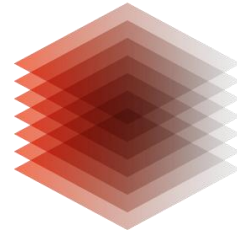

LEIBNIZ-INFORMATIONSZENTRUM
TECHNIK UND NATURWISSENSCHAFTEN
UNIVERSITÄTSBIBLIOTHEK



TIB

Wie kann Künstliche Intelligenz das Lernen mit Videos im Web unterstützen?

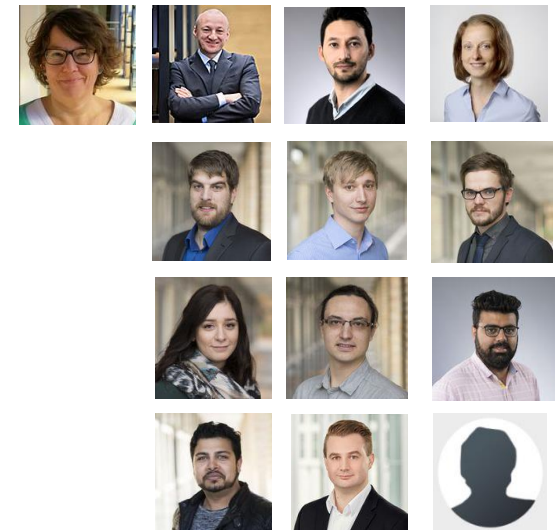
Prof. Dr. Ralph Ewerth
TIB – Forschungsgruppe Visual Analytics

Fachtagung „Künstliche Intelligenz“, Hannover
Agentur für Erwachsenen- und Weiterbildung
06. März 2020

Forschungsgruppe Visual Analytics – Wer wird sind...

Seit 2015 an der TIB, inzwischen

- 2 Postdoktorand*innen
- 10 Doktorand*innen
- 4 studentische Hilfskräfte
- 1 Administrative Fachangestellte



Forschungsschwerpunkte

- Automatische Analyse von Mediendaten
- Multimodale Suche und Bild-Text-Bezüge
- Digitale Bibliothek als virtueller Lernort

Ziele/Aktivitäten/Ergebnisse:

- Transfer von Ergebnissen in TIB-Dienste
- Drittmittelprojekte (EU, DFG, etc.) & Publikationen
- Förderung von wissenschaftlichem Nachwuchs



Auswahl Forschungsprojekte


- **CLEOPATRA:** Sprach-übergreifende Analyse von Nachrichten
- **iOCW:** SlideWiki – Barrierefreiheit für Blinde und Sehbehinderte
- **iART:** Interaktive Suchmaschine für Bilder der Kunstgeschichte
- **VIVA:** Erschließung des Fernseharchivs der ehemaligen DDR
- **SALIENT:** Informelles Lernen im Web mit Multimediadaten



Motivation – Informelles Lernen im Web



Motivation – Eine Suchanfrage im Web...



🔍

Web
Bilder
Neuigkeiten
Videos
Karten
Mehr
🔧 Filter
⚙️ Einstellungen

6.720.000 Suchergebnisse

Inverted index - Wikipedia

https://en.wikipedia.org/wiki/Inverted_index

In computer science, an **inverted index** (also referred to as a postings file or inverted file) is a database index storing a mapping from content, such as words or numbers, to its locations in a table, or in a document or a set of documents (named in contrast to a forward index, which maps from documents to content).

inverted index - LEO: Übersetzung im Englisch ⇌ Deutsch ...

https://dict.leo.org/englisch-deutsch/inverted_index

Lernen Sie die Übersetzung für 'inverted index' in LEOs Englisch ⇌ Deutsch Wörterbuch. Mit Flexionstabellen der verschiedenen Fälle und Zeiten Aussprache und relevante Diskussionen Kostenloser Vokabeltrainer

Inverted Index - GeeksforGeeks

<https://www.geeksforgeeks.org/inverted-index>

An inverted index is an index data structure storing a mapping from content, such as words or numbers, to its locations in a document or a set of documents. In simple words, it is a hashmap like data structure that directs you from a word to a document or a web page. There are two types of inverted

A first take at building an inverted index

https://nlp.stanford.edu/_/htmlmediation/a-first-take-at-building-an-inverted-index-1.html

Index the documents that each term occurs in by creating an inverted index, consisting of a dictionary and postings. We will define and discuss the earlier stages of processing, that is, steps 1-3, in Section 2.2 (page). Until then you can think of tokens and normalized tokens as also loosely equivalent to words.

indexing - What's the difference between an inverted index ...

<https://stackoverflow.com/questions/7727686/whats-the-difference-between-an-inverted...>

Handling updates with the inverted index are expensive in comparison with forward index. Forward index handles updates easily by reflecting the changes only in the corresponding document index, whereas in the inverted index, the same change has to reflect in multiple positions across the inverted index.

Building a simple inverted index using NLTK - NLPFORHACKERS

<https://nlpforhackers.io/building-a-simple-inverted-index-using-nltk>

Building a simple inverted index using NLTK. In this example I want to show how to use some of the tools packed in NLTK to build something pretty awesome. Inverted indexes are a very powerful tool and is one of the building blocks of modern day search engines. While building the inverted index, you'll learn to: 1. Use a stemmer from NLTK 2 ...

Invertierte Datei

Invertierte Dateien werden im Bereich des Information Retrievals als Grundlage für die Durchführung verschiedener Suchanfragen benötigt, beispielsweise für die Suche mit Booleschen Operatoren und Trunkierungen.

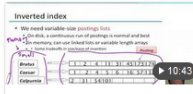
W

Wikipedia


Daten von: Wikipedia
Text unter CC-BY-SA

Feedback


Videos



18.3 The Inverted Index
Stanford NLP Professor Dan Jurafsky & Chris Manning
YouTube



inverted index



Information Retrieval
WS 2017 / 2018
Lecture 1, Tuesday October 17th, 2017
(Introduction, Inverted Index, Zipf's Law)
Prof. Dr. Hans-Joachim Burch
Chair of Algorithms and Data Structures

Information Retrieval WS 17/18, Lecture 1: Introduction, Inverted Index, Zipf's Law

...und evtl. ein Ergebnis davon: Wikipedia & Bildersuche

Von Wikipedia:

“In computer science, an **inverted index** (also referred to as a **postings file** or **inverted file**) is a database index storing a mapping from content, such as words or numbers, to its locations in a table, [...]. A **record-level inverted index** (or **inverted file index** or just **inverted file**) contains a list of references to documents for each word.”

[https://en.wikipedia.org/wiki/Inverted_index]

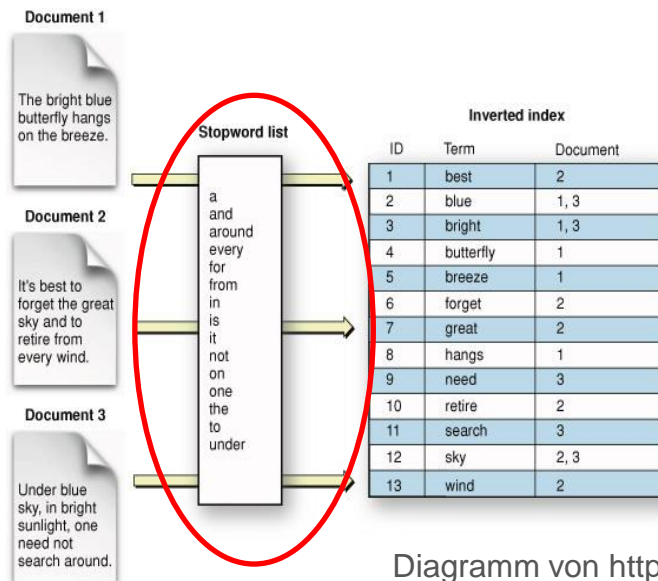
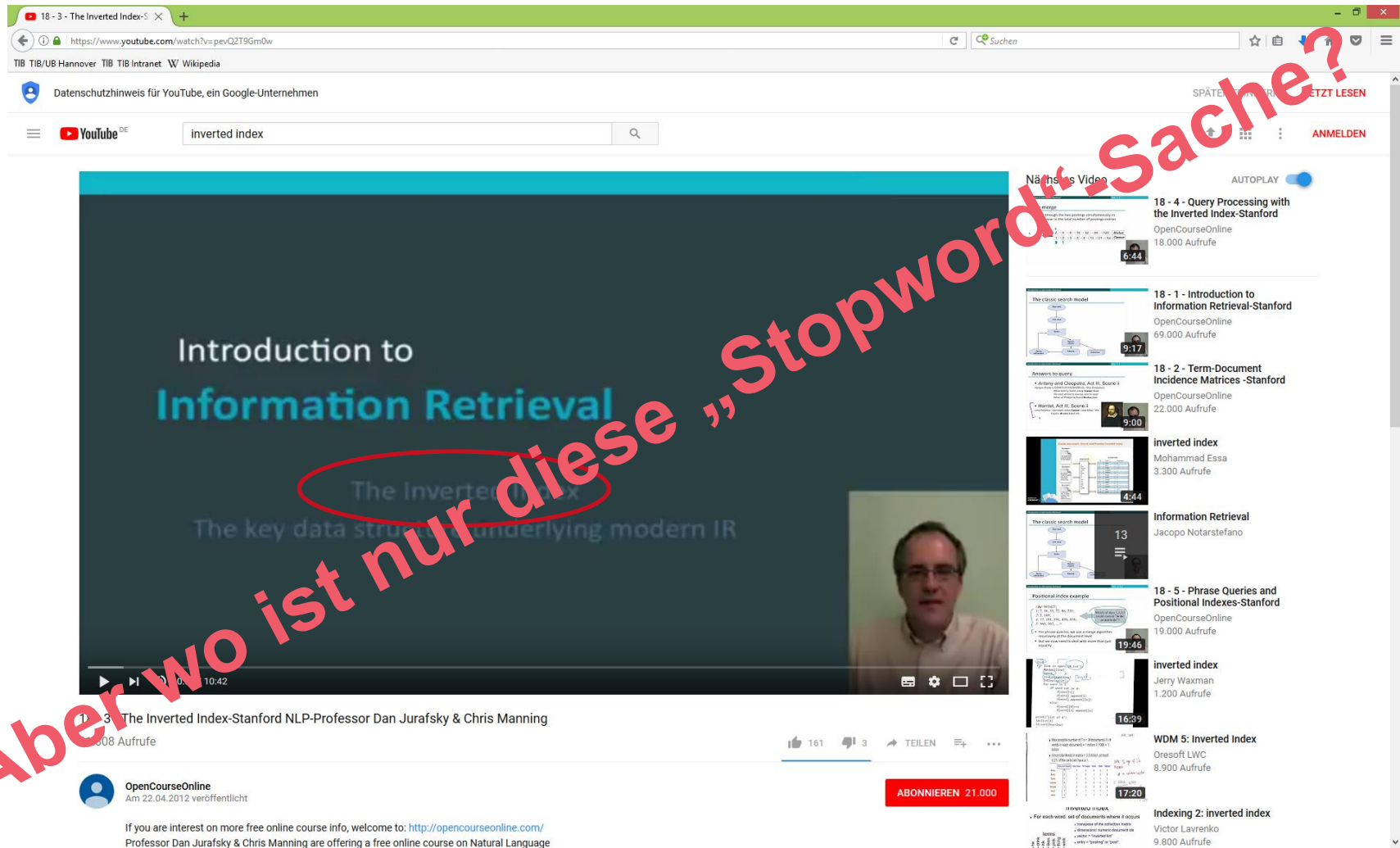


