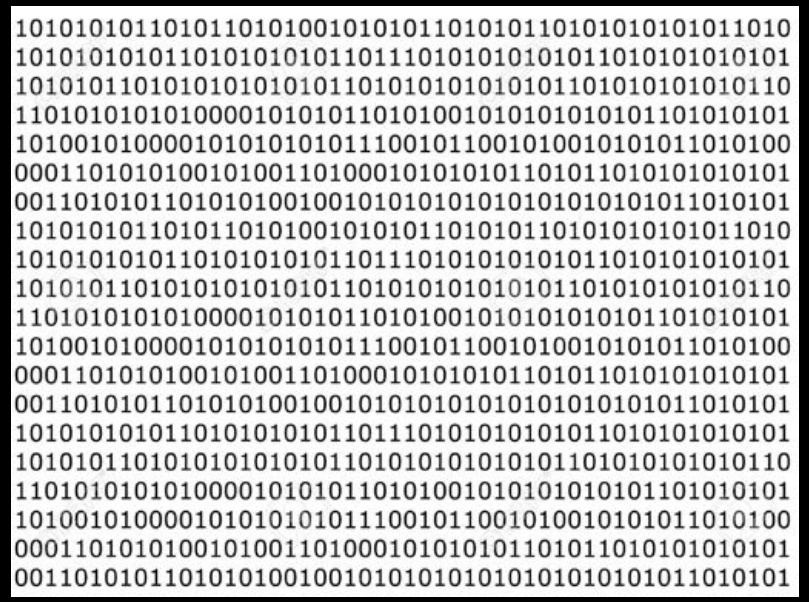
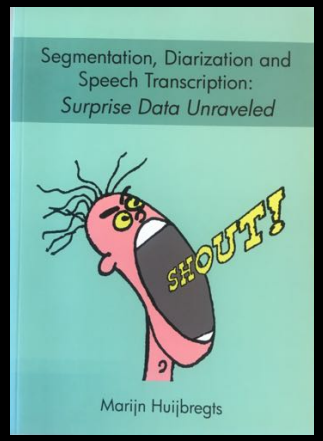
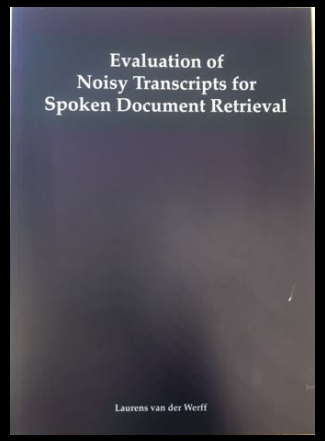


Semantic Computing

Multimodal video analysis





Spoken document retrieval

1998-2010

Improve quality of Dutch ASR for searching

Segmentation & who speaks when

When is ASR quality good enough for searching?

MultimediaN

ECHO
European CHronicles On-line

UNIVERSITEIT TWENTE.

Audiodatabank

Op deze pagina is een bescheiden begin gemaakt met de presentatie van geluidsmateriaal (onder andere documentaires en interviews) waarin Willem Frederik Hermans aan het woord is. De bestanden zijn doorzoekbaar gemaakt met een combinatie van technieken die in Nederland nog niet vaak is toegepast. Klik hier voor hulp bij het zoeken.

tranen der acacia's zoek fragment

1	Over het onderscheid tussen wetenschap en literatuur. Een gesprek met Willem Frederik Hermans (19 maart 1992)	[01:49:02 tot 01:51:05]	Beluister audio
2	Over het onderscheid tussen wetenschap en literatuur. Een gesprek met Willem Frederik Hermans (19 maart 1992)	[00:14:41 tot 00:17:14]	Beluister audio
3	Over De raadselachtige Multatuli. Een gesprek met Willem Frederik Hermans (1976)	[00:11:05 tot 00:11:25]	Beluister audio
4	Over Age Bijkaart. Een gesprek met Willem Frederik Hermans (omstreeks 1980)	[00:12:28 tot 00:12:41]	Beluister audio
5	Waarom schrijven? (lezing op Nijenrode, 1 augustus 1983)	[00:13:13 tot 00:13:22]	Beluister audio
6	Eerste zinnen van romans (18 januari 1967)	[00:43:53 tot 00:48:56]	Beluister audio
7	Eerste zinnen van romans (18 januari 1967)	[00:35:35 tot 00:38:04]	Beluister audio

