

Multimedia Data Modelling: Moving Up the Ladder

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Abstract (extended)

Multimedia data modelling is radically different from the traditional data modelling due to the special requirements imposed by multimedia data. One fundamental issue of concern is the notorious “semantic gap” between what were stored in the database, and what the end-users understand and expect. Due to the ambiguous, subjective, and transient (AST) semantic problems of multimedia data, necessary *context* information needs to be made available and provided in order to conduct meaningful and effective query processing of different paradigms and at various levels of abstraction. Unfortunately, traditional and conventional data models were not designed with such objectives in mind.

More specifically, when people realized that relational databases fall short in supporting advanced applications including multimedia data management due to the limited modelling power of the relational data model, researchers went ahead with devising semantic, object-oriented (OO) data models in the 80's (until early 90's). While the later commercial development of database systems has led to the so-called object-relational (OR) databases since late 90's, such a marriage of the two does not actually solve the problems encountered by multimedia data management. In particular, it does not solve the basic issue of bridging the semantic gap by addressing the AST problems.

In this talk, we present a new approach to multimedia data modelling by extending the traditional ANSI/SPARC architecture, attempting to cater for the unique requirements of multimedia data management. In addition to the traditional three level schemas, an additional semantic view mechanism called *MediaView* is added as a new layer between the external schema and end-user applications, moving up the ladder of semantic abstraction. Various facilities of this *MediaView* are described and discussed. Among other interesting capabilities, *MediaView* supports two important properties termed as *context dependence* and *modality independence* which are important to meaningful and effective query processing with different paradigms and at various levels of abstraction.

A number of applications have been developed based on this *MediaView*, and in this talk we shall describe some of these including Web-based recipe data management and cross-media retrieval.

References

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