Digital Video Processing, SGN 3106, 4cu - Fall 2008

Exam: Oct 8th, 2008

NOTES:

- Correctness in English is NOT taken into account in the evaluation of the exam.

- *Hint 1: "brief" and "short" indicate that 3~5 lines of answer are sufficient. The capability of understanding well the question and summarizing efficiently the important technical aspects is a "plus".*
- *Hint 2: Please be focused in your answer. If I ask "what is a motion vector" do not write a three-page description of a video codec.*

1. What is temporal redundancy? Why is it important in video coding? What is the technique that is typically used in video coding to exploit the temporal redundancy?

2. Consider a scene where there is no movement (e.g. a landscape). Imagine two videos A and B captured from the same scene. In case A, the camera is panning from left to right, in case B the camera is zooming in. Suppose also that the encoder has a bitrate control mechanism, and the two clips A and B have approximately the same bitrate. Which of the two videos is likely to have the higher quality? Why?

3. Provide a short explanation of the following terms:

(a) Image Resolution
(b) Search Window (in motion estimation)
(c) Picture Start Code (PSC) in H.261 standard
(d) Progressive downloading
(e) RTP payload format

4. Draw a block diagram of a basic video **encoder** (such as the H.261 encoder) which is based on motion compensated prediction and DCT coding of the prediction error. The input to the encoder is a sequence of video frames, the output is the compressed video bit stream. Make visible (different color, or thicker line) one block where an external coding controller could act in order to change the bitrate, and briefly describe how this change could be achieved.

5. What is a *file format* in multimedia? Name at least one functionality that is enabled by the file format.