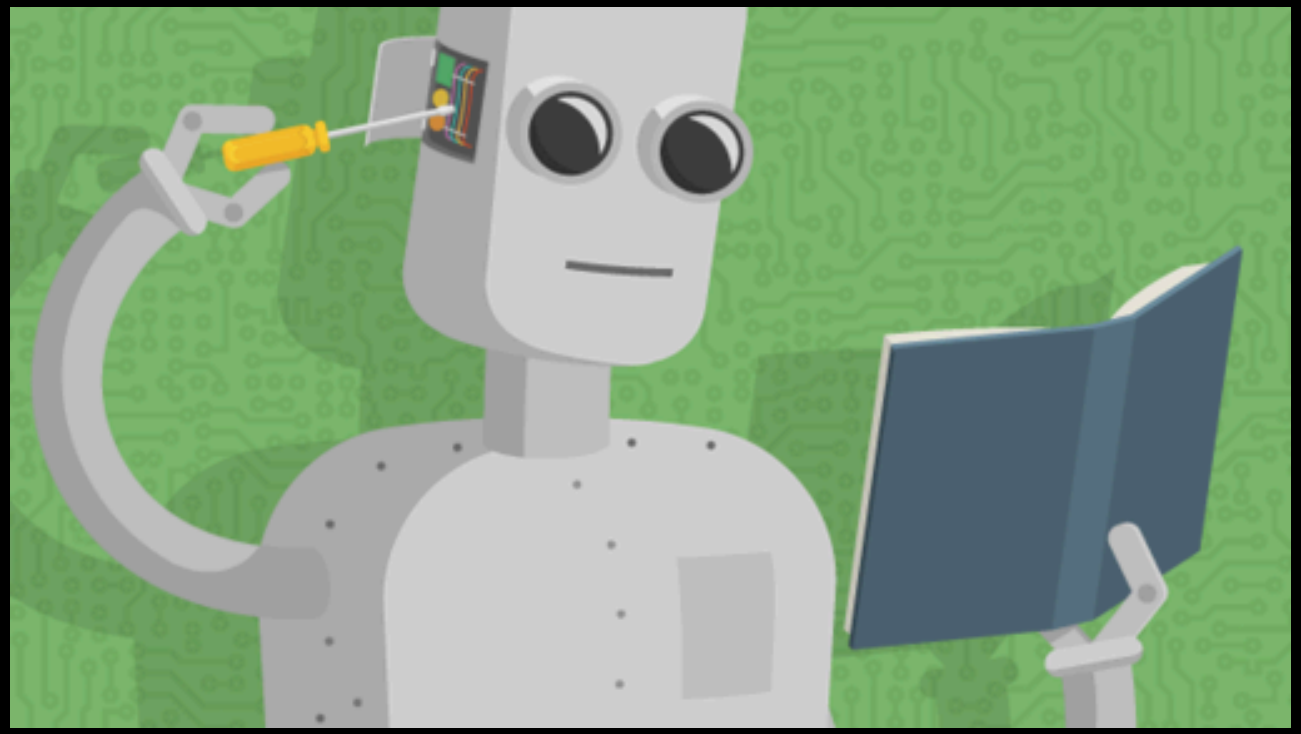
GROTE VARIATIE IN SPRAAK

Fysieke verschillen tussen mensen

Emoties

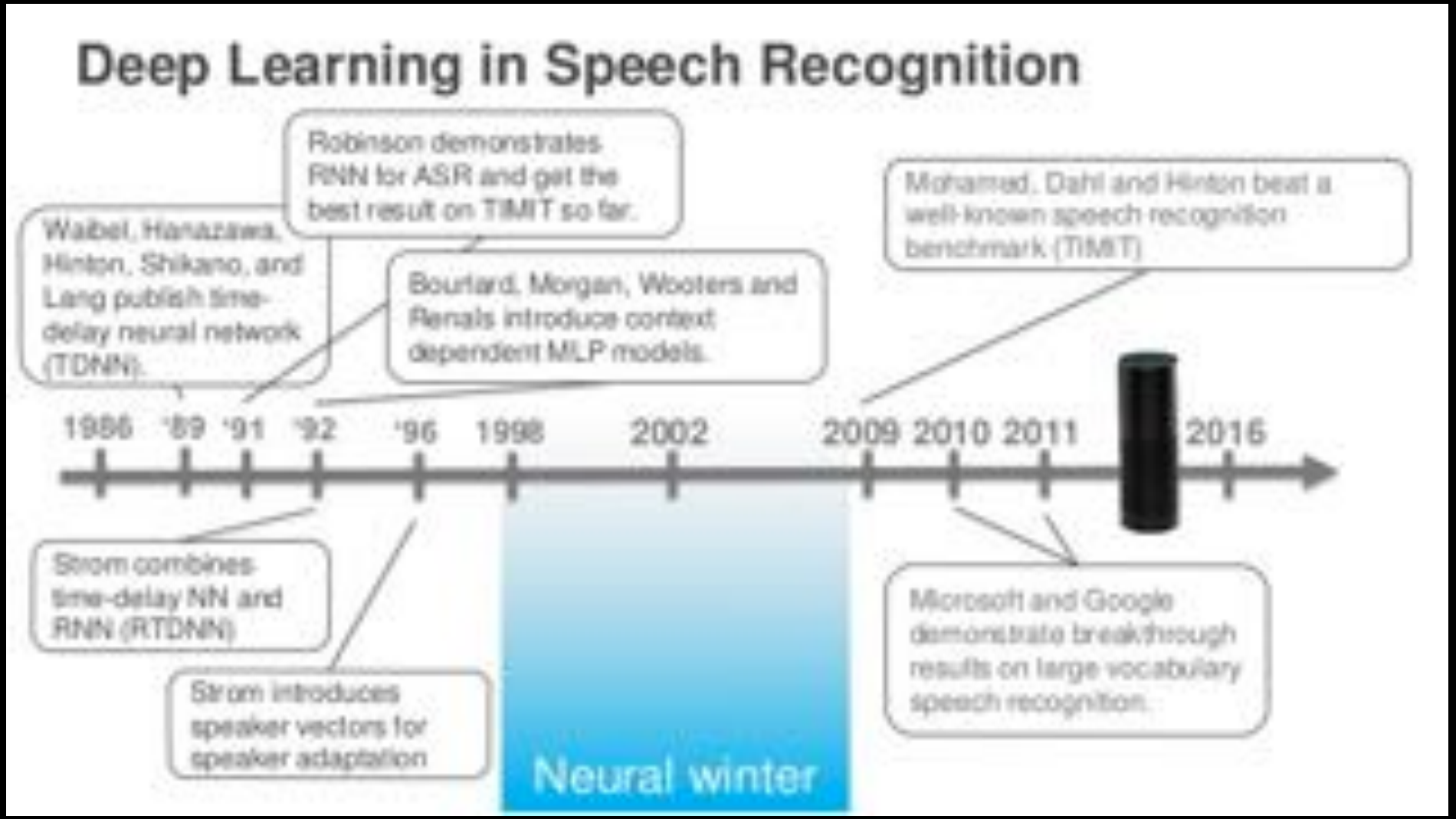
Type spraak (voorgelezen – spontaan)