Diagramm von <https://stackoverflow.com>

Weiterlernen im Web – mit YouTube?




The screenshot shows a YouTube video player for the video '18 - 3 - The Inverted Index-5'. The video title is 'Introduction to Information Retrieval' and the content is 'The Inverted Index'. The video is from the channel 'OpenCourseOnline' and has 10,008 views. The video description includes a link to the OpenCourseOnline website and mentions Professor Dan Jurafsky & Chris Manning. The video player shows a progress bar at 10:42. The right sidebar shows a list of related videos, including '18 - 4 - Query Processing with the Inverted Index-Stanford', '18 - 1 - Introduction to Information Retrieval-Stanford', '18 - 2 - Term-Document Incidence Matrices -Stanford', 'Inverted index', 'Information Retrieval', '18 - 5 - Phrase Queries and Positional Indexes-Stanford', 'Inverted index', and 'WDM 5: Inverted Index'. A red watermark 'Aber wo ist nur diese Stopword-Sache?' is overlaid diagonally across the video frame, with a red circle around the text 'The Inverted Index' in the video player.

“18 3 The Inverted Index Stanford NLP Professor Dan Jurafsky & Chris Manning YouTube”
 Quelle: <https://www.youtube.com/watch?v=bnP6TsqyF30>

Lernen im Web mit dem TIB AV-Portal?

Watchlist
Contact
Deutsch
Login



SUBJECTS
PUBLISHER
UPLOAD
ABOUT

Search

Refine your search 1-12 out of 1983 results

Subject ▲

Information technology (1228)

Mathematics (310)

Chemistry (262)

> show more

Change view ▼

Sort by: Relevance Title Release Date


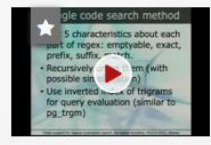


Language ▲

English (1696)

German (282)

Silent film (4)

> show more

<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;">  <p>Indexing [27.4.2011]</p> <p>⌚ 2:12:18</p> <p>Technische Universität Braunschweig, Institut für ...</p> <p>English 2011</p> <p>Found in: 67 1 87</p> <p style="text-align: center;">👁 Preview</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;">  <p>Index support for regular expression search</p> <p>⌚ 54:51</p> <p>PGCon - PostgreSQL Conference for Users and Developers, Andri...</p> <p>English 2012</p> <p>Found in: 19 8 106</p> <p style="text-align: center;">👁 Preview</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;">  <p>Elasticsearch from the bottom up</p> <p>⌚ 36:53</p> <p>EuroPython</p> <p>English 2014</p> <p>Found in: 45 37 2</p> <p style="text-align: center;">👁 Preview</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;">  <p>OIB.1 Formales zur Mathe-Veranstaltung: Videos, Skrip...</p> <p>⌚ 22:29</p> <p>Loviscach, Jörn</p> <p>German 2012</p> <p>Found in: 1 1</p> <p style="text-align: center;">👁 Preview</p> </div>
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Seite 9

< Back to results list

1 out of 1983 results >



Indexing (27.4.2011)



ifis
Institut für Informationssysteme
Technische Universität Braunschweig

Information Retrieval and Web Search Engines

Lecture 4: Indexing
April 27, 2010

Wolf-Tilo Balke and Joachim Selke
Institut für Informationssysteme
Technische Universität Braunschweig

1/66

00:00:10 | 02:12:18

Citation of segment

Embed Code

```
<iframe width="560" height="315" scrolling="no" src="//av.tib.eu/player/362" frameborder="0" allowfullscreen>
</iframe>
```

Automated Media Analysis ! BETA

Recognized Entities Speech transcript

Speech Text in the video Image content

00:00

- Information retrieval
- Query language
- Bit
- Insertion loss
- Number
- Cartesian coordinate system
- Term (mathematics)
- Computer animation
- Home page
- Energy level
- Demoscene
- Network topology
- Scientific modelling
- Web 2.0
- Search engine (computing)
- Information retrieval
- Installation art
- Disk read-and-write head
- Internetworking
- Subject indexing
- Inverse problem
- Mass
- Ocean current
- Electronic mailing list
- Inverter (logic gate)
- Maize
- Computer file
- Subject indexing
- Word
- Information
- Inverter (logic gate)



Indexing (27.4.2011)

Filtration

TOKENIZATION

y2k around the world
computers over the
world switched to 2000 few
y2k bugs were reported in
several labs [...]

➔

FILTRATION

y2k world computers world
switched 2000 y2k bugs
reported labs [...]

- Removal of **stop words!**
- **Stop words:**
Extremely common words, which are of little value in selecting which documents match a user's query
- **Examples:** a, an, and, are, as, at, be, by, for, from, has, he, in, is, it, its, of, on, that, the, to, was, were, which, will, with

16/86 16

be or not to be?"

Level and Web Search Engines — Wolf-Tilo Balke and Joachim Selke — Technische Universität Braunschweig

Citation of segment

Embed Code

```
<iframe width="560" height="315" scrolling="no" src="//av.tib.eu/player/362" frameborder="0" allowfullscreen>
</iframe>
```

Automated Media Analysis !

BETA

Recognized Entities

Speech transcript

Speech

Text in the video

Image content

Social class

Rule of inference

34:28

Query language

Maize

System programming

Computer

Chi-squared distribution

37:51

Domain name

Heuristic

Computer

Maxima and minima

Strategy game

Latent heat

Computer

Statistics

Quicksort

Subject indexing

Process (computing)

Data compression

Context awareness

System programming

Electronic mailing list

Formal grammar

Frequency

Rule of inference

Form (programming)

