

CHAPTER – 6

Document, Hypertext and MHEG

Document:

- A document consists of a set of structural information that can be in different forms of media and during presentation can be generated or recorded.
- A document is aimed at the perception of human and is accessible for computer processing.

Multimedia Document:

- A multimedia document which comprised of information coded in at least one continuous (time-dependent) medium and in one discrete (time-independent) medium. Integration of the different media is given through a close relation between information units. This is also called synchronization.
- A multimedia document is closely related to its environment of tools, data abstractions, basic concepts and document architecture.
- Currently, continuous and discrete data are processed differently: text is processed within an editor program as a type of programming language; a motion picture can be manipulated with the same editor program only through library calls.
- The goal of abstracting multimedia data is to achieve integrated, i.e. uniform, description and processing of all media. This reduces the complexity of program generation and maintenance that process multimedia data.
- Abstractions of multimedia data serve as the fundamental building block for programming different multimedia applications, especially editors and other document processing tools.
- Basic concepts for documents processing use multimedia abstraction and also serve as concepts for the information architecture in a document. Thus we can use the terms document architecture and information architecture interchangeably.

Document Architecture:

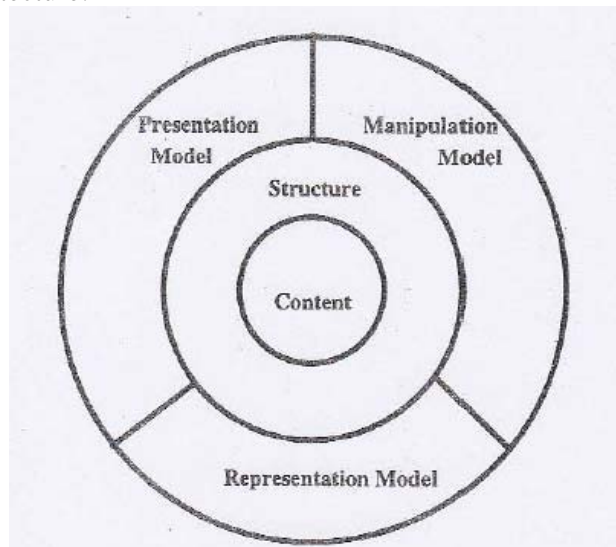


Figure: - Document architecture and its elements

- Exchanging documents entails exchanging the document content as well as the document structure. This requires that both documents have the same document architecture.
 - Information architectures use their data abstractions and concepts.
 - Document architecture describes the connections among the individual elements representing as models (Example, Presentation, Manipulation and Representation). The elements in the document architecture and their relations are shown in above figure.
- (i) The manipulation model describes all the operations allowed for creation, change and deletion of multimedia information.
 - (ii) The representation model defines:
 - a. The protocols for exchanging this information among different components and
 - b. The formats for storing the data.
 - (iii) It includes the relation between the individual information elements which need to be considered during presentation.
 - (iv) It is important to mention that architecture may not include all described properties, respectively models.

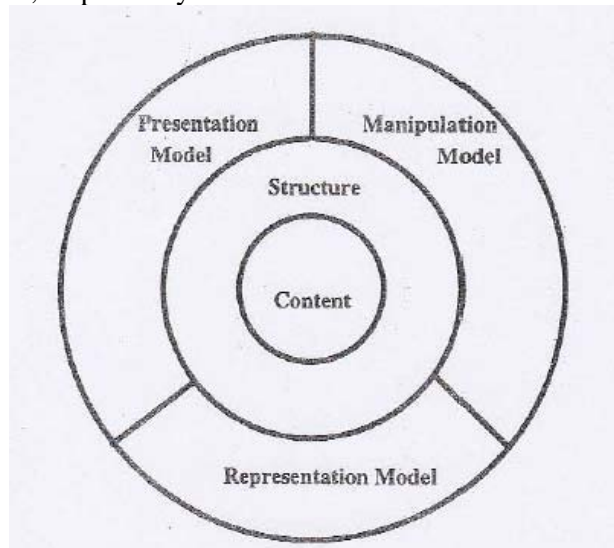


Figure: - a multimedia documents architecture and its constituent elements

The above figure shows a multimedia document architecture including relations between individual discrete media units and continuous media units.

