

MPEG-7 기반 방송 콘텐츠 가상편집기술

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Digital Media Lab



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Digital Media Lab

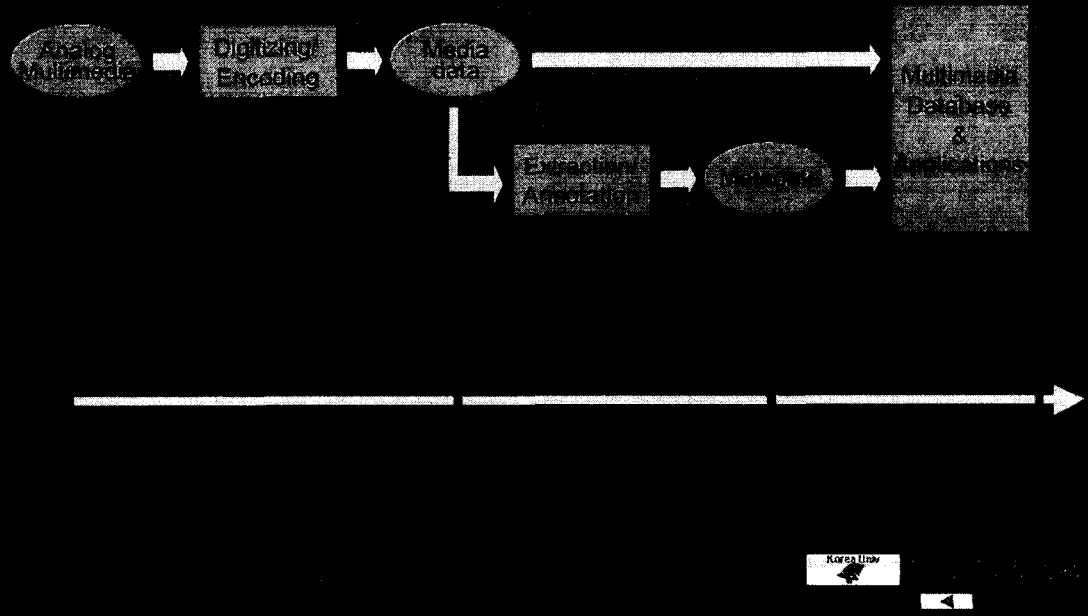


Introduction

Multimedia: Media data & Metadata

- Media data
 - Collection and/or spatio-temporal mix of media data
 - Usually encoded into a compressed file
- Metadata
 - Bibliographic description: title, air date, duration, actors ...
 - Media description : format, file size, resolution ...
 - Summary description : textual and visual summary ...
 - Content description : transcript, histogram ...
 - Content structure description : hierarchical browsing tree, textual annotation for a segment ...

Generation of Multimedia Data



MPEG-7 Description Scheme

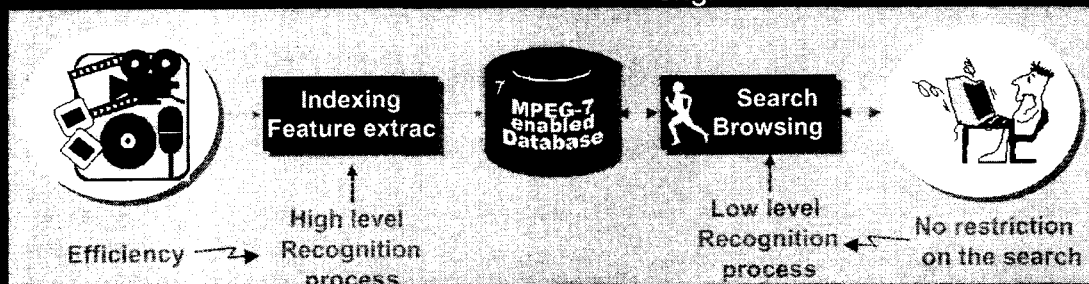
Objective of MPEG-7

- Standardize content-based description for various types of audiovisual information
 - Enable fast and efficient content searching, filtering and identification
 - Describe several aspects of the content (low-level features, structure, semantic, models, collections, creation, etc.)
 - Address a large range of applications
- Types of audiovisual information:
 - Audio, speech
 - Moving video, still pictures, graphics, 3D models
 - Information on how objects are combined in scenes
- Descriptions independent of the data support