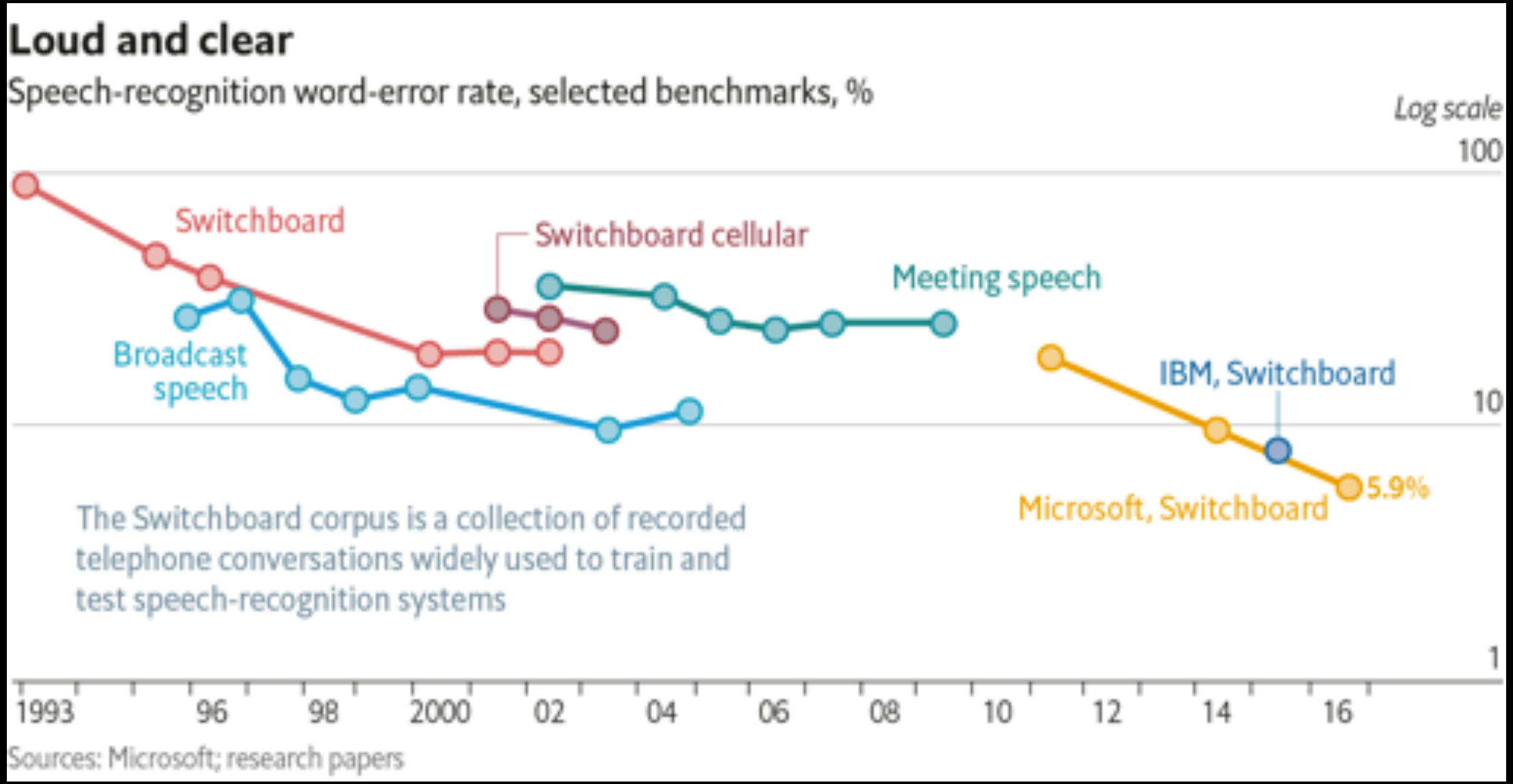
Akoestische condities



MACHINE LEARNING

Deep Learning in Speech Recognition




Loud and clear
Speech-recognition word-error rate, selected benchmarks, %
Log scale
100
10
1
Switchboard
Switchboard cellular
Meeting speech
Broadcast speech
IBM, Switchboard
5.9%
Microsoft, Switchboard
The Switchboard corpus is a collection of recorded telephone conversations widely used to train and test speech-recognition systems
1993
96
98
2000
02
04
06
08
10
12
14
16
Sources: Microsoft; research papers

Benchmarking

NBEST (NL/VL)

MediaEval (EU) -- multimediaeval.org

TRECVid (US) -- trecvid.nist.gov

CLARIAH MEDIA SUITE

Data Tools Workspace

About
Documentation
Contact

Account
berg

Tool / Single Search /

?

Single Collection Search

Set collection (Audiovisual Collection) Set project (Roeland test Media Suite)

Searching in : Audiovisual Collection

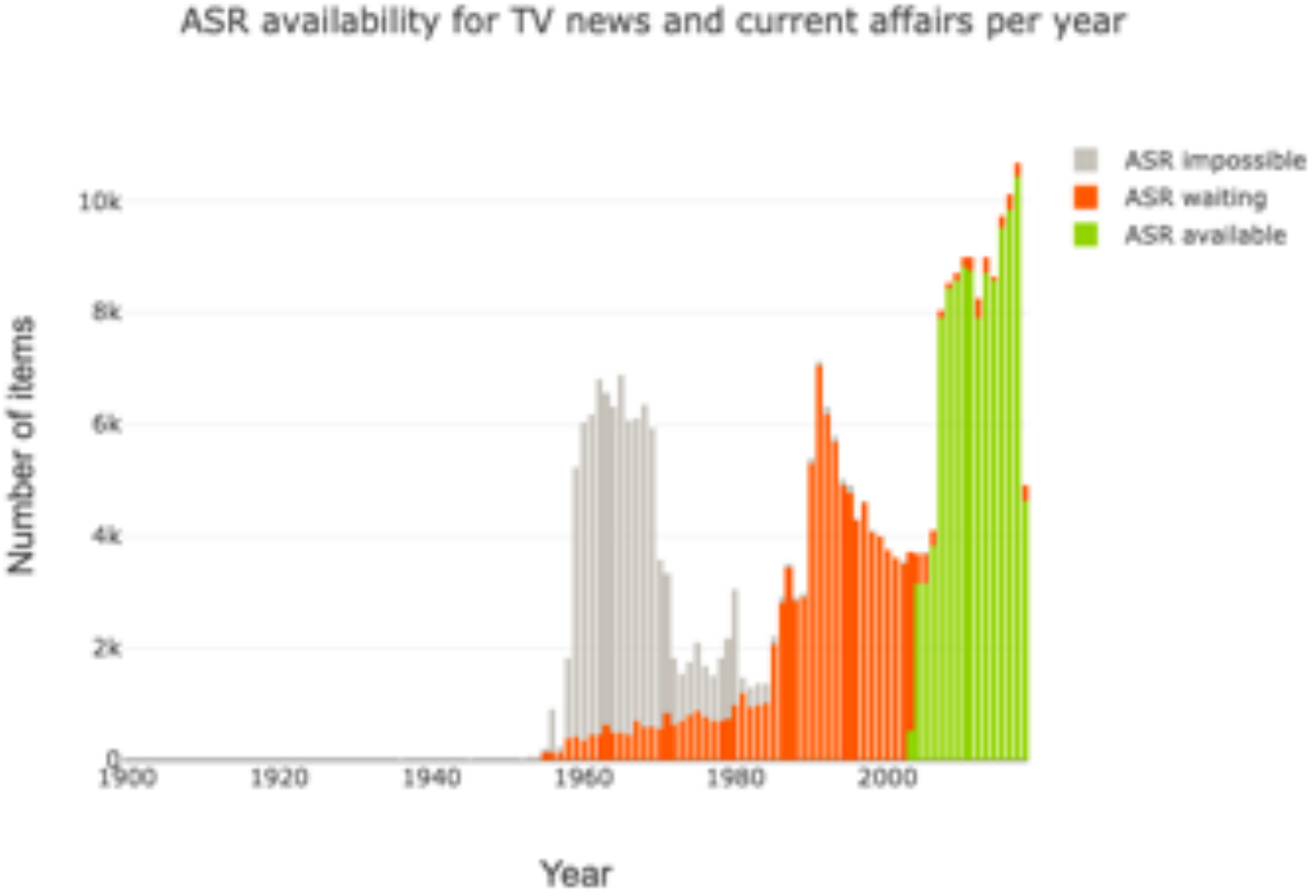
Total amount of records in this collection: 1883516