Manipulation of Multimedia Data:

- The user becomes most aware of multimedia documents through tools for manipulation of multimedia data, such as editors, desktop publishing programs and other text processing programs.
- A document that undergoes the process is shown in figure1.

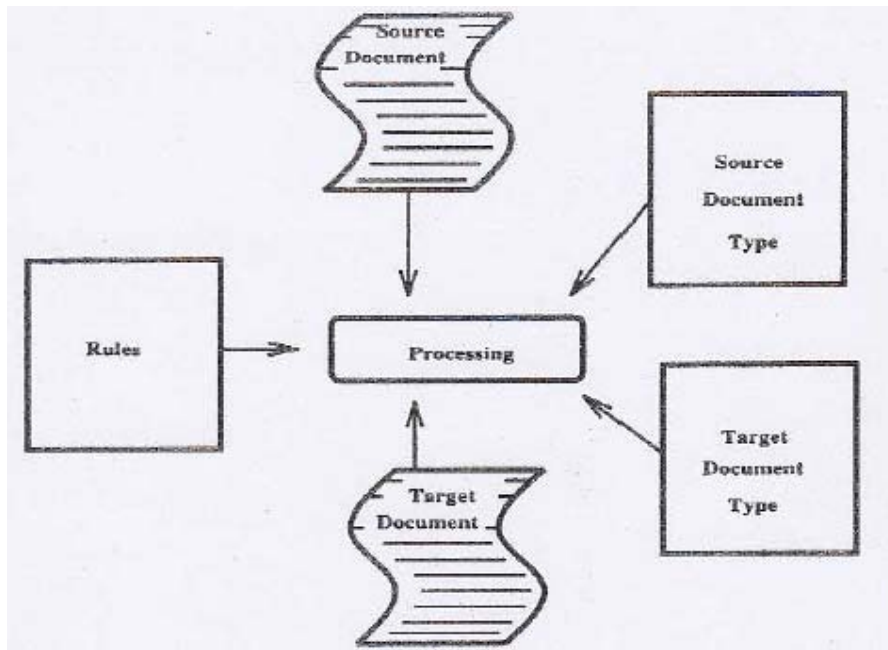


Figure1: - Processing of document: from the information to the presentation

The information included in a document belongs to a certain document type, Example a business letter or an internal document. The same document can belong to other types which mainly influence the final representation. The transformation from the actual information to its final representation behaves according to rules specific to the document architecture.

Hypertext and Hypermedia:

Figure: - Hypertext data: An example of linking information of different media

- Communication reproduces knowledge stored in the human brain via several media. Documents are one method of transmitting information Reading a document is an act of reconstructing knowledge.
- In an ideal case, knowledge transmission starts with author and ends with a reconstruction of the same ideas by a reader. Information loss is minimal.