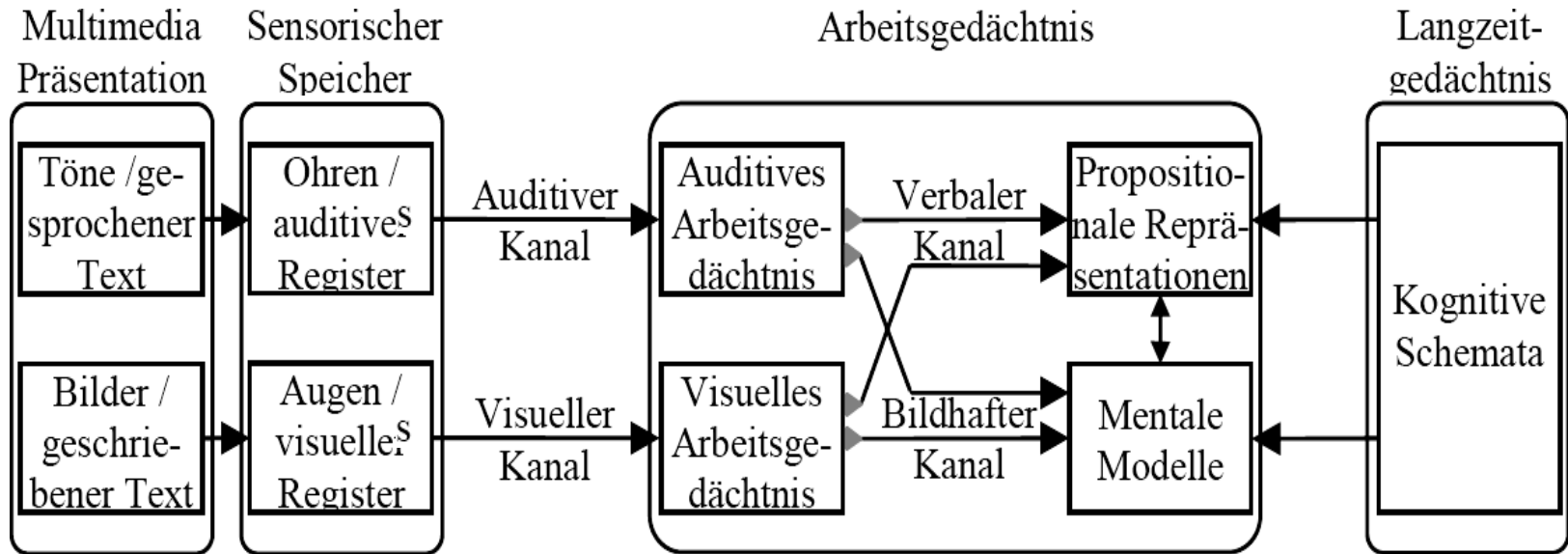
Formal language

Erkenntnisse zum multimodalen Lernen



Kognitive Theorie(n) zum Multimedialernen

„Television is easy, print is tough“ (Salomon 1984)



Schnotz 2011

Propositionale Repräsentationen: „...grundlegende Informationseinheiten, die aus einem Prädikat und einem oder mehreren Argumenten bestehen, wobei diese durch das Prädikat in Beziehung gesetzt werden (z. B. ESSEN[handelnde Person: STUDENT, Zeit: MITTAG, Ort: MENSA]).“

[https://de.m.wikipedia.org/wiki/Datei:Cognitive_Theory_of_Multimedia_Learning_\(Mayer,_2005\).png](https://de.m.wikipedia.org/wiki/Datei:Cognitive_Theory_of_Multimedia_Learning_(Mayer,_2005).png)

<https://creativecommons.org/licenses/by-sa/3.0/deed.de> (CC-by 3.0)

Bildquelle 2: http://www.elearning-psychologie.de/integratives_modell_schnotz_ii.html

„Split-Attention-Effekt“

Theorie der kognitiven Belastung (cognitive load theory, Sweller et al. 1991)

„Wenn man spezielle Aufmerksamkeit aufwenden muss, um eine Abbildung dem zugehörigen Text zuzuordnen, dann fehlt diese Aufmerksamkeit bei der Auseinandersetzung mit den Lerninhalten.“ (Lehner 2018, S. 107)

<p>Es gilt, zwei Alternativen zu vergleichen. Zu diesem Zwecke werden diese Alternativen anhand von zuvor bestimmten Kriterien eingeschätzt. Jedes Kriterium hat eine Gewichtung G, die zwischen 1 (= weniger ausgeprägt wichtig) und 4 (= sehr wichtig) liegt. Jede Alternative wird mit einer Bewertung B, die zwischen 1 (= gering ausgeprägt) und 4 (= stark ausgeprägt) liegt, eingeschätzt. Dann ermittelt man das Produkt P aus Gewicht und Bewertung: $P = G \times B$. Die Werte für die einzelnen Alternativen werden dann aufsummiert.</p>	Neukunden gewinnen			Angebot ausweiten		
	G	B	P	G	B	P
Kompetenzen vorhanden	3	4	12	3	4	12
kostengünstig	4	3	12	4	3	12
in kollegiale Netze einbindbar	1	3	3	1	4	4
geringer zeitlicher Aufwand	3	2	6	3	3	9
familienverträglich	2	1	2	2	3	6
SUMME			35			43

Informationssuche mit Videos

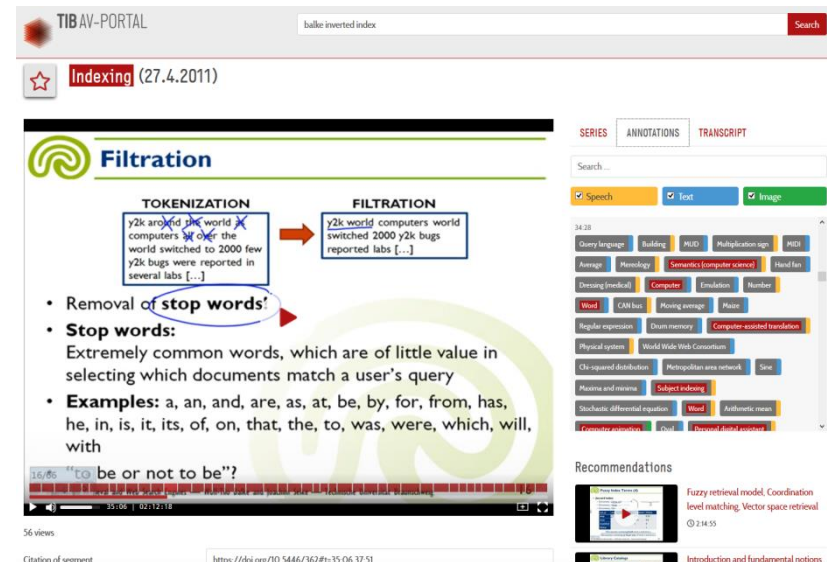
Interaktive Bedienelemente

- Play / Stop
- Kapitelstruktur / Inhaltsverzeichnisse
- Register

Einfache Suche: Informationssuche unterstützt durch interaktive Verzeichnisse (Merkt & Schwan 2014a, 2014b)

Komplexere Aufgaben:

- Engerer Suchhorizont durch Verzeichnisse und Register (Merkt et al. 2011)
- Training führt zu umfassenderer Informationserschließung (Merkt & Schwan 2014a)



The screenshot shows the TIB AV-Portal interface. At the top, there is a search bar with the text "balle inverted index" and a "Search" button. Below the search bar, there is a star icon and the text "Indexing (27.4.2011)". The main content area is titled "Filtration" and features a diagram illustrating the process of tokenization and filtration. The diagram shows a text box on the left with the text "y2k avoided the world computers over the world switched to 2000 few y2k bugs were reported in several labs [...]" and a text box on the right with the text "y2k world computers world switched 2000 y2k bugs reported labs [...]". An arrow points from the left box to the right box. Below the diagram, there is a list of bullet points:

- Removal of **stop words!**
- **Stop words:** Extremely common words, which are of little value in selecting which documents match a user's query
- **Examples:** a, an, and, are, as, at, be, by, for, from, has, he, in, is, it, its, of, on, that, the, to, was, were, which, will, with

 At the bottom of the video player, there is a progress bar and the text "be or not to be?". To the right of the video player, there is a search interface with a search bar and several filters. The filters include "Speech", "Text", and "Image". Below the filters, there is a list of tags such as "Query language", "Building", "MUD", "Multiplication sign", "PDI", "Average", "Phenology", "Semantics (computer science)", "Hand fan", "Densifying binoculars", "Computer", "Emulation", "Number", "Word", "Call bus", "Moving average", "Matrix", "Regular expression", "Brain memory", "Computer-assisted foundation", "Physical systems", "World Wide Web Consortium", "Chi-squared distribution", "Metropolitan area network", "Sine", "Plasma and retrace", "Subject indexing", "Stochastic differential equation", "Word", "Arithmetic mean", "Commutative law", "Euler", "Personal digital assistant". Below the search interface, there is a "Recommendations" section with a video player and the text "Fuzzy retrieval model, Coordination level matching, Vector space retrieval @ 2:14:55". At the bottom of the page, there is a "Citation of segment" section with the URL "https://doi.org/10.5446/362#t=35:06:37:51".

Optimierung der kognitiven Verarbeitung

Nach Theorie des Multimedialernens (beide Kanäle kapazitive Grenzen)

- **Dual-Coding-Prinzip:**
Text und Bild **besser als** Text
- **Modalitätsprinzip:**
Gesprochener Text & Bild **besser als** geschriebener Text und Bild

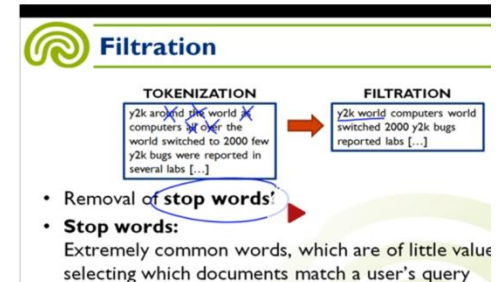
Flüchtigkeit der Information

- Videos erfordern kontinuierliche Aufmerksamkeit
- Visuelle Hinweisreize helfen

Sprachliche Referenzierung (Glaser & Schwan 2015)

- Bilder mit verbaler Referenzierung wurden besser erinnert
- Längere Fixationszeiten für benannte Bildelemente

Glaser, M., & Schwan, S. (2015). Explaining pictures: How verbal cues influence processing of pictorial learning material. *Journal of Educational Psychology*, 107(4), 1006–1018. <https://doi.org/10.1037/edu0000044>



Weitere Gestaltempfehlungen – MOOC Settings

Finding	Recommendation
Shorter videos are much more engaging.	Invest heavily in pre-production lesson planning to segment videos into chunks shorter than 6 minutes.