Search

Search in: all fields

Clear search

Radio Oranje



Visualising the archive: https://sites.google.com/beeldengeluid.nl/stats-beeldengeluid-nl

jupyter Metadata completeness for Clariah summer school (autosaved)

Logout

File Edit View Insert Cell Kernel Widgets Help

Notebook saved Not Trusted Python 3

Run Markdown

Write your own (Python) code to analyze the data in the Media Suite

How complete are the metadata fields?

The Media Suite allows you to see how complete a metadata field is - for how many of the available doc
this completeness over time. Here, we go one step further and compare multiple metadata fields.

Comparing metadata field over time for different fields

Imagine if we want to use information from two metadata fields over time. Then we need to be sure that both fields are present in the time frame we are interested in

Example - NISV archive: Plotting the completeness of genre at the levels of series, season, programme, segment

In [25]:

```
# get the values over time for each metadata level
# must specify date interval, as otherwise lines won't match between queries
collection = "nisv-catalogue-aggr"
dateField = "bg:publications.bg:publication.bg:sortdate"
minDate = "01-01-1800"
maxDate = "31-12-2050"
#specify labels for the different fields
labels= ["series genre", "season genre", "programme genre", "segment genre"]
# specify the fields
fields = ["bga:series.bg:genres.bg:genre", "bga:season.bg:genres.bg:genre","bg:genres.bg:genre",  "bga:segment.bg:genre

# plot the graphs
showMetadataCompletenessOverTimeForFields(fields, labels, dateField, collection, minDate, maxDate)
```

(time-labeled) ENTITIES

People,
Places,
Events,
Topics,
Quotes,
Answers,
Opinions,
Advices,
Excuses,
Promises, …

```
<word wordID="president" beginTime="4.970" endTime="5.420">
  <score AM="-15300.08789" LM="-1053.25122" COMBINED="-16353.33887"/>
</word>
<word wordID="opbouw" beginTime="5.420" endTime="5.720">
  <score AM="-16218.78125" LM="-1212.75183" COMBINED="-17431.53320"/>
</word>
<word wordID="maar" beginTime="5.720" endTime="5.900">
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</word>
<word wordID="verkiezing" beginTime="7.970" endTime="8.390">
  <score AM="-24597.32031" LM="-1744.40735" COMBINED="-26341.72852"/>
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<word wordID="gezegd" beginTime="8.390" endTime="8.850">
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```
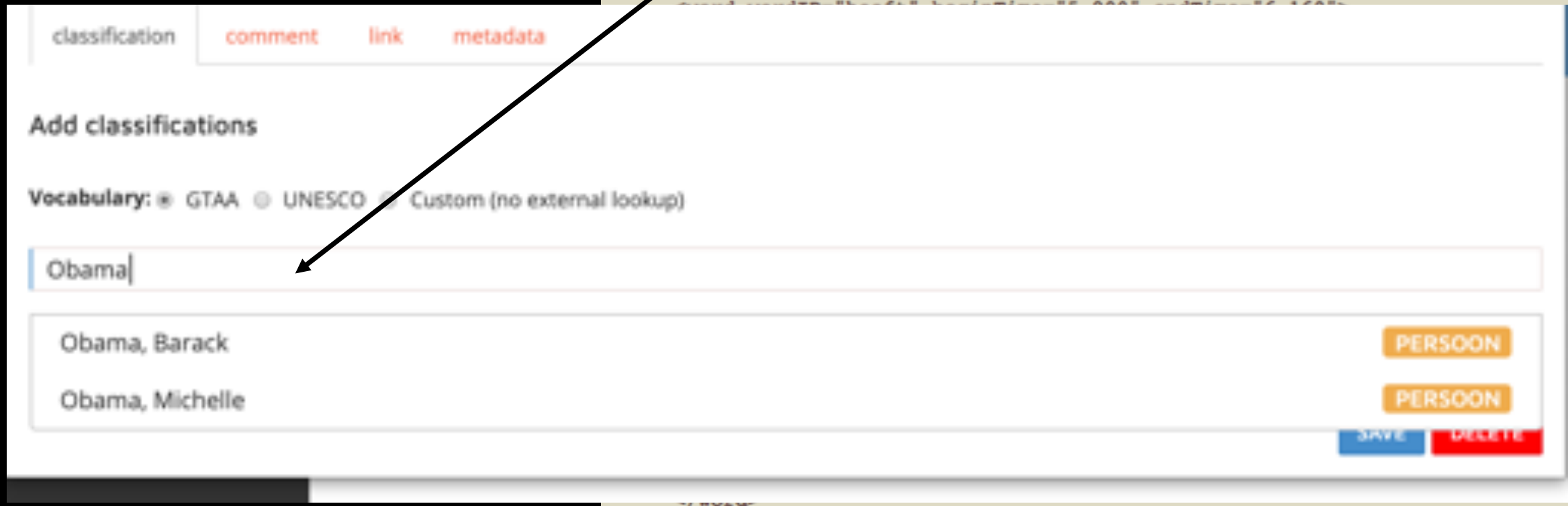

Thesaurus

Automatische Term Extractie




```
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</word>
<word wordID="maar" beginTime="5.720" endTime="5.900">
  <score AM="-16755.39453" LM="-1276.75415" COMBINED="-18032.14844"/>
</word>
```

