

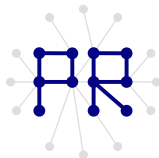
Multimedia Retrieval

1 Introduction

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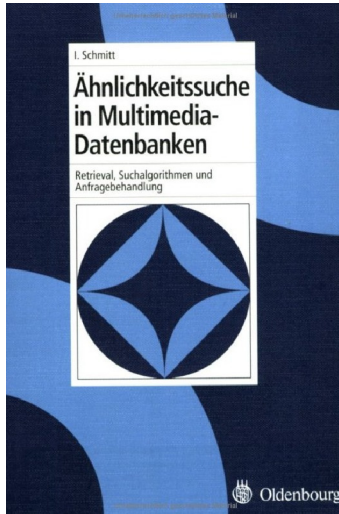


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Concept

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Literature

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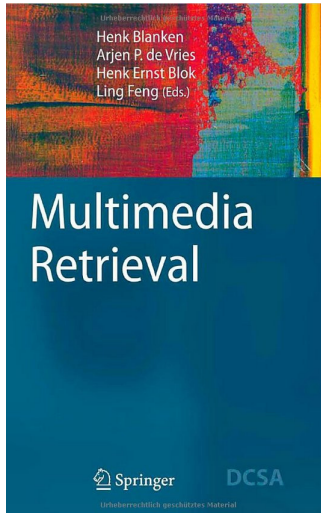


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Overview

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MMDB Systems versus DB Systems

Why are conventional database systems not sufficient?

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- Nowadays there is a huge amount of media data: text documents, images, audio and video files, etc.
- Conventional database systems have not been developed for this kind of data.
- Media data need to be processed differently from relationally structured data.
- Similarity search in MMDB must be much more flexible (e.g., “Search for all images illustrating houses”).

MMDB Systems versus IR Systems

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Why are conventional information retrieval systems not sufficient?

- Such systems have been developed for content-based search in text documents.
- For content-based search in other media data extended functionality is necessary.

MMDB Systems = DB Systems + IR Systems

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- In many multimedia applications a combination of media data and relationally structured data has to be processed.
- Therefore, in the development process of multimedia database systems mechanisms of DB and IR systems have to be combined.

Interdisciplinarity

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The processing of media and multimedia data is manifold:

- Operating Systems
- Computer Networks
- Graphics
- Image Processing
- Signal Processing
- Information Technology
- Psychology
- Document Management

Medium (1)

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- A *Medium* is an intervening substance through which something else is transmitted or carried on.
- If the information is transmitted to a human, medium can be classified based on the type of perception
 - *Vision*
 - *Hearing*
 - *Haptics*
 - *Tasting*
 - *Smelling*

Medium (2)

Concept

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- Media classification in time context:
 - *Static medium*: e.g., written text, photos
 - *Dynamic medium*: e.g., video and audio
- Media classification in computer context:
 - Text
 - Graphics
 - Image
 - Audio
 - Video

Multimedia

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- The term *Multimedia* extends the term *medium*.
- Multimedia denotes integration of different digital media types

Documents and Objects (1)

Concept

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- A *Document* is a logically coherent and digitally coded Text (*Text Document*)
- A *Multimedia Document* may include, apart from text data, also data of other types like video, image, audio, etc.
- A *Media Object* comprises data of any media type.
- A *Multimedia Object* can combine data of different media types, whereas at least one media type must be non-alphanumeric.

Documents and Objects (2)

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| Begriff | Text | Video/Bild/Audio |
|---------------------|-------------------|--------------------------|
| Dokument | + | – |
| Multimedia-Dokument | + | optional (kombiniert) |
| Medien-Objekt | + (ein Typ) | |
| Multimedia-Objekt | + (kombiniert) | |

Multimedia Database Management System (1)

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Definition by Christodoulakis from 1985:

- A *MMDBMS* is a Database Management System that provides, apart from conventional functionality of database systems, solutions for following two aspects:
 1. Management of unformatted data
 2. Consideration of special storing and presentation devices.