Table 1. Summary of the main findings and video production recommendations that we present in this paper.

Aus: Guo, Philip J., Juho Kim, and Rob Rubin. "How video production affects student engagement: An empirical study of MOOC videos." *Proceedings of the first ACM conference on Learning@ scale conference*. ACM, 2014.

Gestaltungsprinzipien von Lernvideos (nach Merkt, 2015 sowie Guo et al. 2014)

Basierend auf wissenschaftlichen psychologischen Erkenntnissen

- Einfacher Zugriff auf Inhalte
- Optimierung der kognitiven Verarbeitung
- Personalisierung und Sichtbarkeit des Lehrenden
- **Kameraperspektive** in Lehr-Lern-Videos
-> **Ich-Perspektive besser** für das Zeigen **prozeduraler Handlungen**

SALIENT – Informelles Lernen im Web

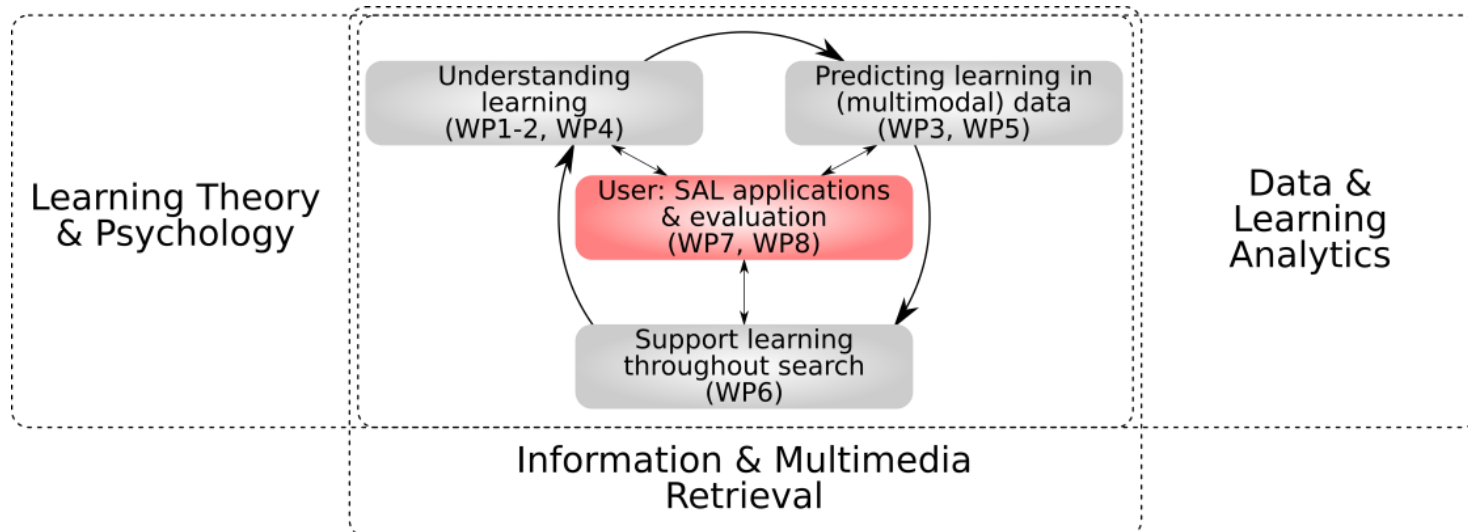


SALIENT – Search as learning



Search as Learning – Investigating, Enhancing, and Predicting Learning during Multimodal Web Search

- Leibniz-Wettbewerb „Kooperative Exzellenz“ (2018 – 2021), Partner:
 - IWM Leibniz-Institut für Wissensmedien, Tübingen
 - GESIS Leibniz-Institut für Sozialwissenschaften, Köln
 - Forschungszentrum L3S, Hannover



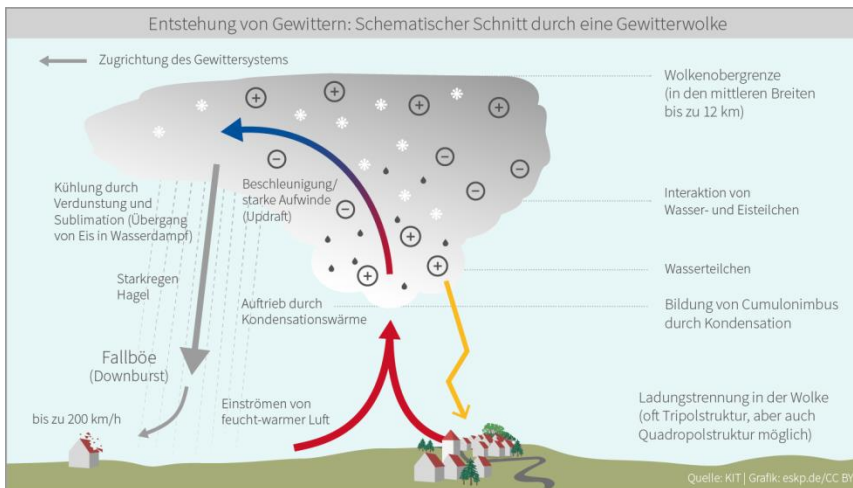
SALIENT: Erste Studien

Erste Studie (durchgeführt am IWM) mit 114 Teilnehmer/innen

Aufgabe: „Wie entstehen Blitz und Donner?“

Relevante Konzepte:

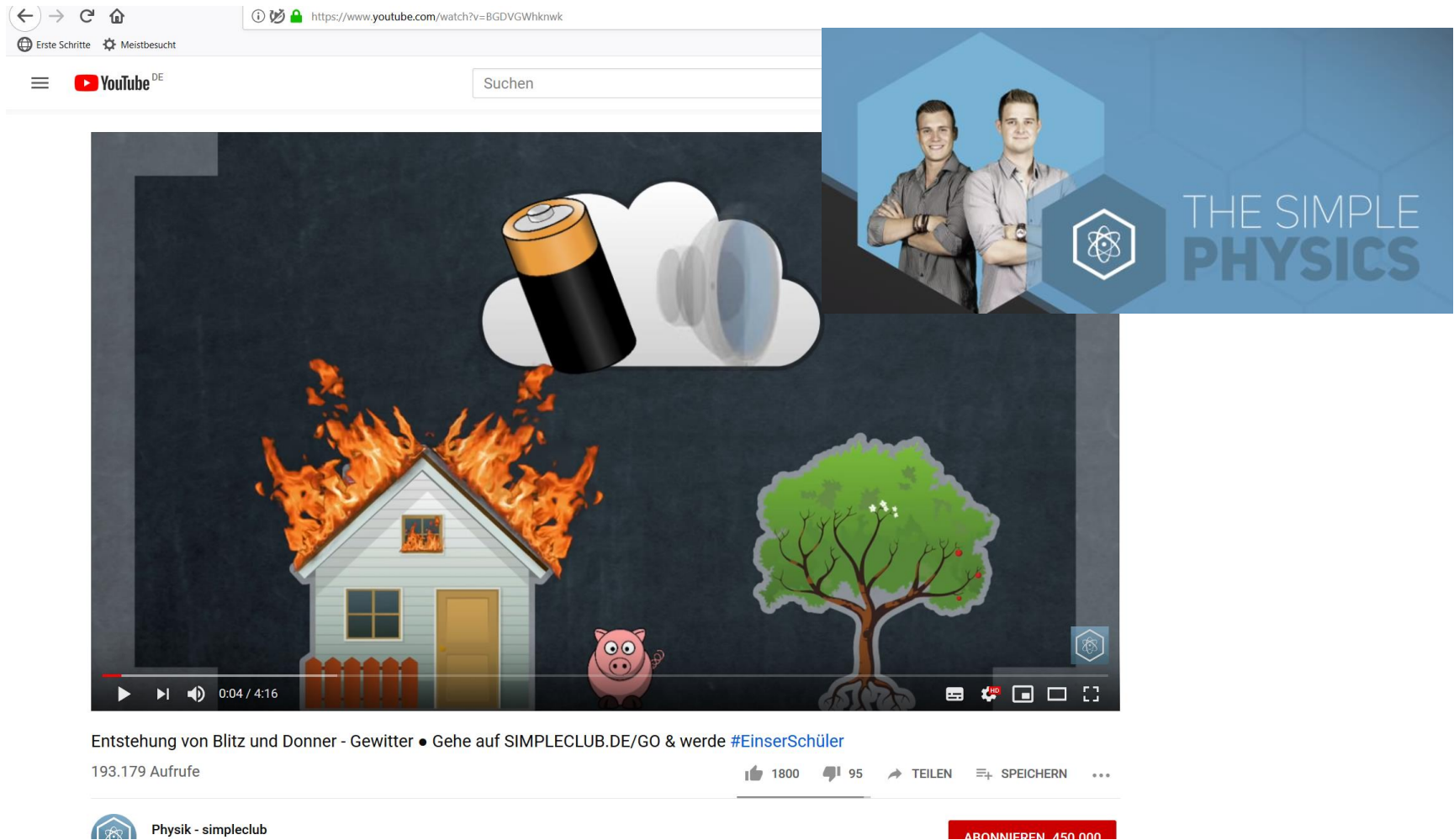
Formation Gewitterwolke, Elektrische Aufladung, Blitz, etc.