Type of description

- Information about the content: recording date & conditions, title, author, copyright, coding format, classification, etc.
- Information present in the content: Combination of low level and high level descriptors
 - High level description:
 - Efficient and powerful
 - Lack of flexibility
 - Low level description
 - Generic and flexible
 - Intelligent / efficient search engine



Scope of MPEG-7

Description generation

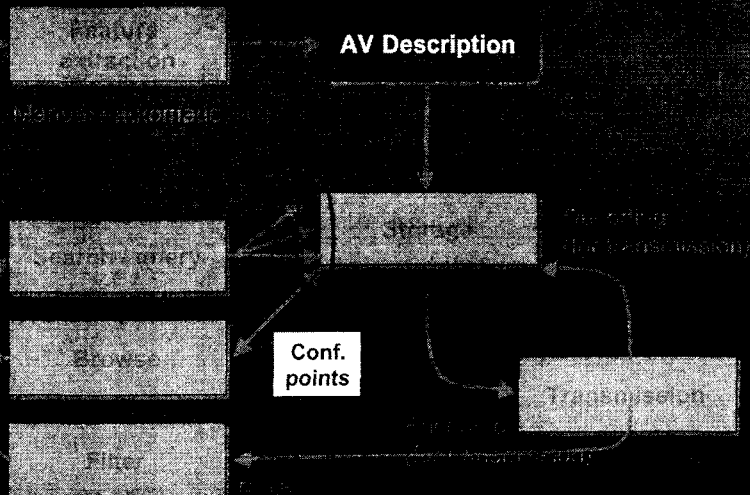
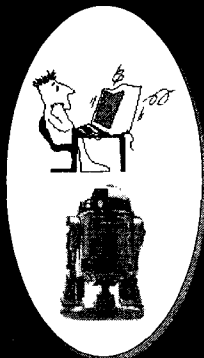
Description

Description consumption

Scope of MPEG-7

- The description generation (feature extraction, indexing process, annotation & authoring tools,...) and consumption (search engine, filtering tool, retrieval process, browsing device, ...) are non normative parts of MPEG-7.
- The goal is to define the minimum that enables interoperability.

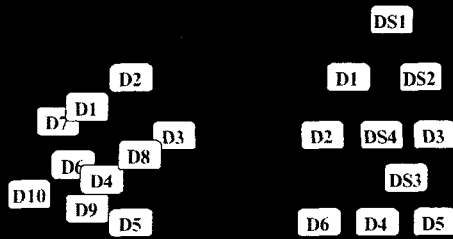
Information Flow



- The content and its description may also be multiplexed

MPEG-7 working areas

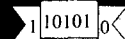
Description Definition Language



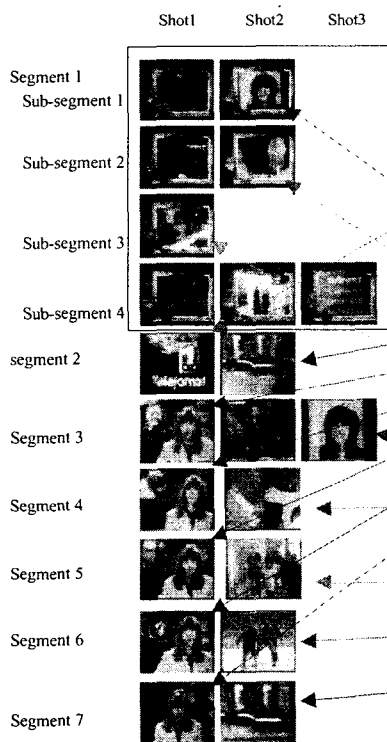
```

<scene id=1>
  <time> ...
  <camera>..
  <annotation>
</scene>
  
