UNIT 8: DOCUMENTS, HYPERTEXT AND MHEG

Multimedia Systems

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MULTIMEDIA DOCUMENTS

- "A document consists of a set of structural information that can be in different forms of media."
- A document is aimed at the perception of a human and is also accessible for computer processing.
- Multimedia documents are composed of multiple file format combinations, such as image and text, image and sound, or image, text and sound.
- The type of multimedia document determines the form of analysis for knowledge architecture design and retrieval methods.
- As continuous and discrete data are processed separately, the goal of abstracting multimedia data is to achieve integrated processing of all media.

DOCUMENT ARCHITECTURE

- Exchanging documents relates to exchanging the contents as well as the document structure.
- This means that they need to have the same architecture.
- The current standard architecture are
  - SGML(Standard Generalized Markup Language)
  - ODA(Open Document Architecture)

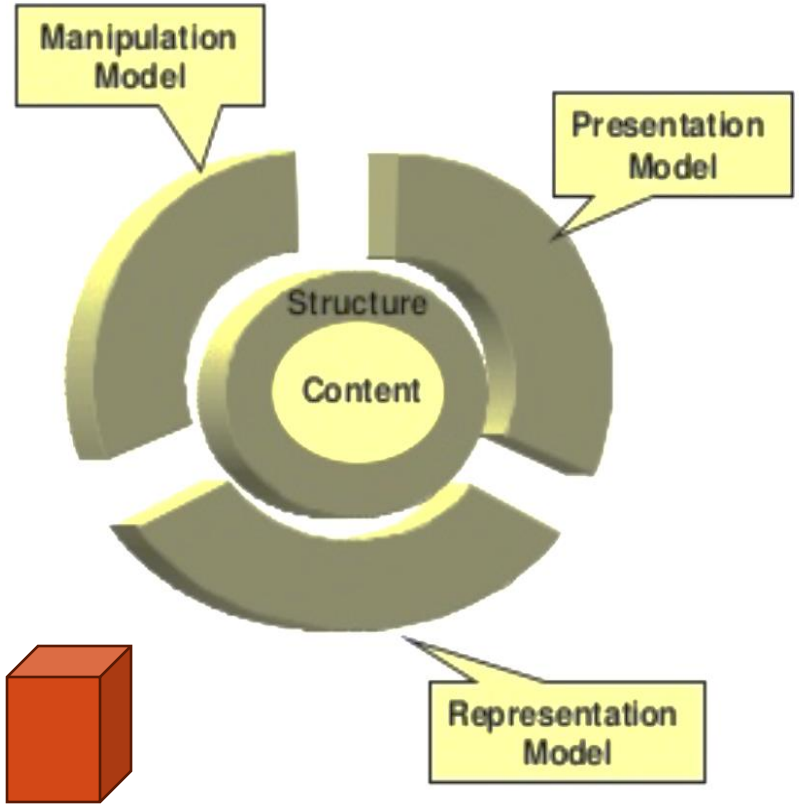
Content: Single or multi media information.

Structure: Spatial and temporal relation between information.

Manipulation Model: Operation for creation, change and deletion of information.

Representation Model: Exchange of protocol and data format.

Presenration model: Rules for presentation



ELEMENTS

Contents

- Content refers to the actual information or data in the multimedia document. It includes all the media types used, such as:

  Text, Images, Audio, Video, Animations

- **Example:** The words in a blog post, the pictures in a slideshow, or the sound in a podcast are all content.

Structure

- Structure defines how the content is organized or arranged. It determines the relationships between different parts of the document.

  Example:

- In a webpage, the structure might consist of a header, body, and footer.
- In a multimedia presentation, it includes slides arranged in a sequence with transitions between them.

CONTD..

Manipulation Model

- The manipulation model specifies how users or systems can interact with or modify the content. It involves editing, transforming, or controlling multimedia elements.
- **Example:**
- Zooming in on an image.
- Pausing or playing a video.
- Editing text or adjusting audio levels in a multimedia editor.

Representation Model

- The representation model deals with how the content is encoded or stored digitally. Different types of media have different formats or file types for representation.

Example:

- Text can be stored as ASCII or Unicode.
- Images might be represented in JPEG, PNG, or BMP formats.
- Video files could be in MP4 or AVI format.

CONTD..

Presentation Model

- The presentation model defines how the content is displayed to the user. It determines the layout, timing, and style of multimedia elements when they are presented.

Example:

- A video player showing a video with subtitles.
- A slideshow presentation where slides appear with animations and audio.

HYPERTEXT, HYPERMEDIA & MULTIMEDIA

- Multimedia becomes interactive multimedia when the user is given some control over what information is viewed and when.

