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Methodological Approach For Multimedia Information Systems Development Under Hypertext Perspective

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Multimedia Information Systems and Image Processing

In Multimedia Information Systems characterized for unstructured data: image, audio, and video, storage and retrieval data issues have been dealt with techniques and methods belonging to image and video [1,2] processing fields. Some data schemes have been provided and Retrieval issues tackled in Geographical Information Systems area. But the problem of attending queries by content-based information remain under research, because one important problem with image processing that is scalability, actually only is possible using simple patterns in images for pictures indexing [2,3]. Hence this time isn't image processing technology the broad solution for handling image data of multimedia information systems.

Hypermedia Approach

Hypermedia approach for authoring used to producing hypermedia applications [4] like: electronic books, guided tours, also manage data types that range textual, image, animation, audio and video. The schema supporting data is based on Components or Nodes containing the different data types related by links forming the Hypermedia network.

Hypermedia is well defined at the Dexter Hypertext Reference Model [5] which divide Hypertext Systems into three layers: the run-time layer, the storage layer and the within component layer. The main focus of the model is on the storage layer, which models the basic node/link network structure. The storage layer describes a "database" that is composed of components (containing the chunks of text, images, animations) interconnected by relational links. The within-component layer is specifically concerned with the contents and structure within the components of the hypertext network, but this issue is not fully treated by the Dexter Model.

Hypermedia data

The Amsterdam Hypermedia Model (AHM) [6] elaborated by Hardman, Bulterman and Van Rossum adds notions of time, high-level presentation attributes and link context to the Dexter Model. The AHM contribution enriches the treatment of hypertext components in the sense that the within component layer can handle component presentation issues such as: audio and video time duration, at display time using different medias.

AHM doesn't deal with image representation within components directly, because AHM components have associated internal structures, and is becomes a hard task assigning some sort of layout to image data. In this sense AHM fails coping with images.

Multimedia data model

Grosky's work [2] has plenty of details while proposing a Model Data for multimedia information systems. This data model defines relationships between entities during design phase like any data model, and can getgenerate derived relationships from existing relationships called Information-bearing content-based relationship, when processing and retrieving some queries.

The Data model shown in Grosky's work is based on two kinds of components: real-world application entities and multimedia objects, and the relationships between them. The design of an appropriate data

model for multimedia information systems is concerned with defining entities attributes and appropriately decomposing multimedia objects in terms of features.

Features of a multimedia object are analogous to attributes of a real-world application entity in standard alphanumeric database while a feature of a multimedia object is based on its content. As well In a similar manner a standard key for real-world entity is a collection of attributes that identifies it in unique way, a content-based key of a multimedia object is a collection of features that should uniquely identify its content. Grosky's data model for multimedia database design contains issues for query processing and browsing, but lacks considering retrieval aspects.

Multimedia Information Systems and Hypertext

There is evidence [7] that multimedia information systems have been made using the available hypermedia and authoring systems.

It is well-known Hypermedia systems (built on the Hypertext model) support the richness of multimedia data. In fact, the distinction between hypertext systems and DBMS is not clear.

Multimedia and Object Oriented Paradigm

Some Authors [1,7] describe how the object oriented paradigm can cope with getting abstractions for a multimedia information system model.

Gronbaek and Trigg [8] took the Dexter Reference Model and converted it successfully into an object oriented design and prototype implementation called De Vise Hypermedia (DHM).

Multimedia Information Systems Development

From the facts cited through former sections and the arguments cited by the author in [9] it is possible formulate the model for a multimedia information system inside the object oriented paradigm. But issues referent withwich refer to how to proceed through the life cycle of the Multimedia Information Systems have not been treated until now.

The Methodological aspect of Multimedia Information Systems development hasn't received adequated attention from the multimedia community; probably because greater efforts have gone to define data models and their implications: storage, structure and retrieval.

Multimedia Information System Development Approach

This work proposes a methodological approach for Multimedia System Development.

This approach was outlined in [9] for system developments when using hypertext for implementation. Approach is inscribed within the object oriented paradigm.

The approach exhibits all elements of a cohesive and complete methodology [10, 11, 12].

The Approach s the following activities: (1)Problem domain object identification, (2)Hypertext block building identification, (3) Refine problem objects using basic building blocks of Hypertext, (4) Refine problem structures, (5) Establish policies for defining the possible link types for structure problems and object problems, when data is being added to the data model.

Approach Activities Description

1. Problem domain object identification. This activity preteens to know the essential objects of the real-world to wich the problem belongs.

This activity can be realized applying initial phases of any object oriented analysis method. Even though this approach has its own notation, other notations can be applied.

2. Hypertext block building identification. Known as the building blocks of the hypertext system used for implementation, given the fact that building blocks can deeply vary between systems.

Building block types, bind and prescribe the objects to be used and the structures formed with objects.

3. Refine problem objects using basic building blocks of Hypertext. This activity completes labor undertaken during activities 1 and 2.

Identified objects must be expressed by way of basic building blocks of the hypertext system.

4. Refine problem structures. Evaluation is done, for establish how to link problem objects.

This activity considers rigorously building blocks details of the Hypertext System, because the final product of this activity is the logical model and the physical model of the problem.

5. Establishing policies for defining the possible link types for structure problems and object problems, when data is being added to data model. In this case it is necessary that users know the object schema, that in this particular case is the same data model. In traditional information systems the data schema does not concern users, but in the case of multimedia information systems, some insight about the data schema must be supplied to users.

Notation

A particular Notation is proposed to use troughout the activities for building the problem models.

Conclusion

Multimedia information systems have been involved with technical and methodical issues of the image processing area, but advances in this direction still remain uncertain. Beside this, successfull Multimedia information system developments have been reported, using Hypertext Systems under Hypertext approach. Because Hypertext Systems are here and can be used by developers, they are commendable assets for multimedia information system developments.

This work introduces an object oriented approach for multimedia information system development.

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