CSA402

Overview of approaches to Multimedia Information Retrieval

Lecture 10

Example Queries:

- Find images in which Don Quixote attacks the giants

- Find examples of Don Quixote attacking the giants

- Find a video clip of a train crossing a bridge over a valley

- Find the song which goes (hum the tune here…)

- Find an image of a scene of sunset in a horseshoe bay which has two palm trees growing in an X-shape on the left-hand side.

- Find examples of Captain Kirk saying "Beam me up, Scotty!"

Problems

- Ubiquitous MIR very hard (at the moment!)

- Scalability: high volume of multimedia data compared to textual document

- Semantics: already very hard in text collections

- Versatility: usually, solutions are domain and medium specific

Approaches

- Query-by-Example

- Query-by-Content

- Description Logics

Query-by-Example

- Use low-level syntactic properties of media to locate "similar" multimedia documents

- Statistical features

  Image (colour frequency, texture)

  Video (image features, variation over time)

  Audio (loudness, pitch, brightness [higher frequency content of signal])

- Structural information

  Image (spatial colour, contour)

  Video (shot length, shot type)

  Audio (bandwidth [variation of frequencies], harmonicity [comparison of spectra to white noise])

QBE Advantages

- Pattern recognition and matching

- Supports similarity-based retrieval

- Can classify documents (or rather, document segments)

- Can train QBE systems to auto-recognise/classify new material

- Don't need to mark-up with text

QBE disadvantages

- Not expressive enough

- Exceptions hard to classify/quantify

- Requires the user to know composition of relevant documents

- Can't search using a textual description

Query-by-Content

- Based on QBE, but with extensions for shape and motion.