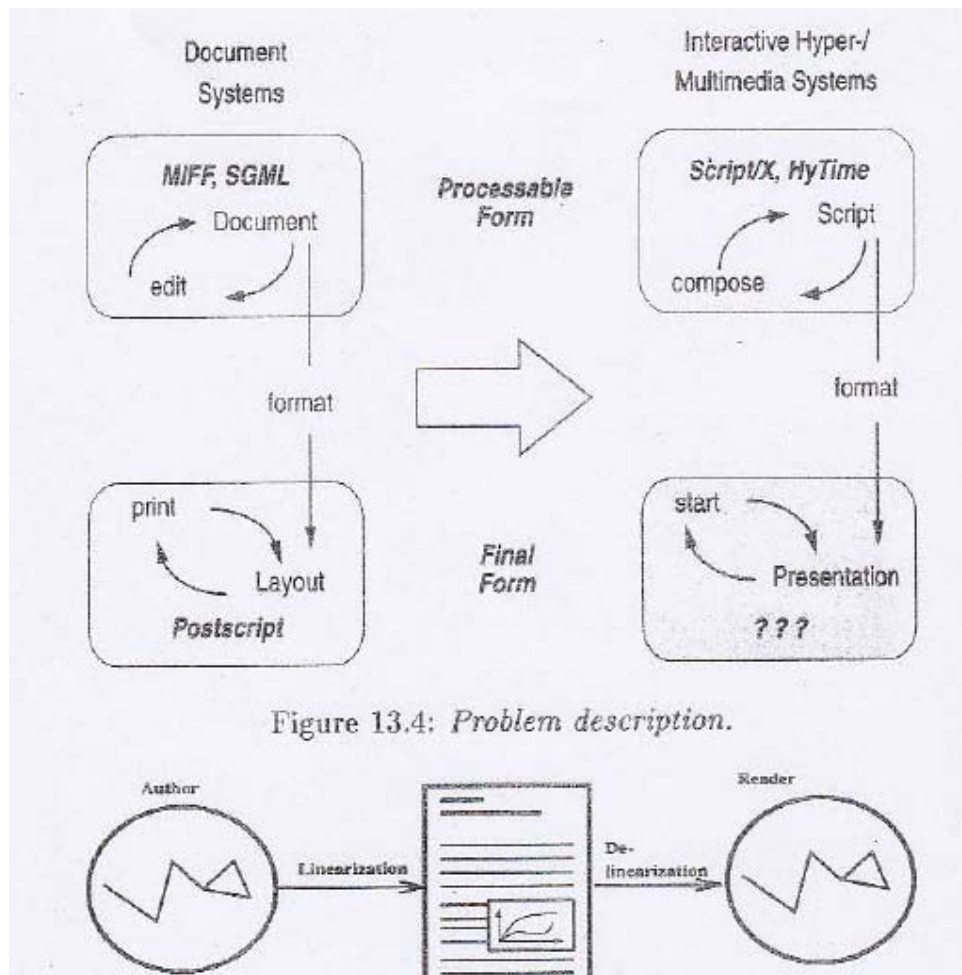


Figure 13.4: Problem description.

Figure: - Information transmission

- Today's ordinary documents (excluding hypermedia), with their linear form, support neither the reconstruction of knowledge, nor simplify its reproduction. Knowledge must be artificially serialized before the actual exchange. Hence, it is transformed into linear document and the structural information is integrated into the content.
- In the case of hypertext and hypermedia, a graphical structure is possible in a document which may simplify the writing and reading processes.

Non-linear Information Chain:

- Hypertext and hypermedia have a major property of a non-linear information link. There exists not only a reading sequence, but also the reader decides on his/her reading path. The reader can start with notation hypertext, then go through a cross reference to system and finish with a description of AppleTalk. By this association, through reference links the author of the transmission determines the actual link.

- A hypertext structure is a graph, consisting of nodes and edges.
- (i) The nodes are the actual information units. Example, text element, individual graphics, audio or video LDU.
- (ii) The edges provide link to other information units. They are usually called pointers or links.

Anchor:

- At the user interface the origin of pointers must be marked, so that the user can move to a further information unit. This origin of a pointer is called an anchor.
- The representation of anchor in a user interface should following properties.
 - o A media-independent representation can happen through the selection of general graphical elements, such as buttons.
 - o In a text, individual words, paragraphs or text sections of different length can be used for representation.
 - o In Images specific graphical objects or simply areas are defined as selection object.
 - o In motion video, media-independent representations of the anchor are preferred.
 - o With respect to audio, a media-independent solution is used.

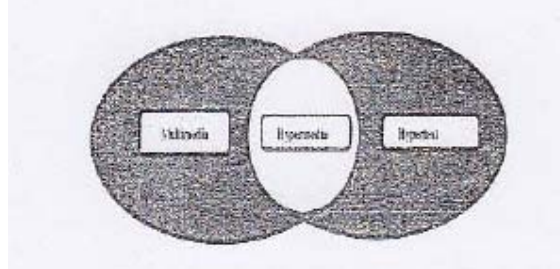


Figure: - The hypertext, hypermedia and multimedia relationship

Hypertext System:

- 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.
- Hypertext is an information object which includes links to several media.

Multimedia System:

A multimedia system contains information which is coded at least in a continuous and discrete medium.

Hypermedia System:

Hypermedia system includes the non-linear information links of hypertext systems and the continuous and discrete media of multimedia systems.

