

# DISIMA: A Distributed and Interoperable Image Database System

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## 1 Introduction

DISIMA (Distributed Image Database Management System) is a research project under development at the University of Alberta. DISIMA implements a database approach to developing an image database system. Image contents are modeled using object-oriented paradigms while a declarative query language and a corresponding visual query language allow queries over syntactic and semantic features of images. The distributed and interoperable architecture is designed using common facilities as defined in the Object Management Architecture (OMA).

## 2 Modeling and Querying Images

In DISIMA [OÖL+97], an image is composed of a set of physical salient objects (*PSO*) which are regions of this particular image with some syntactic features such as shape, color, and texture. The meaning of a PSO is given by an LSO (logical salient object), an abstraction of all the PSOs, referring to the same real world concept.

The colors in the images are organized in a hash-like index structure for color similarity searches. The entire image is divided into 4 quadrants, and each quadrant is recursively divided into 4, and so on. Each image is then represented by a quadtree that stores the color histograms corresponding to the quadrants. The dimensions of the colors histograms are then reduced and the result is stored in a multidimensional hash structure for a filtering step in similarity searches before using the color histograms for a refinement step.

The syntactic and semantic features are used in MOQL (Multimedia Object Query Language) to query

images. MOQL is an extension of the standard OQL language. We also defined an equivalent visual query language (VisualMOQL [OÖX+99]) and a translator to translate a visual query into an MOQL query.

The distributed architecture is based on CORBA which provides transparencies at the platform and the communication levels. At the image database level, different data models (different schemas) can be found, necessitating homogenization of the semantics of these schemas and any associated image content descriptions. The distributed architecture involves both homogeneous and heterogeneous systems although the first distributed prototype is built for DISIMA sites only.

## 3 Conclusion

Most image database systems are built around a multidimensional index and focus on similarity queries. In DISIMA, data are manipulated through algebraic operators, and indexes (if any) are used to speed up the query processing. This conference demonstration augments the on-line version (<http://www.cs.ualberta.ca/~database/DISIMA/Interface.html>) with distributed features and a novel indexing facility for multi-precision color-similarity searches.

## 4 Acknowledgments

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## References

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