- Interactive multimedia becomes hypermedia when its design provides a structure of linked elements through which the user can navigate and interact.

- A hypertext is like a special type of text that is not just linear but are interconnected. Its like a web of words that are linked together allowing you to jump from one piece of content to another with just a click.

- These links called hyperlinks and are the building blocks of the internet making it possible for us to explore the vast world of information online.

- HTML and XML languages are used for implementation

HYPERTEXT

Slide 1 (Underlined words are hyperlinked to slides 2-5)

Excerpt from Martin Luther King Jr.
***I Have a Dream* Speech**

Five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation. This momentous decree came as a great beacon light of hope to millions of Negro slaves who had been seared in the flames of withering injustice. It came as a joyous daybreak to end the long night of their captivity.

Slide 2

Symbolic Shadow

"Symbolic means it's not a real shadow, but it represents something or someone. This reminds me of how small I felt when I stood next to the statue of Lincoln in Washington, DC."

Photo from *memory.loc.gov*

Slide 3

Emancipation Proclamation

Photos from *memory.loc.gov*

Slide 4

Withering Injustice

Collage Created in WordSift *wordsift.com*

Slide 5

Joyous Daybreak

Elvis Presley - Amazing Grace
4 min - Apr 30, 2007 - Uploaded by purelistener
Elvis Presley - **Amazing Grace** Recorded: 1971/03/15, first released on "He Touched Me" Words & Music: Arranged by Elvis ...
youtube.com - Related videos

"This song reminds me of the importance of freedom for all people."

HYPERTEXT

- As seen in the example, a hypertext is like a hyperlink but the link is embedded into a word, a phrase that the maker of the website chooses.
- The hypertext is a subset of hyperlink.
- Hypertext structure is a graph containing nodes and edges/pointers.
- Nodes are the actual information units and the edges provide links to other information units.
- Hypertext is called a non-linear chain of information link because it allows users to navigate information in a non-sequential manner, unlike traditional text or documents, which are typically read from beginning to end in a linear sequence.

HYPERTEXT ARCHITECTURE

- The hypertext system architecture can be divided into three layers with different functionalities:
- (i) Presentation Layer:
- All functions connected to the user interface are embedded.
- Here, nodes and pointer are mapped to the user interface.
- At the user interface, one or several parts of the document are visualized.
- This layer determines, based on the given structure and user's desired display, which data are presented and how they are presented.
- This layer takes over control of all inputs.
- ii) Hypertext Abstract Machine:
- The Hypertext Abstract Machine (HAM) is placed between the presentation and storage layers.
- It does not have to consider input and output of the upper layer (Presentation Layer).
- Hypertext Abstract Machine knows the structure of the document, it has the knowledge about the pointers and its attributes.
- The data structure, respectively a document architecture, is constructed for the management of the document.

HYPERTEXT ARCHITECTURE..CONTD

- (iii) Storage Layer :
- The storage layer (also called the database layer) is the lowest layer.
- All functions connected with the storage of data, i.e., secondary storage management, belong to this layer.
- The specific properties of the different discrete and continuous media need to be considered.
- Functionalities from traditional database systems are expected, such as persistence (data persist through programs and processes), multi-user operations (synchronization, locks) and the restoration of data after a failure (transaction).

HYPERMEDIA

- Hypermedia is an extension of hypertext that incorporates multiple types of media — such as text, images, audio, video, graphics, and animations — interconnected through hyperlinks.
- It allows users to navigate and interact with information across different media formats rather than just text.
- The World Wide Web (WWW) is an excellent example of a hypermedia system interconnected through the internet.
- The system allows internet users to access more information through links embedded in digital elements such as videos and images.
- *The Web is a system of hyperlinked hypermedia that, despite the endless varieties of software languages that are used to construct its websites and media types, generally manages to stay remarkably interconnected and communicate clearly between its many constituent parts.*

HYPERTEXT, HYPERMEDIA & MULTIMEDIA

- A hypertext system is mainly determined through non-linear links of information. Pointers connect the nodes. The data of different nodes can be represented with one or several media types. In a pure text system, only text parts are connected.
- A multimedia system is characterized by computer-controlled, integrated production, manipulation, presentation, storage and communication of independent information, which is encoded at least through a continuous and a discrete medium.
- A hypermedia system includes the non-linear information links of hypertext systems and the continuous and discrete media of multimedia systems. For example, if a non-linear link consists of text and video data, then this is a hypermedia, multimedia and hypertext system.