Document Architecture of SGML:

- The Standard Generalized Mark-up Language (SGML) was supported mostly by American publishers. Authors prepare the text i.e. the content. They specify in a uniform way the title, tables etc, without description of the actual representation (Example, script type and line distance). The publisher specifies the resulting layout.

- The basic idea is that the author uses tags for marking certain text parts. SGML determines the form of tags, but it does not specify their location or meaning. User groups agree on the meaning of tags. SGML makes a frame available with which the users specify the syntax description in an object-specific system.
- In SGML classes and objects, hierarchies of classes and objects, inheritance and link to methods can be used by specification. SGML specify the syntax but not the semantics.

Example,

<title>Multimedia System</title>

<author>Mr Ram</author>

<side>KIT</side>

<summary>This is his first published book</summary>

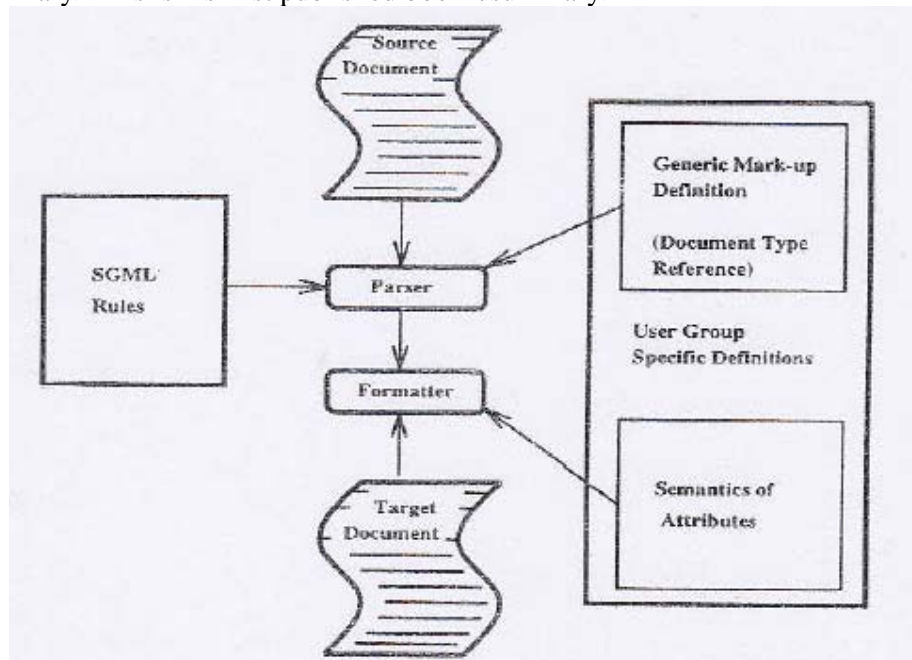


Figure: - SGML: Document Processing from the information to the presentation.

- The above figure shows the processing of SGML documents. It is divided into processes.
 - (i) Formatter
 - (ii) Parser
- Formatter knows the meaning of tag and it transforms the document into a formatted document.
- The Parser uses the tags, occurring in the document, in combination with the corresponding document type.
- A specification of the document structure is done with tags. In above figure, parts of layouts are linked together. This is based on the joint context between the originator of the document and the formatter process. It is not defined through SGML.

Document Architecture ODA:

- The Open Document Architecture (ODA) was initially called the Office Document Architecture because it mostly supports office-oriented applications.
- The main goal of this document architecture is to support the exchange, processing and presentation of documents in open systems.
- ODA has been used mainly by the computer industry, especially in Europe.