Multimedia Database Management System (2)

Concept

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Definition by Meyer-Wegener:

- A *MMDBMS* is a Database Management System that considers following aspects:
 - Multimedia database model
 - Information retrieval
 - Data independence
 - Storage, input and output devices
 - Time aspects
 - User interfaces

Overview

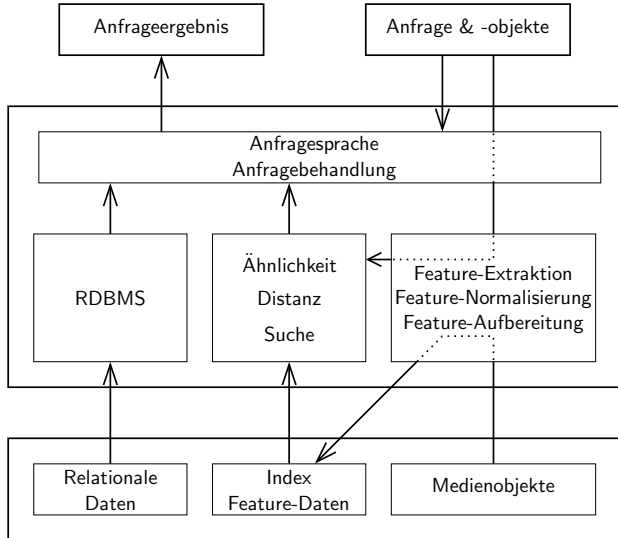
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Search Process



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Classification and Applications (1)

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Applications can be classified based on the ratio of change operations to search operations:

- Static applications
- Dynamic applications

Classification of Applications (2)

Concept

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Applications

Applications can also be classified based on the interaction mode between the application and the MMDBS:

- Passive applications
- Active applications

Classification of Applications (3)

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Applications

Applications can also be classified depending on the search type (content-based or not):

- Retrieval applications
- Standard database applications

Classification of Applications (4)

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Classification based on media types:

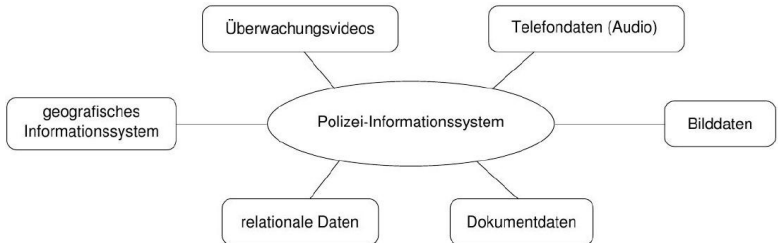
- Text
- Image
- Audio
- Video

Police Information System

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Video Management and Retrieval System

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Applications

The screenshot shows the K-Space Content Management and Retrieval System interface within a Microsoft Internet Explorer browser window. The address bar displays the URL <http://138.37.33.138:9759/>.

The main content area is titled "K-Space Document Navigation" and displays a table of documents. The table has five columns: "View", "Document title & abstract", "Transcode", "Shot edition", "Semantic annotation", and "Visual search".

| View | Document title & abstract | Transcode | Shot edition | Semantic annotation | Visual search |
|------|--|-----------|--------------|---------------------|---------------|
| | shakira tips don't lie "Tips Don't Lie" is a Grammy award-nominated Latin pop song performed by Colombian singer Shakira and Haitian rapper Wyclef Jean. The music video was direct... | | | | |
| | simonid success nothing compares to you "Nothing Compares To You" is a song written around 1944 or 1945 by Prince For The Family, a folk band created as an outlet to release some of his music. More... | | | | |
| | brutary spawns baby one more time Just as leave high school in California, the scenario begins with Spawns in a particularly boring class right before the end of the day. Her assistant Falc... | | | | |

A pop-up window titled "View Document 'moloko sing it back'" is open, showing a music video player. The video player displays a woman in a dark, shiny outfit dancing. The text "MOLOKO SING IT BACK" and "MUSIC FACTORY" is visible on the video player interface.

The left sidebar contains the following navigation options:

- Create content ...
 - Input content
 - Process content
 - Current tasks
- Content Retrieval ...
 - Navigate
 - Search
- Auxiliary tasks ...
 - User Profile
 - Help
- Home
- Logout guest

The bottom status bar shows the Windows taskbar with the Start button, several open applications, and the system clock displaying 10:13 AM.

Image Retrieval based on Sketched Lines

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http://www.youtube.com/watch?v=IC7Q0khzc_M