Von Helmholtz-Wissensplattform "Erde und Umwelt", ESKP –
<https://www.eskp.de/charakteristik-und-entstehung-von-gewitterstuermen/>, CC-BY 4.0,
<https://commons.wikimedia.org/w/index.php?curid=50096272>

Eines der ausgewählten Videos

<https://www.youtube.com/watch?v=BGDVGWhknwk>



The image shows a screenshot of a YouTube video player. The browser address bar at the top displays the URL <https://www.youtube.com/watch?v=BGDVGWhknwk>. The YouTube interface includes a search bar with the text "Suchen" and the YouTube logo. The video player itself shows a scene with a house on fire, a pig, and a tree. A large battery icon is superimposed over a cloud in the upper part of the video frame. In the top right corner of the video player, there is a blue banner for "THE SIMPLE PHYSICS" featuring two men and a hexagonal logo with an atom symbol. The video progress bar at the bottom indicates a duration of 0:04 / 4:16. Below the video player, the video title "Entstehung von Blitz und Donner - Gewitter" is visible, along with a link to "SIMPLECLUB.DE/GO" and the hashtag "#Einserschüler". The video has 193,179 views, 1,800 likes, and 95 comments. The channel name "Physik - simpleclub" is shown at the bottom left, and a red "ABONNIEREN 450.000" button is at the bottom right.

SALIENT: Erste allgemeine Ergebnisse

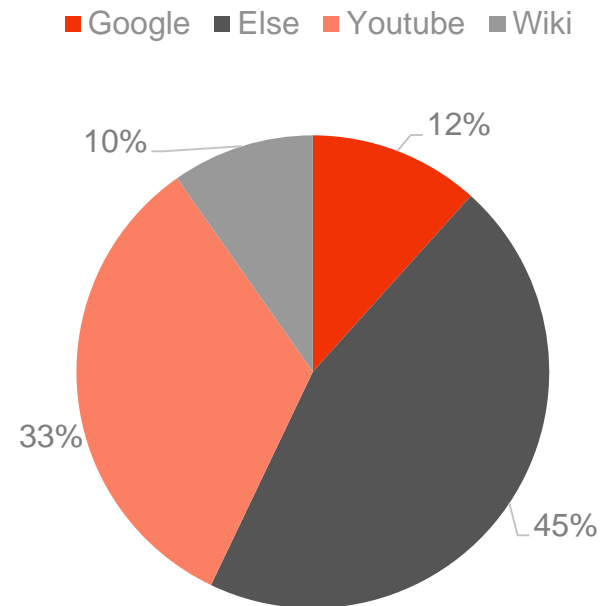
Erste Studie (durchgeführt am IWM)

Lernen mit dem Web: Wie entstehen Blitz und Donner?

Wo und wie lange suchten Teilnehmer*innen:

- | | |
|------------------|----------|
| 1. Übrige Seiten | 12,3 min |
| 2. YouTube: | 8,5 min |
| 3. Google: | 2,5 min |
| 4. Wikipedia: | 2,3 min |

Insgesamt durchschnittlich 25,6 min



SALIENT: „False-Certainty-Effekt“

Dunning Kruger Effekt (Kruger & Dunning, 1999)

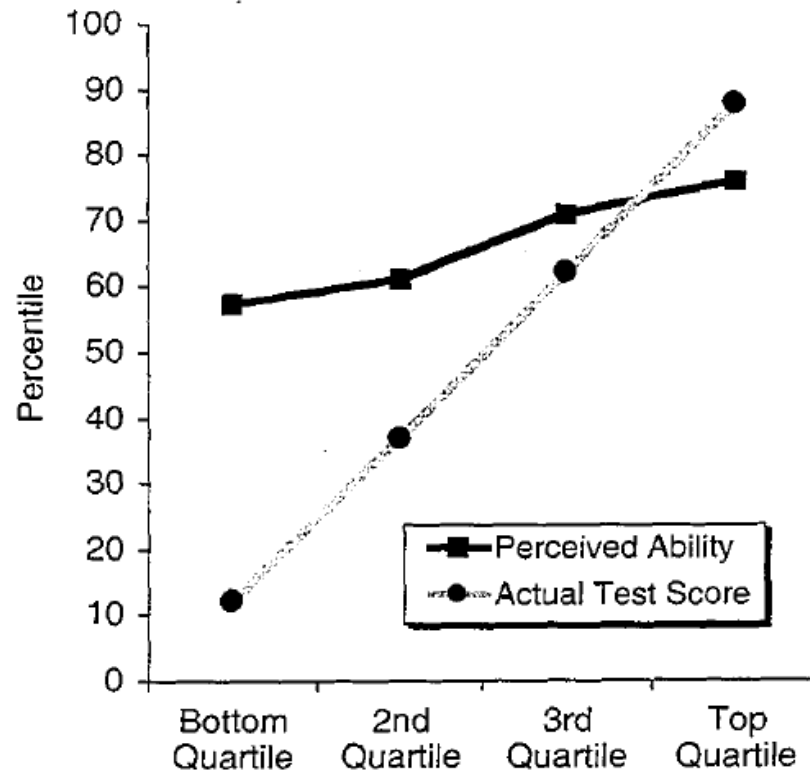


Figure 1. Perceived ability to recognize humor as a function of actual test performance (Study 1).

False-Certainty-Effekt?

Durchschnittliche Konfidenz für richtige **bzw. falsche** Antworten

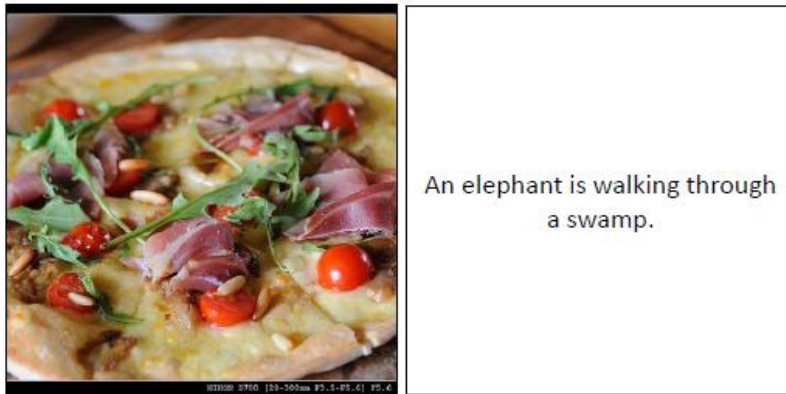


SALIENT – Cross-modale Bezüge

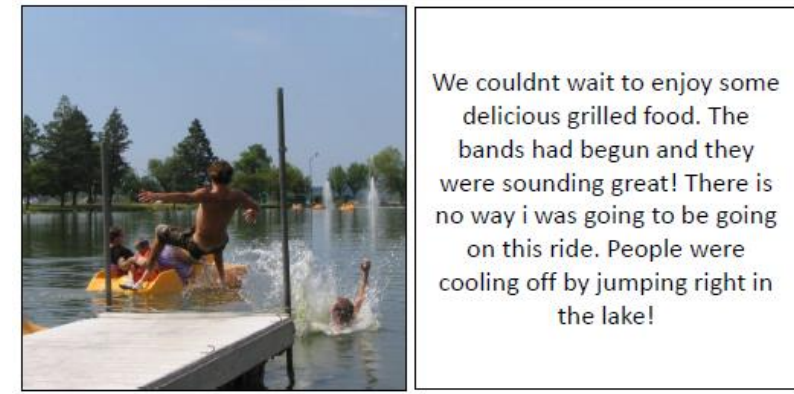


Semantische Bild-Text-Bezüge

Unkorreliert (cmi=0, sc=0,stat=0):



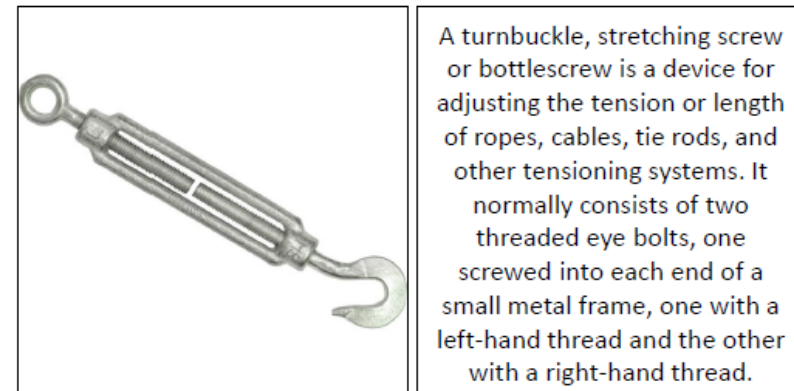
Ergänzend (cmi=1, sc=1,stat=0)



Interdependent (cmi=0, sc=1,stat=0):

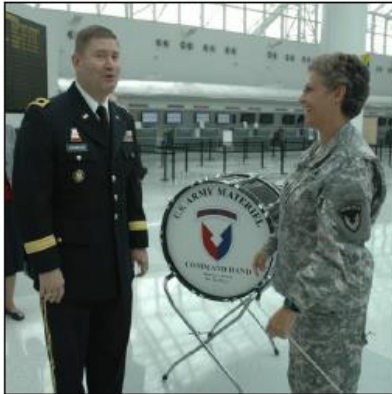


Illustration (cmi=1, sc=1,stat=T):



Semantische Bild-Text-Bezüge

Anker (cmi=1, sc=1,stat=Bild)



A man in dress uniform talks with a woman wearing camouflage.

