CMPSCI 754 Multimedia Systems **Spring 2001**

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26.1 Other Aspects of Multimedia Systems

- *Media Synchronization:* Synchronization of audio and video streams.
- *Collabrative applications:* Multimedia applications that allow group of people to interact. For example, shared whiteboard.
- *Multimedia Document architecture:* A generalized notion of WWW for continuous media. For example, hyperlink from one media file to another.
- *Multimedia Databases:* This consists of databases storing audio, video and images. Issues about querying, indexing, etc. need to be addressed.
- *Hardware Architectures:* Hardware encoder and decoder for digital media.

26.2 Multimedia Databases

Traditional databases for Textual objects are incapable of dealing with Multimedia objects. Indexing structures and query languages for textual and numeric databases are not adequate.

26.2.1 Query by Image Content (QBIC)

QBIC is a Multimedia Database system developed by IBM. It stores pictorial information in images/video like color, shape, texture, sketches in the database. The issues which need to be answered are how to query, index and retrieve data.

QBIC supports two types of data:

- Still images that contain objects like a tree or a house.
- Video shots that contain moving objects.

26.2.1.1 Handling Images

- QBIC extracts various properties of an image. These properties include color, texture, shape, etc. For example, it might compute the number of blue pixels in an image and so on.
- Images can also be annotated with textual information so that search for images can also be made using text.
- QBIC allows identification for an interesting region in an image.
- Image characteristic is stored with a thumbnail version of the image.

26.2.1.2 Handling Video

- QBIC allows one to do shot detection or identify scenes within a video clip. A representative frame can be choosen for each scene in the database.
- Information is extracted from these representative frames in the same way as done for images.
- It also stores how things are moving and allows one to extract motion information.

26.2.1.3 Handling Audio

- Various attributes of the audio can be stored in the database. For example, frequency matching can be done to search for some audio stream.
- Use a speech to text converter and index them.
- Find songs based on the words occuring in them.
- Query by humming.

26.2.1.4 Handling Queries

- QBIC allows queries based on color, texture, shape. It mimics a human mind to search the result of the query. Simple heuristics are used in this regard.
- QBIC also allows similarity based queries. For example, a user can sketch an object in freehand.
- The result of a query is a list of all thumbnail images.

26.2.2 Future challenges in Multimedia Databases

- Optimization of querying and indexing methods
- Annotation and database population tools
- Feature extraction
- Integrating multimedia databases with text