```
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</word>
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</word>
<word wordID="gezegd" beginTime="8.390" endTime="8.850">
  <score AM="-25921.66797" LM="-1854.76404" COMBINED="-27776.43164"/>
</word>
```
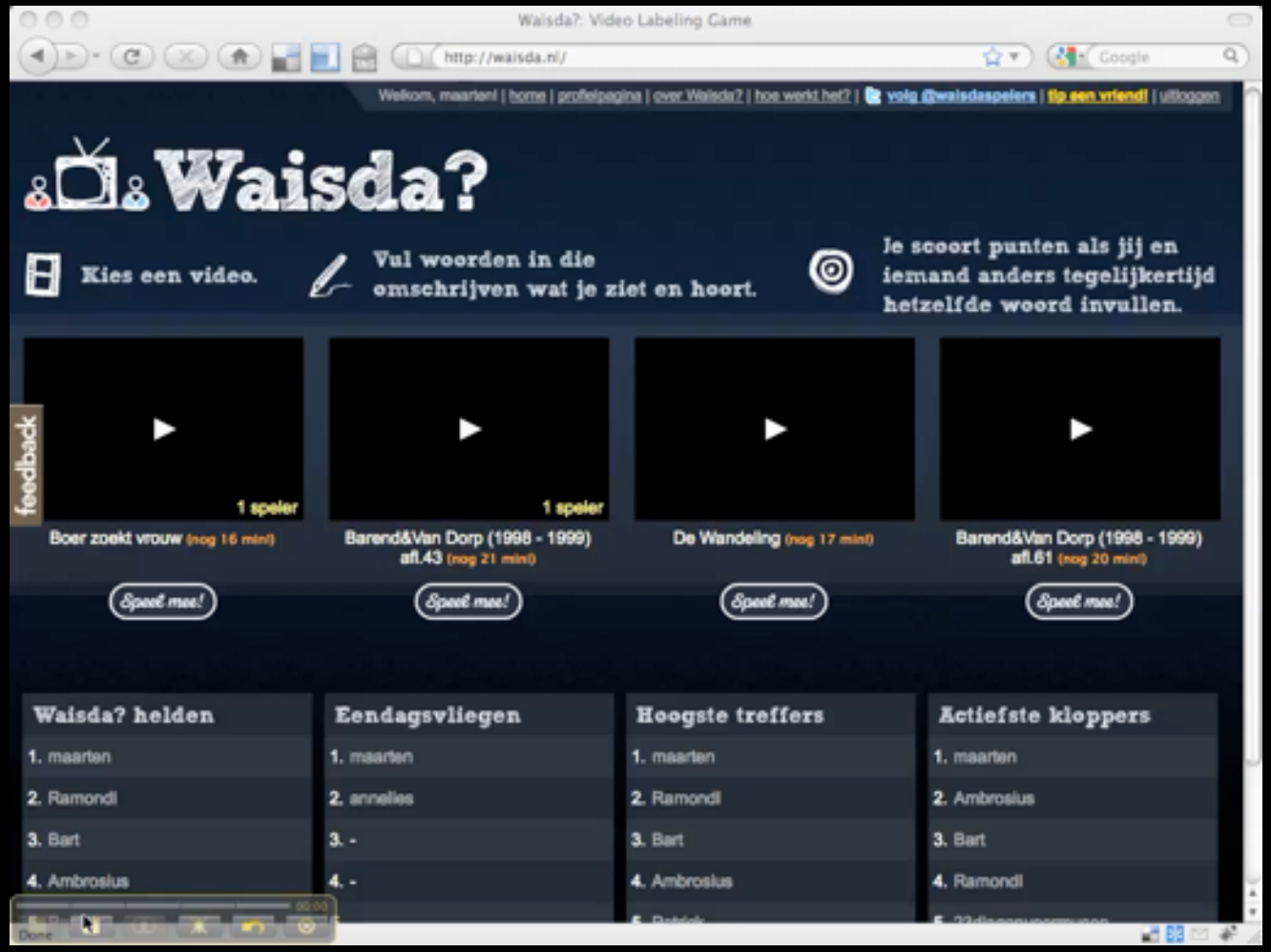

CROWDSOURCING



``computer vision''

Hollands Glorie op Pinkpop – Home

http://rdbg.tuxic.nl:8080/pinkpopdemo/

system audio jing

Home | Feedback | Colofon | Technologie

Welkom bij de vernieuwde site van hollandsglorieoppinkpop!

Nieuwsgierig naar de mogelijkheden van deze site? Bekijk dan de uitleg in de player hiernaast.

Als je niet kan wachten met het zien van je favoriete band, start dan direct met zoeken!

ZOEK OPTREDENS

Gelabeld door onze video labeling technologie

Peter Pan Speedrock
Editie:2003
Fragment:Drummer

Top 5 best bekeken optredens

Urban Dance Squad
Editie:1990

Laatste reacties op fragmenten

Johan: Jacco de Greeuw
over "GITARIST" bij Johan, 2001

Ronald: Dramatisch slechte registratie. Je ziet de artiesten niet. Loop bijleveren
over "GITARIST" bij dEUS, 1995

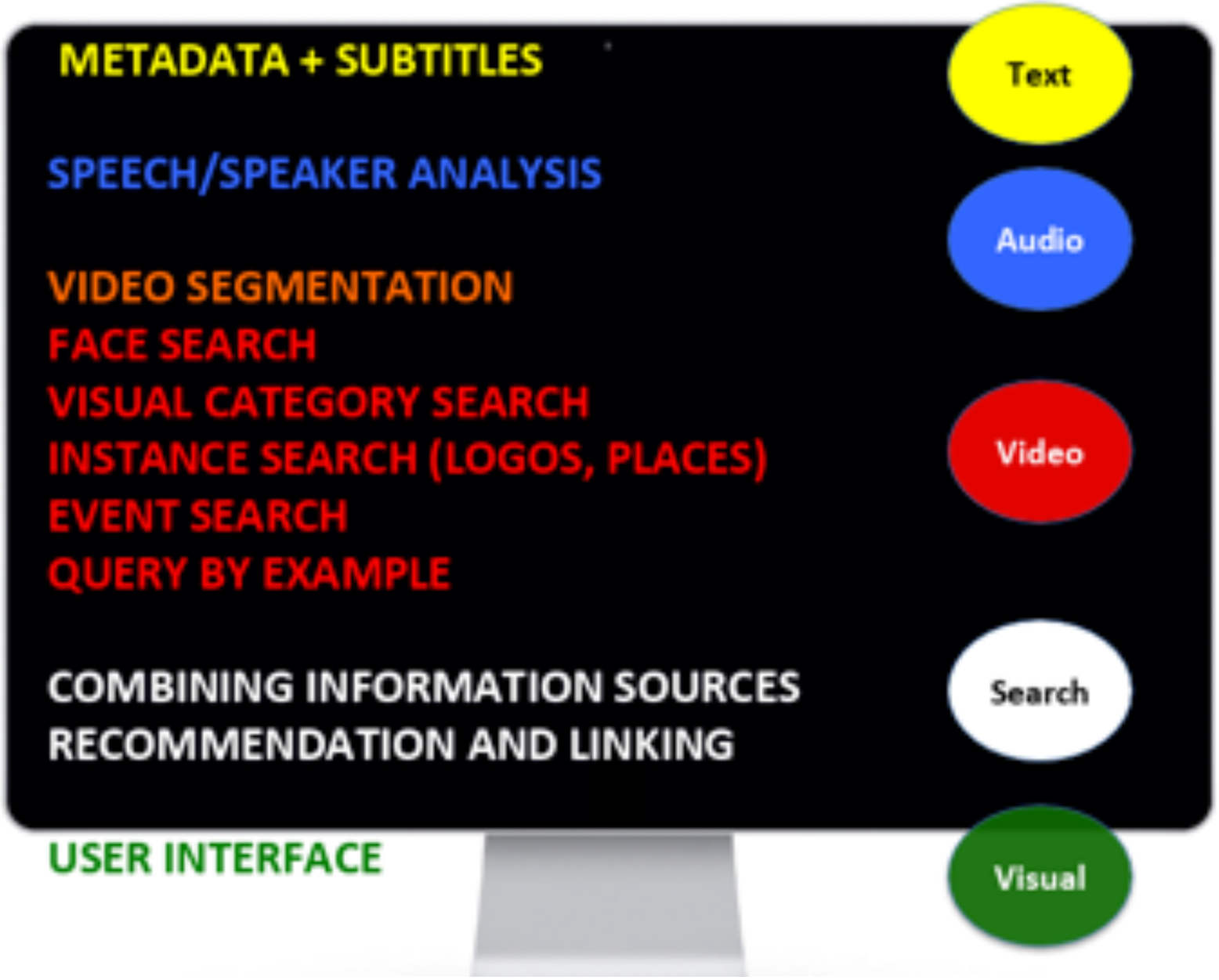
Klaar

Multimodal Search

AXES

FP7 EU-project

ACCESS TO
AUDIO-VISUAL ARCHIVES