```

Encoding & Delivery



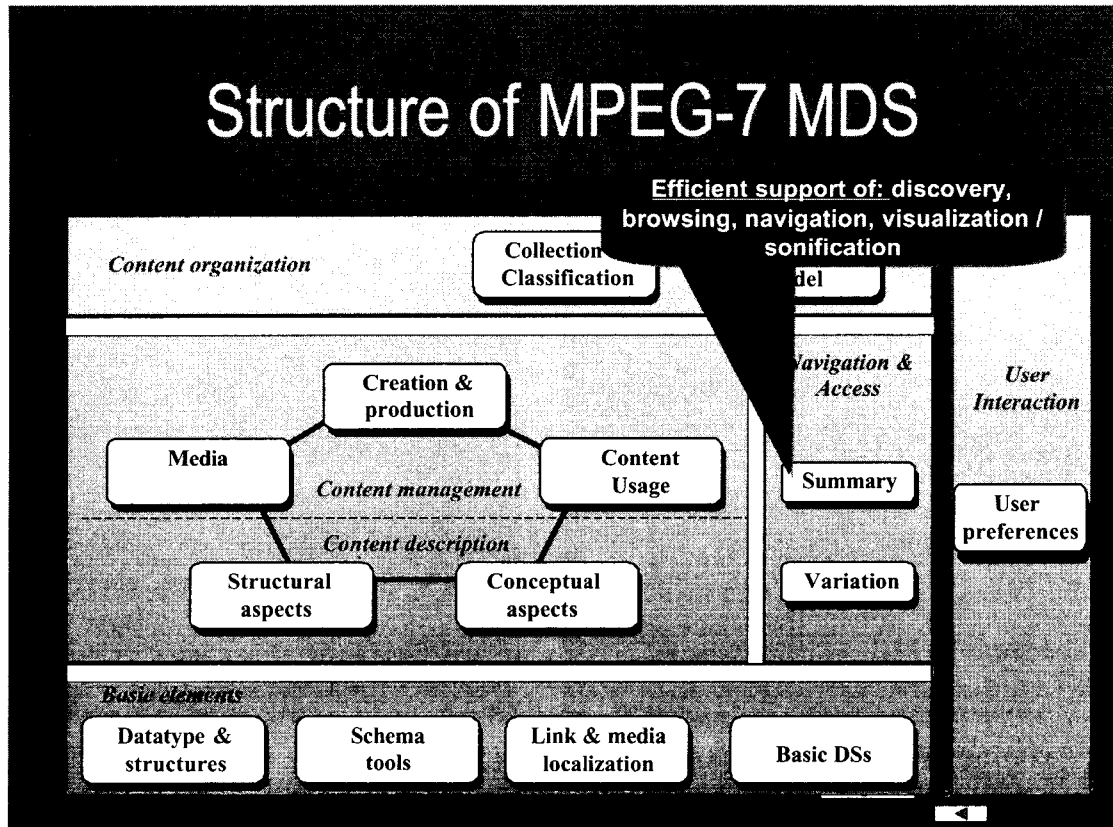
Segment Tree



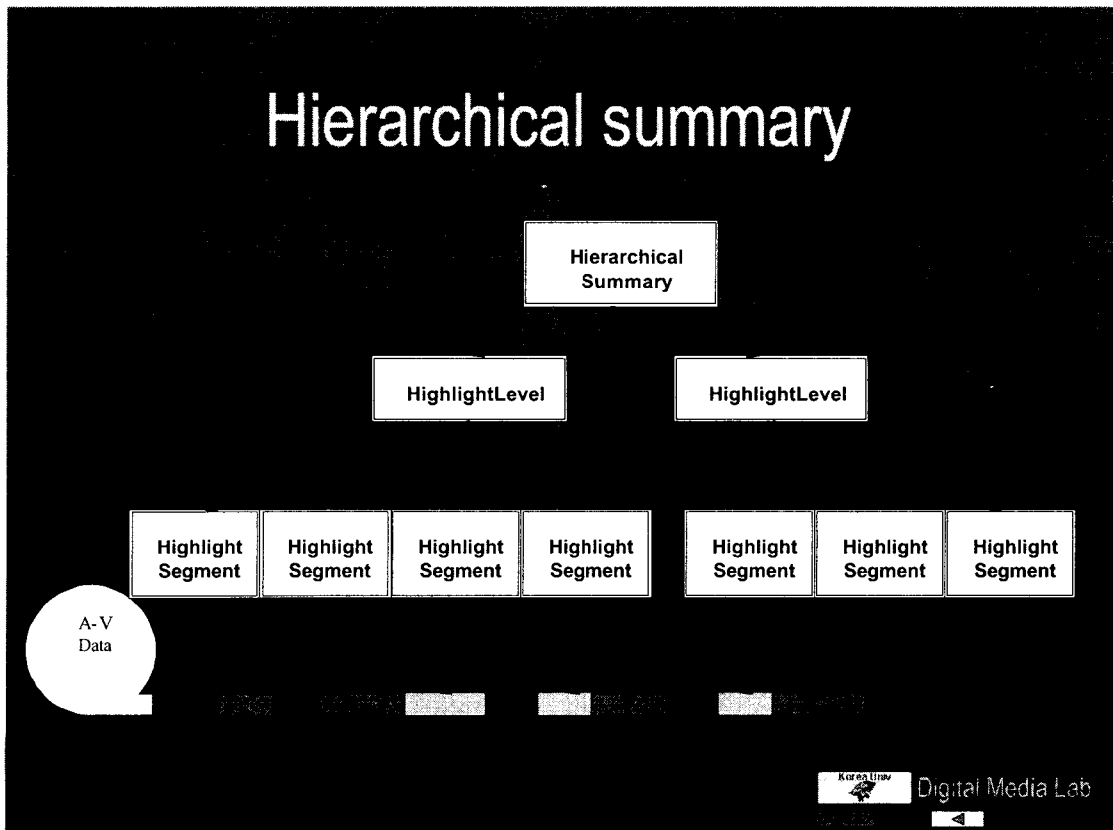
Semantic DS (Events)

- Introduction
 - ▶ • Summary
 - ▶ • Program logo
- Studio
 - ▶ • Overview
 - ▶ • News Presenter
- News Items
 - ▶ • International
 - ▶ • Clinton Case
 - ▶ • Pope in Cuba
 - ▶ • National
 - ▶ • Twins
- ▶ • Sports
- Closing

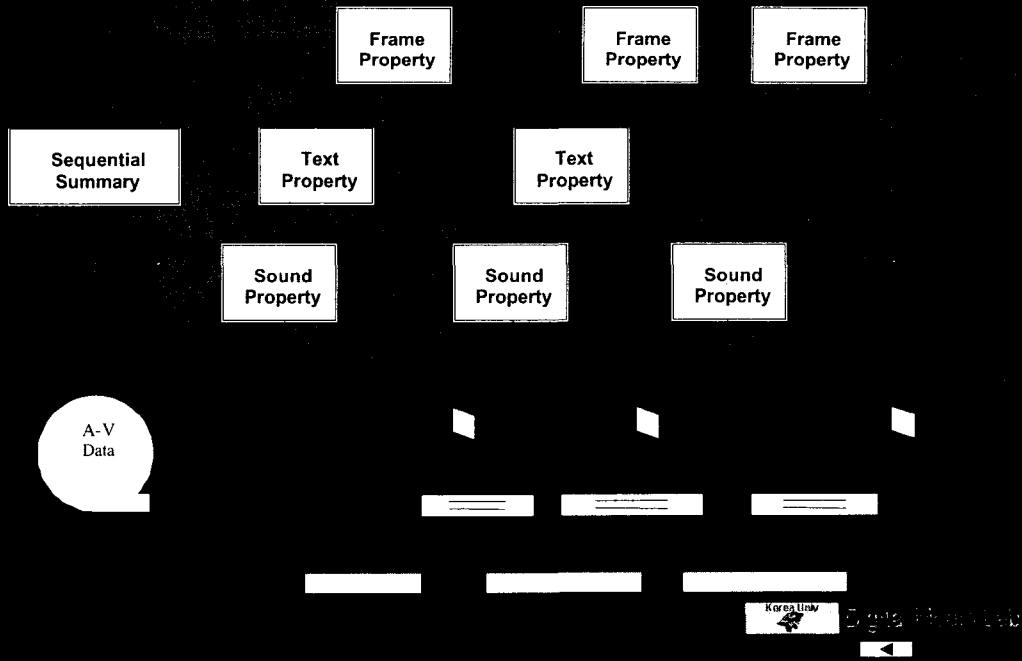
Structure of MPEG-7 MDS



Hierarchical summary



Sequential summary



Summary on AV Content Description and MPEG-7

- MPEG-7:
 - AV content description for interoperable applications
- Description Definition Language:
 - XML Schema (flexibility) + Binary version (efficiency)
- Description Schemes:
 - Library of description tools
 - Covers a wide range of generic needs