Kontrast:(cmi=1, sc=-1,stat=0)



Here were so **few** people walking and talking on their phones. It was fun to see the **brown** costumes that patrons were wearing. My sister and his **enemy** marched in the parade. Me and my brother wore funky **purple** hats in honor of the Irish holiday.

Illustration (widersprüchlich):
(cmi=1, sc=-1,stat=T)



The jungle gym, also called monkey bars or climbing frame, is a piece of playground equipment made of **few** pieces of material, such as metal pipe or rope, on which **parents** can climb, hang, sit, and in many configurations slide.

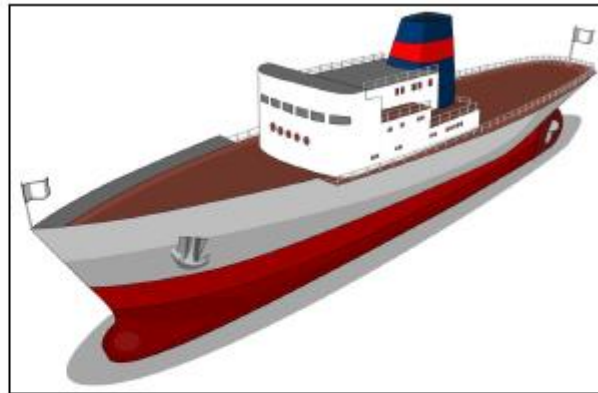
Anker (widersprüchlich):
(cmi=1, sc=-1,stat=B)



A **woman** is posing with two people dressed **down** as stormtroopers.

Differenzierterer Blick auf Illustrationen

Weitere neue Metrik: **Relativer Abstraktionsgrad**



A ship is a large watercraft that travels the world's oceans and other sufficiently deep waterways, carrying passengers or goods, or in support of specialized missions, such as defense, research and fishing.

TIB AV Portal <https://av.tib.eu>

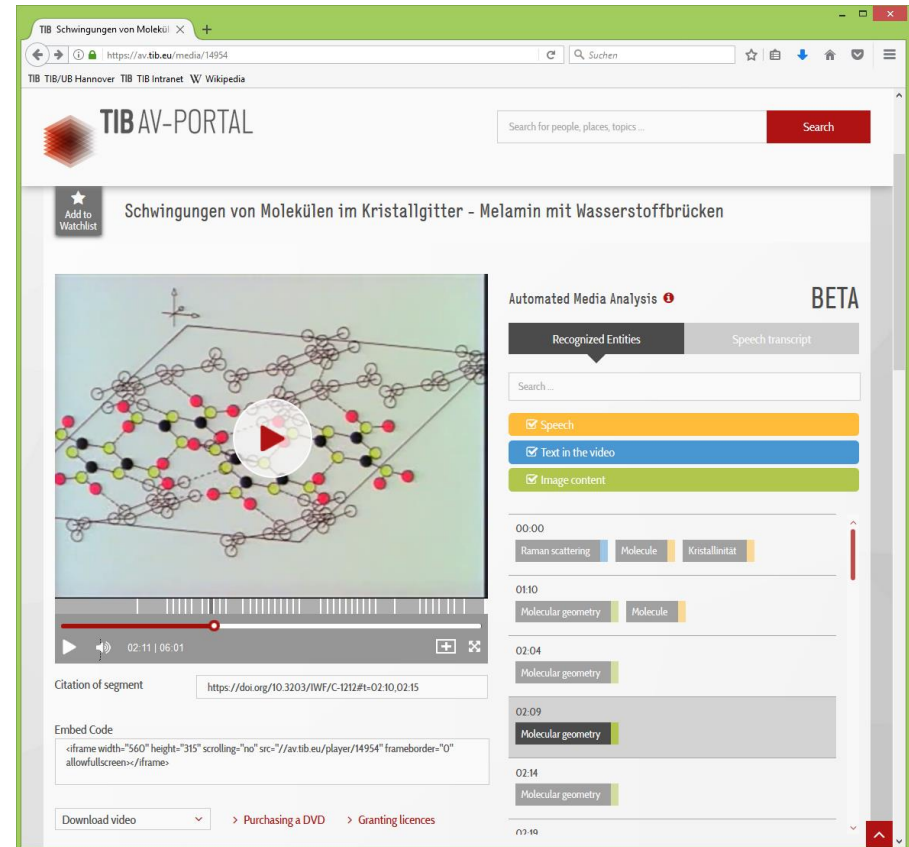
Semantische Suche im TIB AV-Portal

Automatische Videoanalyse

- Spracherkennung
- Video OCR
- Visual concept detection (VCD)

Examples for VCD:

- 12533 (Agricultural machinery)
- 14956 (Chemical experiment)
- 14954 (Molecular geometry)
- 12793 (Rocket)
- 12858 (Satellite)
- 11539 (Water transport)
- 12775 (Motor vehicle)
- 16154 (Indoor)



The screenshot displays the TIB AV-Portal interface. The main content area features a video player titled "Schwingungen von Molekülen im Kristallgitter - Melamin mit Wasserstoffbrücken". The video player shows a 3D molecular model with a play button in the center. Below the video player, there is a citation of the segment: <https://doi.org/10.3203/WWF/C-1212#t=02:10.02:15>. An embed code is also provided.

On the right side, there is an "Automated Media Analysis" sidebar. It includes a search bar, a "Recognized Entities" section, and a list of detected entities with their corresponding time segments:

- 00:00: Raman scattering, Molecule, Kristallgitter
- 01:10: Molecular geometry, Molecule
- 02:04: Molecular geometry
- 02:09: Molecular geometry
- 02:14: Molecular geometry
- 02:19: Molecular geometry

The sidebar also includes a "Speech transcript" tab and a "BETA" label.

Liste von Konzepten

Universe, Astronomical object, Star, Galaxy, Gas giant, Nebula, Terrestrial planet, Asteroid, Black hole, Aerospace engineering, Spacecraft, Rocket, Artificial satellite, Interior space, Facade, Building, City, Bridge, Power station, Hydraulic engineering, Conceptual model, Software, Source code, JSON, XML, UML, Plant, Bacteria, Virus, Amphibian, Arachnida, Bird, Crustacea, Fish, Insect, Mammal, Mollusca, Reptile, Chemical compound, Chemical experiment, Atom, Atomic_model, Molecular geometry, Elementary particle, Laser, Magnet, Physics experiment, Particle, Pendulum, Visualization, Computer animation, Engineering drawing, Diagram, Drawing, Table, Program flowchart, Map, Lecture/Conference, Meeting/Interview, Panel painting, Aerial photography, Satellite imagery, Machine, Motor vehicle, Aircraft engineering, Helicopter, Railroad, Agricultural machinery, Water transport, Electronic component, Transformer, Computer, Turbine