2010-2014



RETRIEVED RESULTS (Found 883 segments in 281 videos. Showing 499 segments)

VIEW: THUMBNAILS | COMPACT | DETAILED | TRAINING IMAGES (x2)

RETRIEVED RESULTS (Found 883 segments in 281 videos. Showing 499 segments)

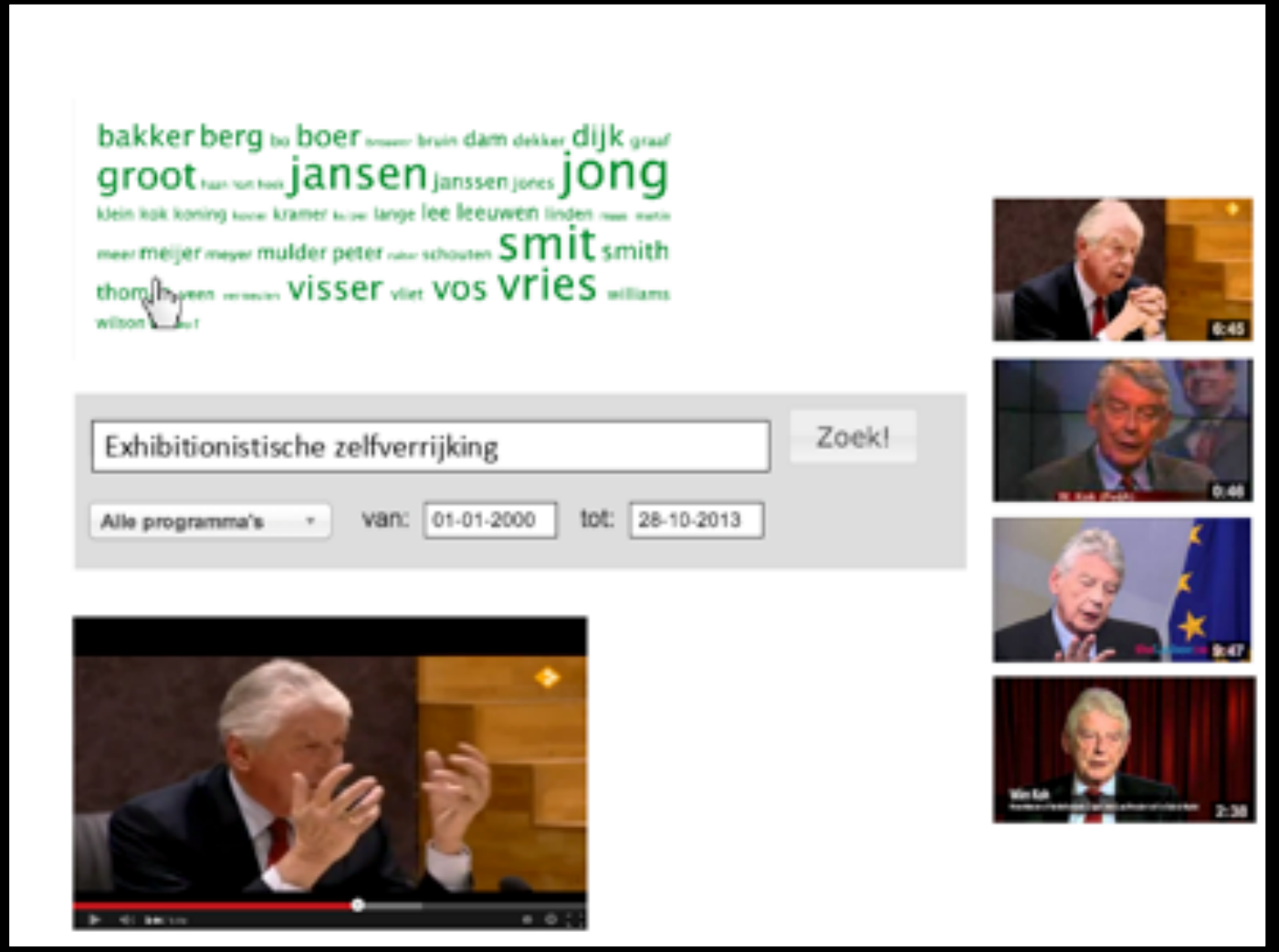
VIEW: THUMBNAILS | COMPACT | DETAILED | TRAINING IMAGES (63)

Browsen door beeldconcepten

00:02:26:00 - 00:02:43:03 [face-labels] Niehe, Ivo
00:02:54:15 - 00:03:10:04 [face-labels] Niehe, Ivo
00:03:13:08 - 00:03:14:21 [face-labels] Niehe, Ivo
00:03:19:01 - 00:03:34:15 [face-labels] Niehe, Ivo
00:04:03:13 - 00:04:38:13 [speaker-labels] Niehe, Ivo
00:04:05:08 - 00:04:07:11 [face-labels] Niehe, Ivo
00:04:43:13 - 00:04:58:13 [speaker-labels] Niehe, Ivo
00:06:07:00 - 00:06:12:04 [face-labels] Niehe, Ivo
00:06:08:13 - 00:06:58:13 [speaker-labels] Niehe, Ivo
00:06:13:06 - 00:06:22:01 [face-labels] Kim Jong-un
00:06:15:08 - 00:06:16:21 [face-labels] Niehe, Ivo
00:06:26:19 - 00:06:29:21 [face-labels] Kim Jong-un
00:06:52:19 - 00:07:58:24 [face-labels] Kim Jong-un
00:06:52:19 - 00:07:10:23 [face-labels] Niehe, Ivo
00:07:03:13 - 00:07:16:13 [speaker-labels] Niehe, Ivo
00:07:14:15 - 00:07:17:04 [face-labels] Niehe, Ivo
00:07:22:23 - 00:07:26:00 [face-labels] Niehe, Ivo
