

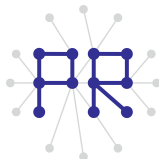
Multimedia Retrieval

1 Introduction

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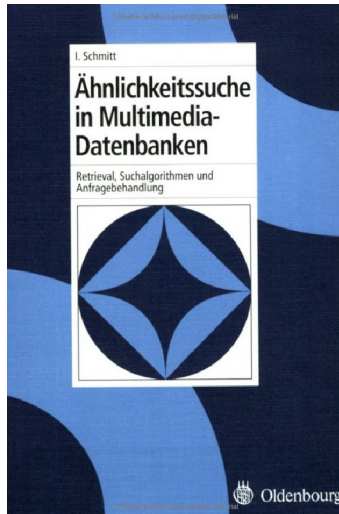
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Literature

Concept
Search
Applications



Literature

Concept
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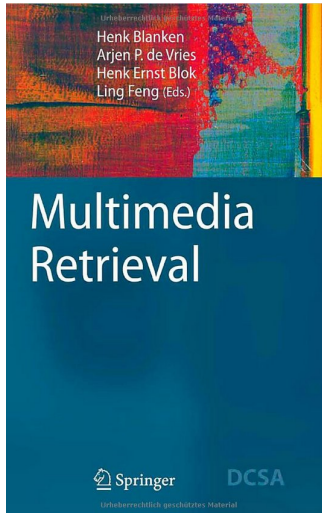


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Overview

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1 1.1 Fundamental Concept

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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)

Concept

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Applications

- 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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Applications

- 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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Search

Applications

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

Documents and Objects (1)

Concept

Search

Applications

- 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)

Concept

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Applications

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

Multimedia Database Management System (1)

Concept

Search

Applications

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

Search

Applications

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

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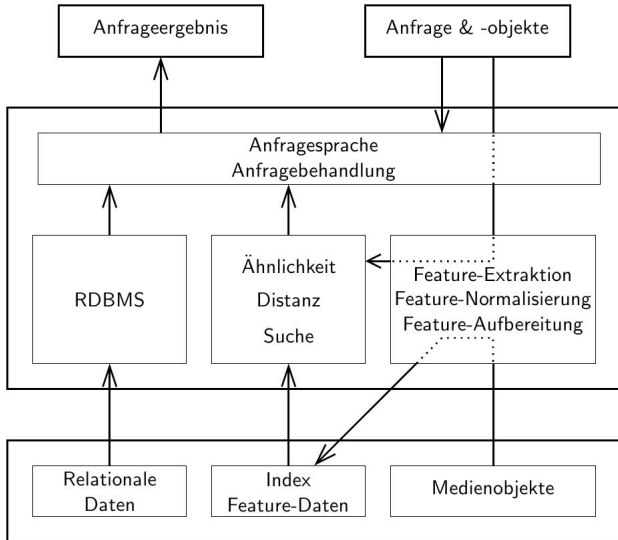
Applications

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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

Search

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)

Concept

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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)

Concept

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Applications

Classification based on media types:

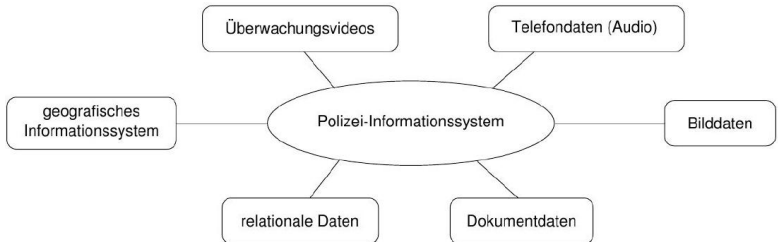
- Text
- Image
- Audio
- Video

Police Information System

Concept

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Applications



Concept

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Image Retrieval based on Sketched Lines

Concept

Search

Applications

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