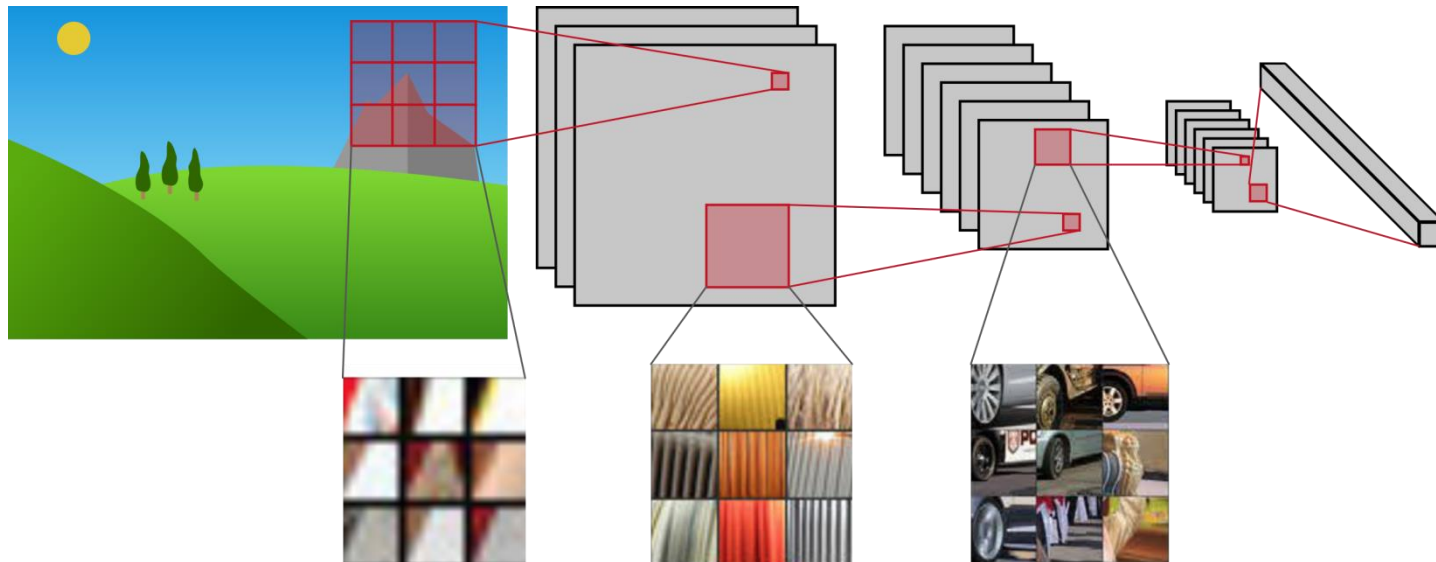
Liste von Konzepten

Universe, Astronomical object, Star, Galaxy, Gas giant, Nebula, Terrestrial planet, **Asteroid**, Black hole, Aerospace engineering, **Spacecraft**, Rocket, Artificial satellite, Interior space, Facade, **Building**, City, **Bridge**, Power station, Hydraulic engineering, Conceptual model, Software, **Source code**, JSON, **XML**, **UML**, Plant, Bacteria, Virus, Amphibian, Arachnida, Bird, Crustacea, Fish, Insect, Mammal, Mollusca, Reptile, Chemical compound, **Chemical experiment**, Atom, Atomic_model, Molecular geometry, Elementary particle, Laser, Magnet, Physics experiment, Particle, Pendulum, Visualization, Computer animation, Engineering drawing, **Diagram**, **Drawing**, Table, Program flowchart, **Map**, **Lecture/Conference**, Meeting/Interview, Panel painting, Aerial photography, Satellite imagery, Machine, Motor vehicle, Aircraft engineering, Helicopter, Railroad, Agricultural machinery, **Water transport**, Electronic component, Transformer, **Computer**, Turbine

Von der Forschung zum Betrieb: Konzeptdetektion im AV-Portal

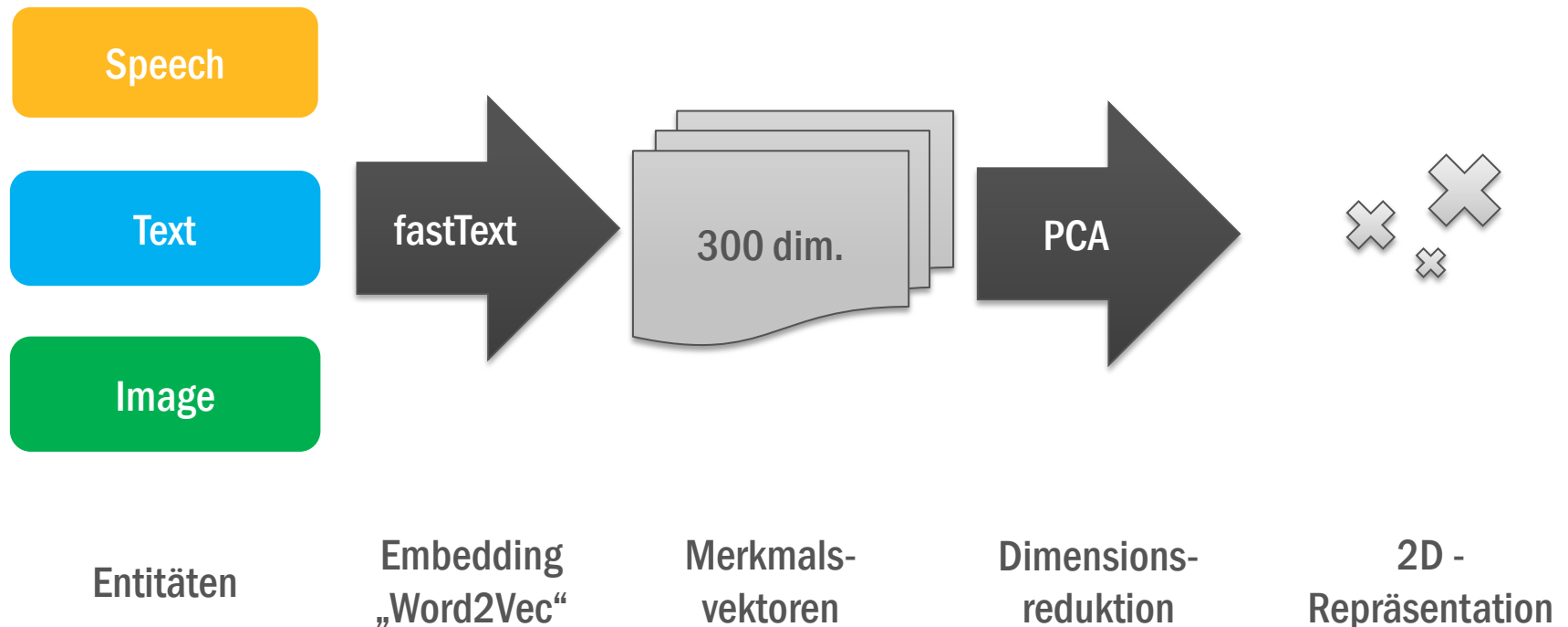
Neue Konzeptdetektion mit Web-überwachtem Lernen realisiert

- 73 visuelle Konzepte für TIB-Fächer
- 50.000 Bilder mit Googles Bildersuche als Trainingsdaten gesammelt
- Inception-Resnet-v2 Netzwerkarchitektur (Google)
- Vortrainiert mit 1 Million Bilder