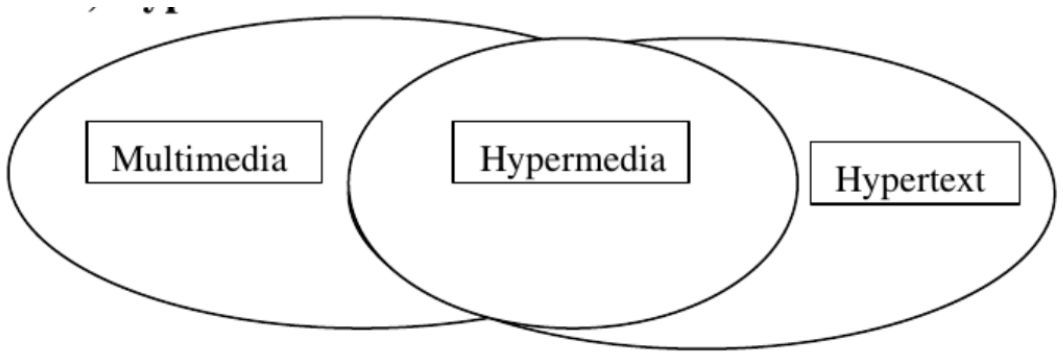


Figure: The hypertext, hypermedia and multimedia relationship.

SGML(STANDARD GENERALIZED MARKUP LANGUAGE)

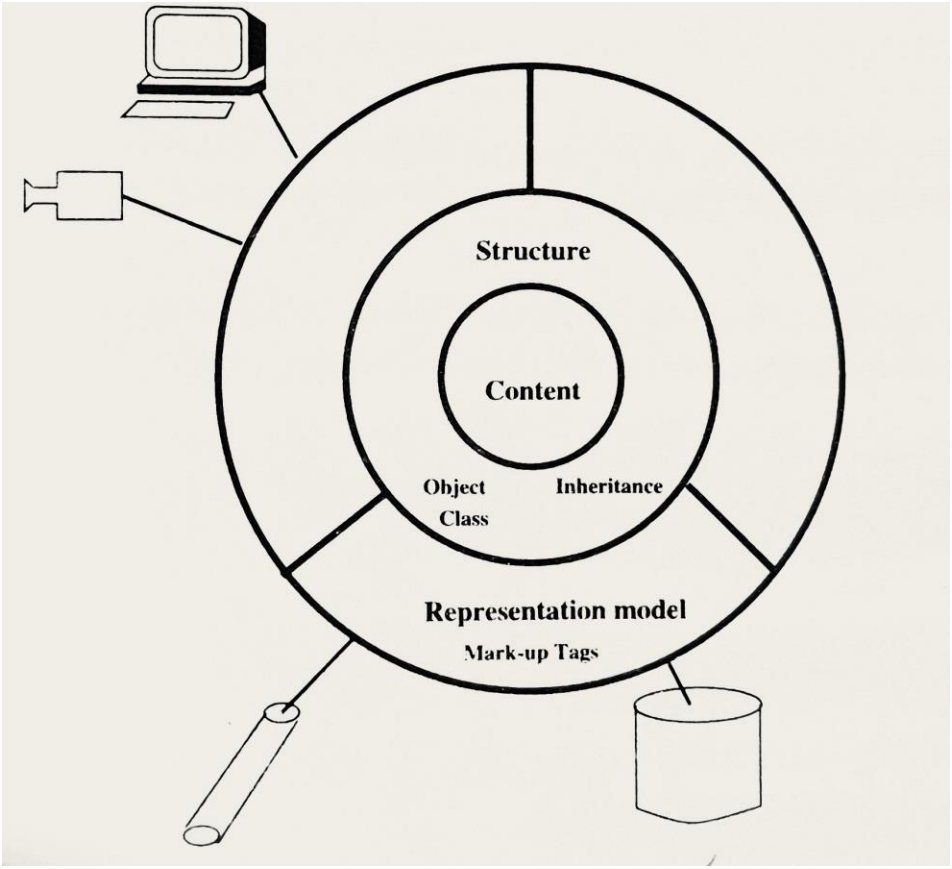
- Developed in 1986, HTML(1991), XML(1998)
- Developed prior to the world wide web.
- HTML is developed from SGML and it is the language that enabled the WWW.
- They are all markup languages.
- Developed as software and platform independent tool to deal with large amount of text.
- Some major users were aeronautics, military, pharmaceuticals companies etc.

