Multimedia Database

Ajit Burad

April 10, 2006
1. Introduction

2. Advance Data structure
   - k-d trees
   - Quadtree
   - R-tree

3. Metadata
   - Need of Metadata
   - Metadata Classification
   - Source and Generation
   - Metadata Standards

4. Multimedia support for database
Introduction

What is Multimedia Data?
- Text, Images, Audio, Video, Graphical Objects (like CAD, CAM objects).

How is Multimedia Data different?
- Size
- Capture Methods
- Time Constraint like streaming
- Querying

Basic Approach of data retrieval
- Conventional Database System
- Information Retrieval System
- Content Based Retrieval System
- Graph or Tree Pattern Matching
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Advance Data Structure

Why are these important?
- Spatial Indexing
- Clustering Technique

Different Data Structures:
- k-d trees
- Quadtree
- R-tree
K-d Tree

K-d trees has properties like:

- Each node represents a rectilinear region
- Each node associated with an axis
- Direction of cutting plane alternate with depth

Node Structure of K-d Tree

- Child pointers
- Extent of the cell
- Parent pointer
- Pointers to content of the cell
K-d Tree Example

Division of points by k-d tree
Building K-d Tree

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QuadTrees
Representing Image through quad-tree
Quadtree
R-trees
Types of Queries

- Whole Match Queries
- Sub-pattern Match Queries
- K-nearest Neighbour Queries
- All Pair Queries or Spatial joins
Comparison of Data Structures

- K-d tree is easy to implement
- Tree height of K-d tree is greater
- For R-tree: large no of rectangles in one node (lower disk space)
- In R-trees overlapping of nodes allowed
  - So while searching, go down multiple paths
- In Quadtree: searching and deletion more difficult
Metadata

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Need of Metadata

- Inadequate processing techniques:
- Different Query Paradigm
- Lacking Efficiency
- Semantics of Multimedia Data
Metadata Classification

Based on dependence on content
Hierarchical Classification
Source and Generation

Source of Metadata
Generation of Metadata
What does it Mean??

- Development of metadata taxonomy
- Development of ontologies related to metadata attributes, description, and domain
- Development of metamodel registry structure (interoperability)
- Definition of functionality of tools for development and operation of metadata base.

Organization providing metadata standards

- Dublin Core metadata element set
- ISO 11179 standards
- Metadata Content Format (MCF)
Things to remember
Requirement for new data types ??
Oracle and SQL/3 supports:
Supported Operations:
SQL/MM & Oracles Intermedia
Thanks !!