

Tutorial 5: Video Retrieval
(SEMESTER II: 2001-2002)

CS4241 Multimedia Information Systems

1. Explain one example each where:

- a raw-domain shot-boundary detection algorithm
- a compressed-domain shot-boundary detection algorithm

will fail to detect a shot boundary.

2. Given a video V which has n shots $\{S_1, S_2, \dots, S_n\}$ and the length of each shot S_i is $|S_i|$, develop a key-frame extraction algorithm based on the *average histogram* technique which can extract N key-frames by extracting multiple key-frames from a shot such that the number of key-frames in a shot is directly proportional to the length of that shot. Ensure that at-least one key-frame is extracted per shot and assume $n < N$. Describe an example of a video where the above technique will work well and an example where the above technique will not work well.
3. Given a video V which has n shots $\{S_1, S_2, \dots, S_n\}$ and the length of each shot S_i is $|S_i|$, develop a key-frame extraction algorithm based on the *average histogram* technique which can extract exactly N key-frames where N is specified by the user. Your algorithm should cater for all three cases i.e. $n > N$, $n = N$ and $n < N$.
4. Suppose that for *representative frame extraction* for digital videos, it is required that at least one representative frame should be extracted from each shot. Explain how will you modify the cluster-based extraction algorithm to satisfy this constraint.