Digital Asset Management
数字媒体资源管理

3. Multimedia Database Technologies
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Summary of Multimedia Database
What’s Multimedia?

• Multi => Many

• Media:
  – A means to distribute and represent information: Text, graphics, pictures, voice, sound and music..
    • Perception media (how do humans perceive information?)
      – Audio/visual media
    • Representation media (how is information encoded?)
      – ASCII, JPG, MPEG, PAL.
    • Presentation media (medium used for output/input)
      – Input/output media (keyboards, papers)
    • Storage media (Where is information stored?)
      – Magnetic disk, optical disk
What is Multimedia?

• Serious definitions:

  “From a user’s perspective - multimedia enables computer information to be represented through audio, video, text, images, graphics and animation.”

  “Multimedia is defined as an interactive computer-mediated presentation that included at least two of the following elements: text, sound, still graphic images, motion graphics and animation.”
What is Multimedia?

- Multimedia involves **Many Media**
  - THE MEDIA DOMAIN

- Multimedia involves **Computers**
  - THE SYSTEMS DOMAIN

- Multimedia enhances the **presentation and communication of information**
  - THE APPLICATION DOMAIN
Classification of Media Types

- Media types can be divided into two groups:
  - **Temporal (Continuous media)**
    - Time or more exactly time-dependency between information items, is part of the information itself.
    - dynamic, time-based, continuous
    - e.g., audio, video, music, animation
  - **Non-temporal (Discrete media)**
    - Time is not part of the semantics of the media.
    - static, non-time-based, discrete
    - e.g., text, graphics, images
Challenges about managing MM data

- Huge Size
- Quality of Service (QoS)
- Synchronization
- Content-Based Retrieval
Challenges about **managing** MM data

*E.g., in Oracle 9i...*

<table>
<thead>
<tr>
<th>Name</th>
<th>Data type</th>
<th>Size</th>
<th>characteristics</th>
</tr>
</thead>
</table>
| BLOB     | Binary         | 4Kb in table space  
4GB in ext. space | random access;  
transaction support |
| CLOB     | Character      | 4GB                                 | random access;  
transaction support |
| NCLOB    | National       | 4GB                                 | random access;  
transaction support |
| BFILE    | Binary         |                                      | Read only;  
external file |
e.g., in Oracle 9i, after the following:

```
CREATE TABLE Grape
  (grape_name VARCHAR2(25) primary key, picture BFILE);
CREATE DIRECTORY "PHOTO_DIR" AS 'C:\PICTURES';
```

The user can then do insert:

```
INSERT INTO Grape(grape_name, picture)
  VALUES ('chardonnay', BFILENAME('PHOTO_DIR', 'chardonnay.jpeg'))
```
Challenges about **modeling** MM data

- High level content abstraction is natural to the way humans think
- Effective modeling of MM data is critical
  - support for semantically rich conceptual contents
  - ability to represent diverse aspects of the data to be modeled
  - facilities for dynamic concept enrichment and expansion
  - incorporation of knowledge of low level data
  - isolation of the user from the low level representation and storage levels
• **MMDBMS**

• **Multimedia Database Management System**
  
  – *a framework that manages* different types of data potentially represented in a wide diversity of formats on a wide array of media sources
MMDBMS Characteristics

- **Uniformly query** data represented in different formats
- Query data represented in **diverse media**
- Retrieve media objects from a local storage devices in a smooth, jitter-free manner
- Provide audio visual presentation of a query result
- Deliver presentation to satisfy quality of service requirements
Multimedia equation
Multimedia equation

Multimedia = presentation + context
Multimedia equation

Multimedia = presentation + context

presentation: sensory, aesthetic part (美学)
Multimedia equation

Multimedia = presentation + context

presentation: sensory, aesthetic part

context = convergence + information + architecture
  • convergence = data + platform + distribution
  • information = storage and retrieval
  • architecture = compression + components + connectivity
Homework (I)

• Build your own multimedia data-base

• Requirements:
  – Choosing 1 of the following multimedia combines:
    • image + text, music + image, video + audio
  – Selecting >2 domains (or categories):
    • e.g., sports v.s. science, cartoon v.s. movie,
    • e.g., U2 v.s. 周杰伦 v.s. the Beatles, face v.s. no face
  – Gathering >50 examples for each domain:
    • Use google or baidu to search all required data
Homework (I)

• Hand out
  – Deadline: next Friday (12:00PM, 2008-09-26)
  – Data format:
    • one main folder (named by your ID)
    • two subfolders (named by chosen domain)
      – data in the same category should be installed in 1 subfolders
    • Unique data file format
      – .mp3 (music), .txt (text document),
      – .png (image), .avi (video, please use simple codec, <2min per seg)
  – Upload: FTP
    • TBD (will be ftp://10.76.1.1xx)