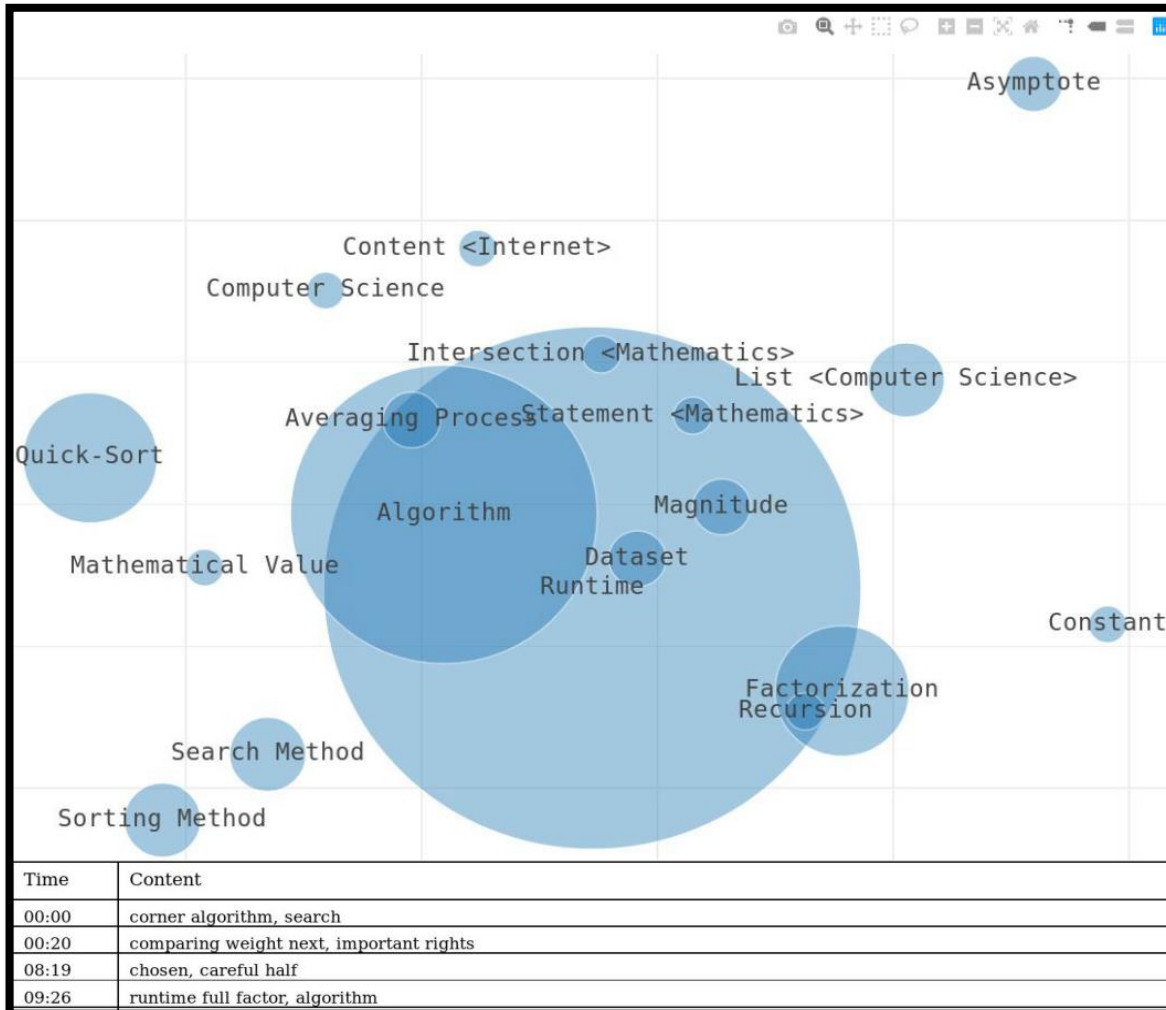


Visuelle Inhaltsverzeichnisse für Videos

Erstellung einer 2D-Repräsentation der wichtigsten Entitäten im Video



Visuelle Inhaltsverzeichnisse für Videos



<https://av.tib.eu/media/9557>

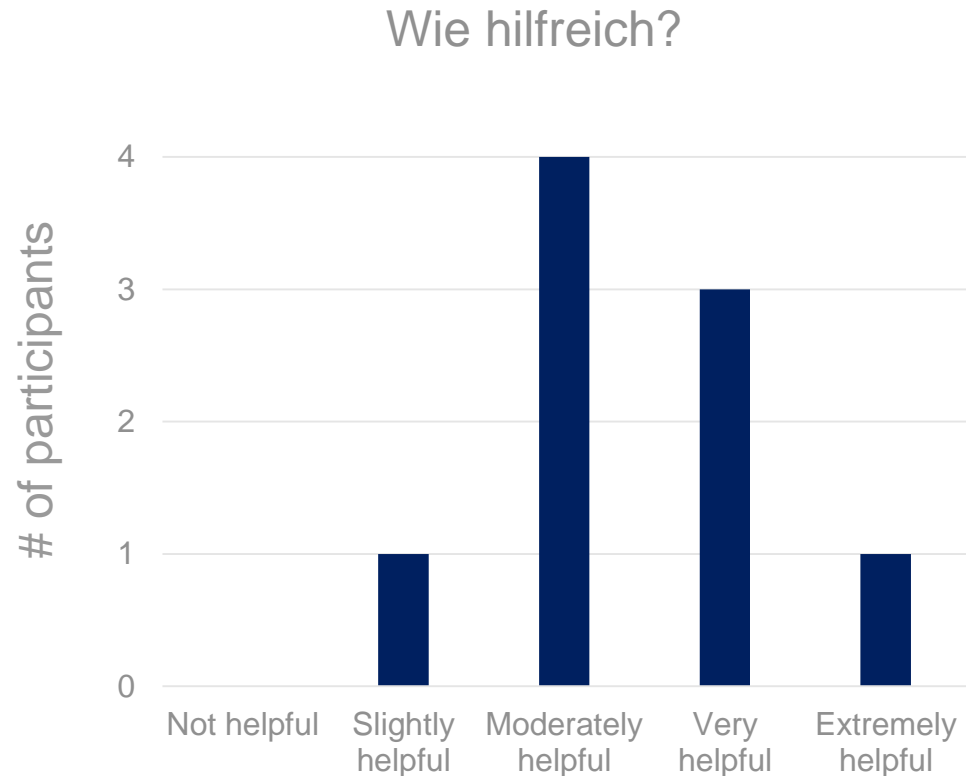
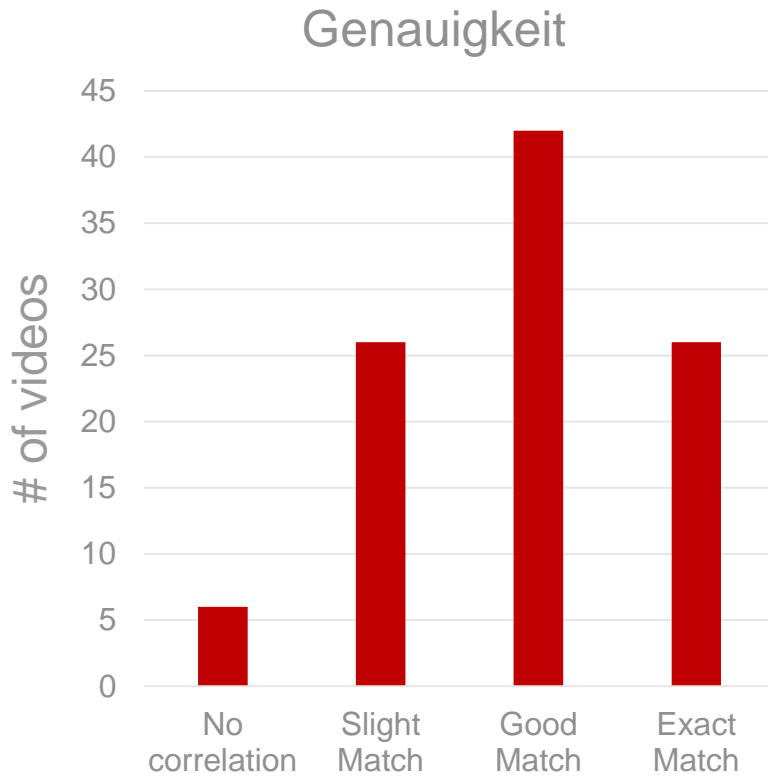
Visualization: *Plot.ly* API

Size of Bubble: entity frequency

Distance: semantic similarity

Table: keyphrases by segment

Experimentelle Ergebnisse



- 68% der Visualisierungen sind eine gute (oder besser) Inhaltsbeschreibung
- 6% korrelieren nicht

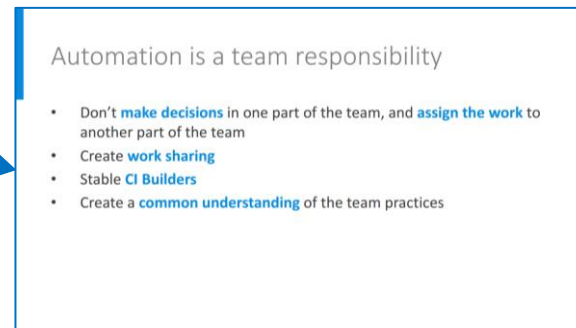
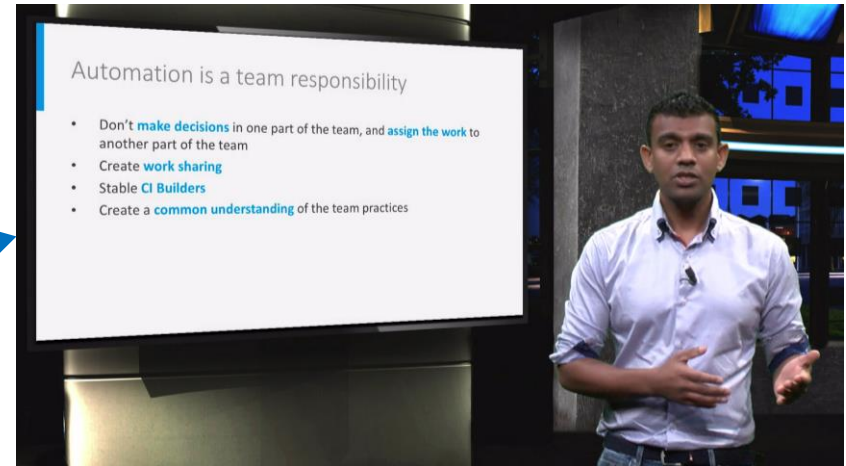
SALIENT – Qualitätsbewertung von Lehrvideos

Qualitätsbewertung von Lehrvideos

Lehreinheit „Softwareengineering“:
23 Lektionen

Zu jeder Lektion


- Video
- Folien
- Transkripte



Zeitintervall (Δt = einige Sek.)
„Another important thing you should not do, is to make decisions in one part of the team“

Qualitätsbewertung von Videos

Audio



Grundfrequenz	Lautstärke
Harmonie	...

Sprache



Sprechgeschwindigkeit

Visuell



Überschrift

Information Retrieval (IR) bedeutet Information abzurufen. Das Fachgebiet beschäftigt sich mit computergestütztem




Hervorhebung

Detaillierungsgrad

Abdeckung von Folieninhalten

Korelationsanalyse

Automatisch extrahierte Merkmale	Manuell annotierte Merkmale	Korrelation	Kommentar
Grundfrequenz	Klare Sprache	0,60	Repräsentation der klaren Sprache in verschiedenen Aspekten
Lautstärke		0,43	
Harmonie		0,43	
Artikulationsrate	Füllwörter	0,46	<ul style="list-style-type: none"> • Anzahl Füllwörter • Anzahl gesprochener Silben
Varianz von Detailierungsgrad	Detailierung	0,38	Repräsentation der modalitätsübergreifenden Wahrnehmung

Zusammenfassung

Forschungsschwerpunkte der Gruppe Visual Analytics

Informelles Lernen mit Videos im Web

Forschungsprojekt **SALIENT**

Erste Ergebnisse

- Psychologische Perspektive
- Cross-modale Bild-Text-Bezüge
- Visuelle Inhaltsverzeichnisse von Videos
- Qualitätsbewertung von Videos

Berichterstattung über Forschungsgruppe

Geolocation – Schätzung des Aufnahmeorts

- Bericht in  Heise Magazine |  (<https://www.heise.de/ct/>)
- Exponat auf **MS Wissenschaft** 2019 😊



MS Wissenschaft – das schwimmende Science Center (<https://ms-wissenschaft.de>)

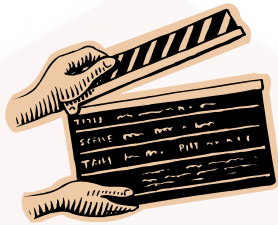
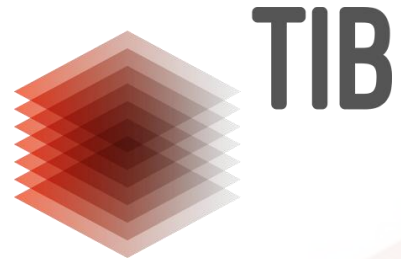
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Vielen Dank für Ihre Aufmerksamkeit!

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