00:07:27:13 - 00:07:32:13 [speaker-labels] Kim Jong-un
00:07:32:13 - 00:07:42:13 [speaker-labels] Niehe, Ivo
00:07:33:08 - 00:07:35:22 [face-labels] Niehe, Ivo
00:07:40:15 - 00:07:43:17 [face-labels] Niehe, Ivo
00:07:43:00 - 00:07:52:24 [speaker-labels] Kim Jong-un
00:07:56:13 - 00:08:01:13 [speaker-labels] Kim Jong-un
00:07:57:06 - 00:08:57:13 [face-labels] Kim Jong-un
00:08:03:12 - 00:08:07:15 [face-labels] Niehe, Ivo
00:08:06:13 - 00:08:11:13 [speaker-labels] Niehe, Ivo
00:08:13:09 - 00:08:16:11 [face-labels] Niehe, Ivo
00:08:16:13 - 00:08:26:13 [speaker-labels] Kim Jong-un
00:08:25:08 - 00:08:32:01 [face-labels] Niehe, Ivo
00:08:33:00 - 00:08:37:24 [speaker-labels] Kim Jong-un
00:08:37:07 - 00:08:49:18 [face-labels] Niehe, Ivo
00:08:38:00 - 00:08:47:24 [speaker-labels] Niehe, Ivo
00:08:46:00 - 00:08:57:24 [speaker-labels] Kim Jong-un
00:09:02:13 - 00:09:12:13 [speaker-labels] Kim Jong-un
00:09:12:13 - 00:09:42:13 [speaker-labels] Niehe, Ivo
00:09:17:21 - 00:09:19:09 [face-labels] Kim Jong-un
00:09:38:03 - 00:09:39:03 [face-labels] Kim Jong-un
00:09:43:21 - 00:10:18:16 [face-labels] Kim Jong-un

ID Segment	
Sequence Number	56
Text/value	Kim Jong-un
Person	Kim Jong-un
Label	