HTML-Document (Example of an SGML Document):

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
        "http://www.w3.org/TR/html4/strict.dtd">
<HTML>
    <HEAD>
        <TITLE>My first HTML document</TITLE>
    </HEAD>
    <BODY>
        <P>Hello, world!
    </BODY>
</HTML>
```

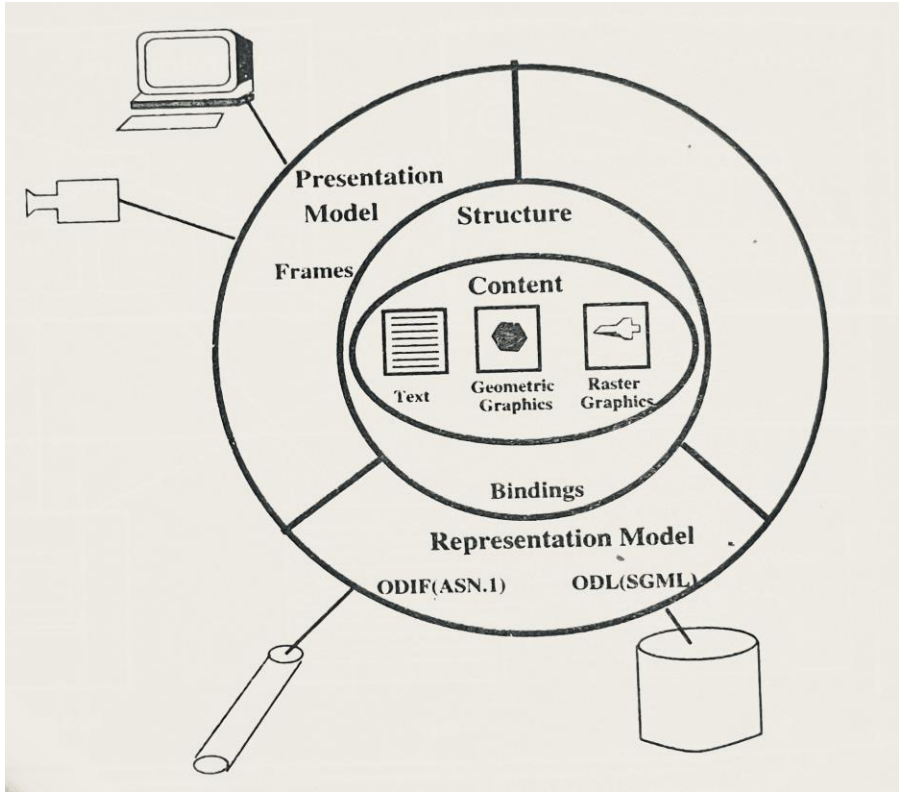
SGML

- It is a language and notation for describing classes of documents.
- SGML is a meta-language, meaning it provides rules for creating other markup languages like HTML and XML.
- SGML focuses on the structure and meaning of content rather than its presentation, which allows for flexible data interchange.
- A document may, for example, have tags that delimit elements like paragraphs, subsections, appendices, and figures.
- An SGML-encoded document has three parts: an SGML declaration, a document type declaration, and a document instance.
- *Fig(Right): SGML Document Architecture*



ODA(OPEN DOCUMENT ARCHITECTURE)

- The Open Document Architecture (ODA) was initially called the Office Document Architecture because it supports mostly office-oriented applications.
- The main goal of this document architecture is to support the exchange, processing and presentation of documents in open system.
- The main property of ODA is the distinction among content, logical structure and layout structure. i.e.
  - Content: The actual text, images, or graphics in the document.
  - Structure: The organization of content (e.g., chapters, paragraphs).
  - Presentation: The appearance of content (e.g., fonts, colors, layout).
- This is in contrast to SGML where only a logical structure and the contents are defined. ODA also defines semantics.
- It is Mostly obsolete, and are replaced by simpler document formats like PDF .
- *Fig(Right): ODA Architecture*



MHEG

- MHEG stands for Multimedia and Hypermedia Experts Group.
- It refers to a standard for encoding multimedia and hypermedia data.
- It was developed by ISO/IEC to define how interactive multimedia systems should handle text, images, audio, video, and other multimedia objects, along with user interaction in an interoperable way.
- https://youtu.be/D2oiE7_Pi8I?si=udH4uDyYYbv4ayAT

MHEG COMPONENTS

1. **MHEG Identifier:**

- Uniquely identifies an MHEG object within a presentation.

2. **MHEG Descriptor:**

- Provides metadata about the MHEG object. It can include information such as object type, dimensions, position, and other relevant attributes.

3. **Contents:**

- Defines the actual data associated with the MHEG object. Includes various media types like text, images, audio, video, or even other MHEG objects.

4. **Behavior:**

- Specifies how the MHEG object should behave or react. Actions triggered by user interaction, animations, or time-based events.

5. **Interaction:**

Defines how users can interact with the MHEG object. Clicking buttons, entering text, dragging and dropping elements.

6. **Container:**

A special type of MHEG object that can hold other MHEG objects. Allows for hierarchical organization and grouping of elements within a presentation.

7. **Closing Comments:**

Optional section for additional information or notes about the MHEG object. Can include developer notes, version history, or other relevant details.

END OF CHAPTER 8