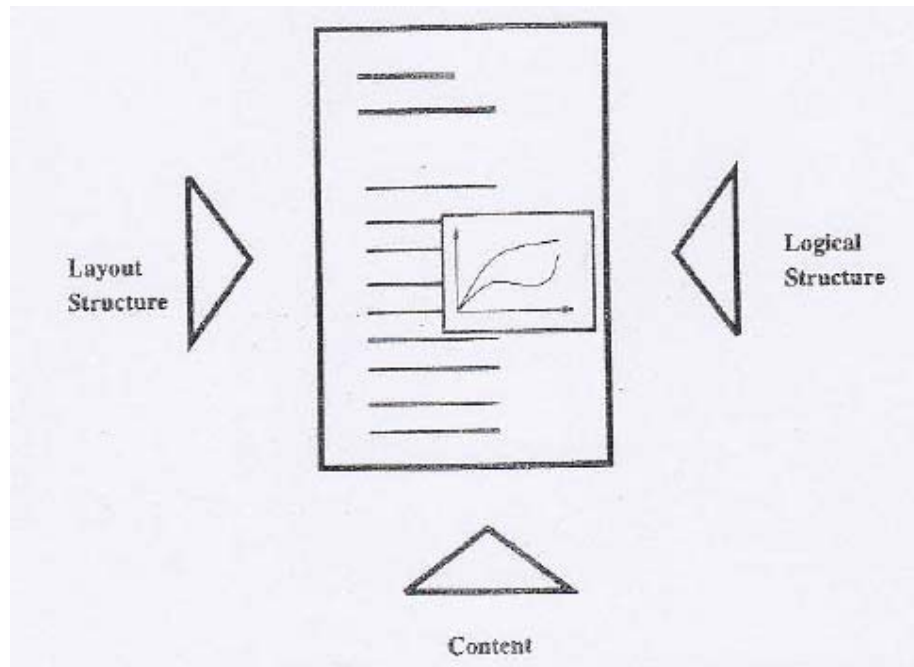


Figure: - ODA: Content, layout and logical view

- The main property of ODA is the distinction among content, logical structure and layout structure.
- This is a contrast to SGML where only a logical structure and the contents are defined ODA defines semantics.
- The above figure shows three aspects (content, logical structure and layout structure) linked to a document. One can imagine these aspects as three orthogonal views of the same documents. Each of these views represent one aspect, together we get the actual document.

Content:

- The content of the document consist of content portions.
- A content architecture describes for each medium:-
 - (i) Specification of the elements
 - (ii) The possible access functions and
 - (iii) The data coding
- ODA has content architectures for media text, geometrical graphics and raster graphics.

Layout Structure:

The layout structure specifies mainly the representation of a document. It is related to a two dimensional representation.

Logical Structure:

It includes the partitioning of the content.

MHEG (Multimedia and Hypermedia Information Expert Group):

- The committee ISO/IEC JTC1/SC29 (coding of Audio, Picture, Multimedia and Hypermedia Information) works on the standardization of the exchange format for multimedia systems. The actual standards are developed at the international level in three working groups corresponding with research and industry.

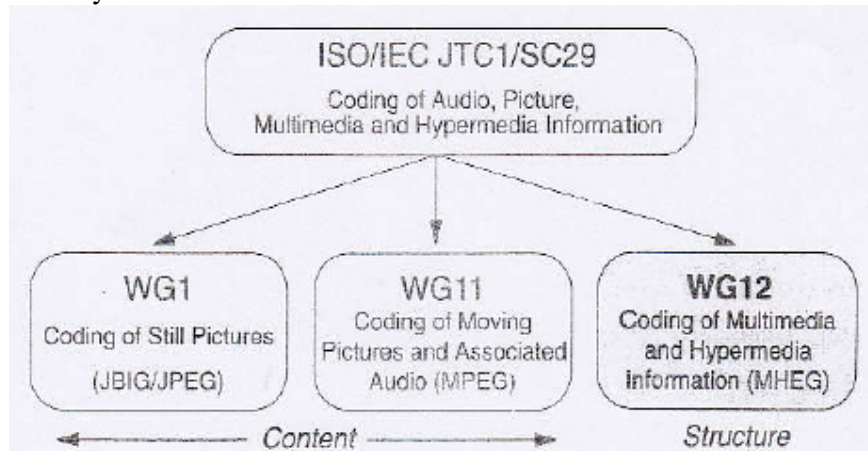


Figure: - Working Groups within the ISO-SG29

- The above figure shows the three standards dealing with the coding and compression of individual media.
- The standard WG12 is also known as the Multimedia and Hypermedia Information Coding Expert Group (MHEG).
- The name of the developed standard is officially called Information Technology Coding of Multimedia and Hypermedia Information Expert Group (MHEG).