Confidence/score	0.99945054945054
Generation Method	Facial Recognition

Spraakherkenning combineren met sprekerherkenning



Video Hyperlinking

- Establish links between an ‘anchor’ video segment and ‘target’ video segment(s) in a repository, based on topical relevance

- Or:
  - Content-based, segment level video recommendation
  - Multimodal search using video segment as a query

nationaal archief

BEELD EN GELUID

Audio-2-Image Hyperlinking

Cross-media Recommendation

SVDJ
STIMULERINGSFONDS
VOOR DE JOURNALIST

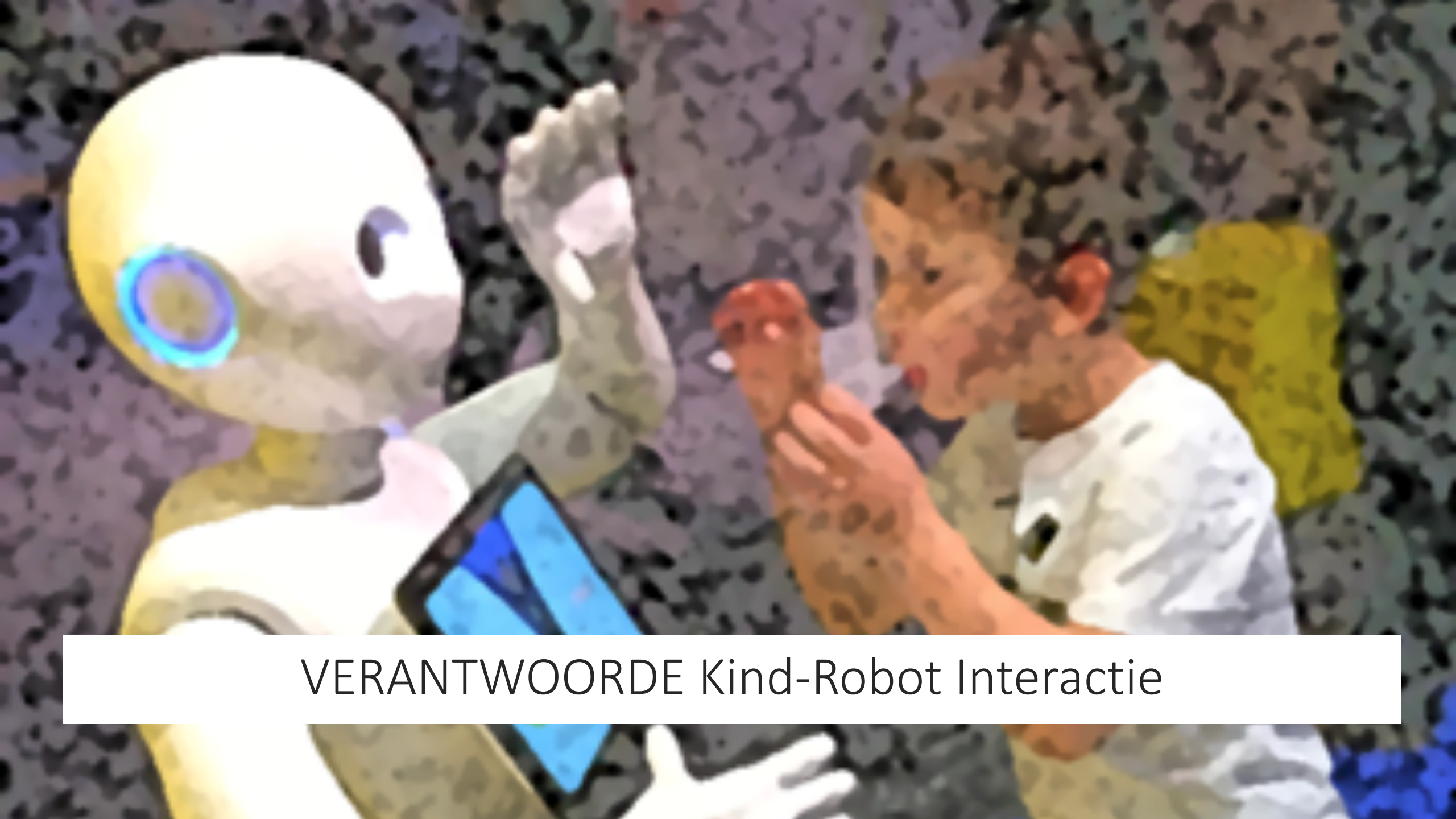
Spoken Conversational Search

Dialogue to understand

Information Need

Media Suite Kids

Playfully and Responsibly diving into millions of hours of premium content



VERANTWOORDE Kind-Robot Interactie

Hoe gaan kinderen om met een agent?
Welke informatie zijn ze naar op zoek?
Hoe bieden agents de informatie aan?
In welke mate vertrouwen we de agent?
Vertrouwen we de aangeboden informatie?

DATA

1998 50 hrs

2002

500 hrs

2008

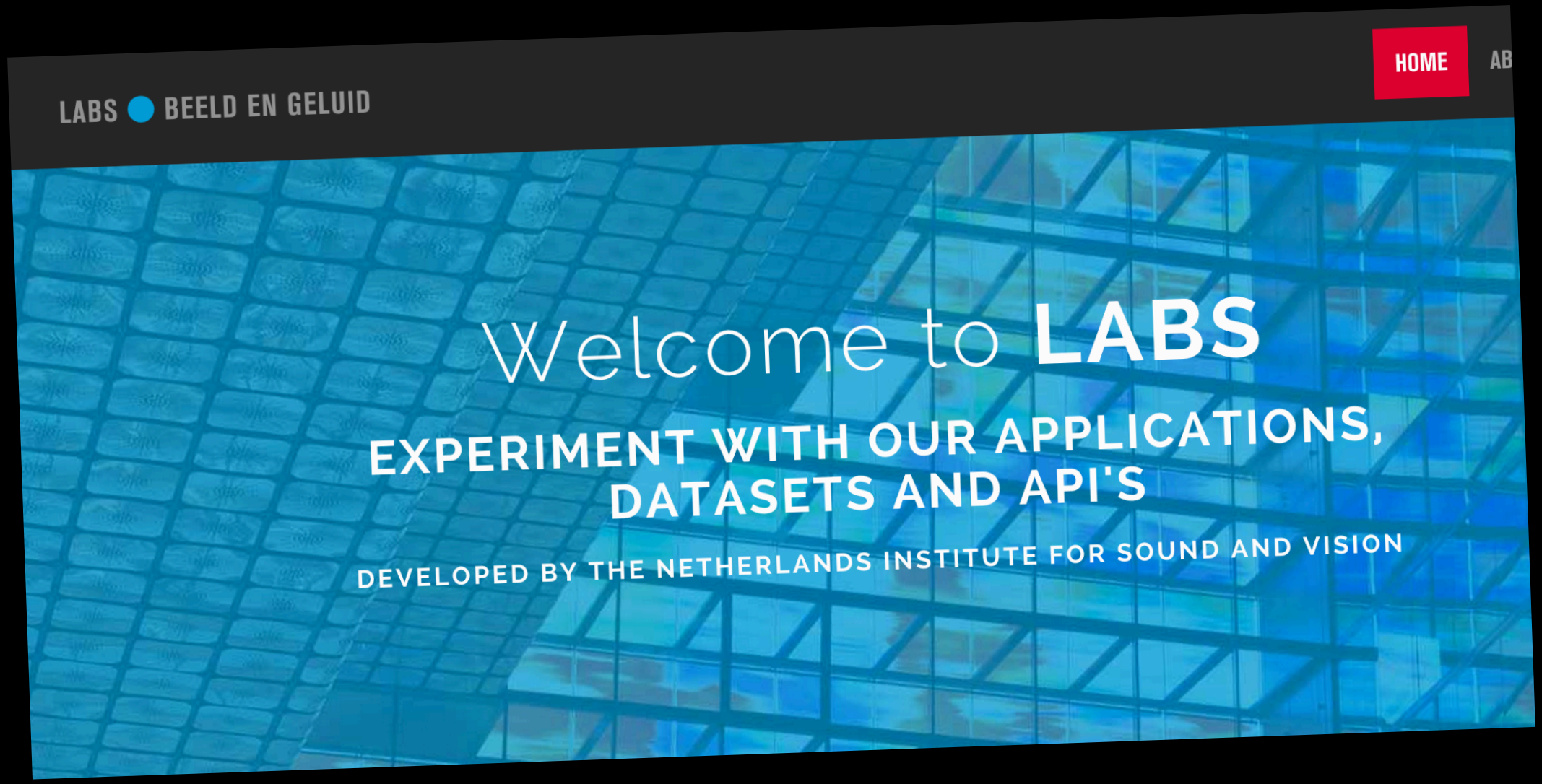
2010

AXES

5000 hrs

2014

2015-2020


LABS BEELD EN GELUID
HOME
AB
Welcome to LABS
EXPERIMENT WITH OUR APPLICATIONS, DATASETS AND API'S
DEVELOPED BY THE NETHERLANDS INSTITUTE FOR SOUND AND VISION