Content description tool based on metadata

Use of description schemes

- The description schemes are presented on the basis of the functionality they provide.
- In practice, they are combined into meaningful sets of description units.
- Furthermore, each application will have to select a sub-set of descriptors and DSs.
- Library of tools!
- DDL can be used to handle specific needs of the application.

Example

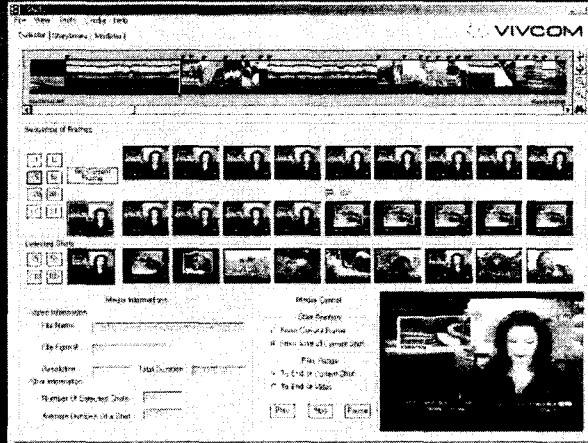
- Consider a video consisting of the following segments
 - VS0: 0 ~ 100 sec
 - VS1: 0 ~ 0.1 sec
 - VS2: 0.1 ~ 2 sec
 - VS3: 2 ~ 100 sec
 - VS4: 2 ~ 30 sec
 - VS5: 30 ~ 100 sec

Example (Cont.)

VideoDescription.mp7

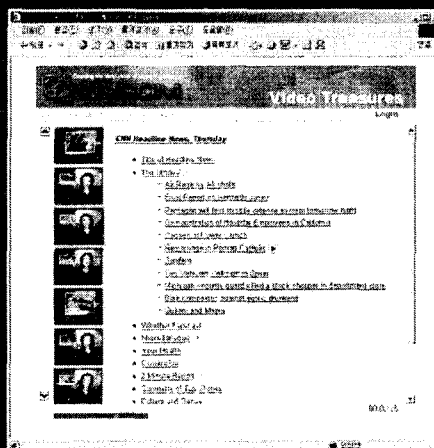
```
• <Video id=" " >
  <MediaLocator><MediaUri>video.mpg</MediaUri></MediaLocator>
  <MediaTime>
    <MediaTimePoint>T00:0F10</MediaTimePoint>
    <MediaDuration>PT1M40S</MediaDuration>
  </MediaTime>
  <TemporalDecomposition gap="false" overlap="false">
    <VideoSegment id=" " >
      <MediaTime>
        <MediaTimePoint>T00:0F10</MediaTimePoint>
        <MediaDuration>PT1N10F</MediaDuration>
      </MediaTime>
    </VideoSegment>
    <VideoSegment id=" " >
      <MediaTime>
        <MediaTimePoint>T00:1F10</MediaTimePoint>
        <MediaDuration>PT1S9N10F</MediaDuration>
      </MediaTime>
    </VideoSegment>
  </TemporalDecomposition>
</Video>
```

Content Description Tool



Enable users to easily and quickly generate the hierarchical description of video data content in MPEG-7 metadata format (XML schema).

Video Browsing



Allow users to quickly browse the entire video contents and play from any specific video segment based on the metadata generated by the content description tool.

Conclusion

- MPEG-7 provides a standard set of description schemes (metadata) that can be used to describe various types of multimedia information
- Based on the metadata (Summarization DS), we can easily generate a customized video without editing the video stream itself