H.261 Standard – Exercise

Multimedia Technology,

Tutorial 3, section 1

H.261 Standard

Suppose a video is transmitted using the H.261 standard with CIF resolution at 15 fps.

If we send an I-frame every 30 frames and the compression ratio of the I-frames is 1:20, what should be the compression ratio of the P-frames so that the data rate does not exceed 256 kbps?

What will the size of each frame be?

In CIF we have 352 x 288 luma resolution and 176 x 144 chroma resolution.

Note: two chroma channels!

Each sample is 8 bits, so:

352 * 288 * 8 + 2 * 176 * 144 * 8 = 1,216,512 bits.

Note: I calculate bits because I have the rate in kbps.

How much bitrate do I have available?

I have 256 kbps = 256,000 bits/ sec

Note: Transmission rates are in powers of 10, not 2!

However, I have 15 fps and an I-frame every 30 frames.

So, one GOP requires 2 seconds.

In 2 seconds, I have 2 * 256,000 = 512,000 bits available.

What compression ratio is needed?

Let x be the required compression ratio.

In each set of 30 frames (a GOP), one frame (the I-frame) is compressed at a ratio of 1:20.

The other 29 frames (P-frames) are compressed at a ratio of x.

Thus: 1,216,512 / 20 + 29 * 1,216,512 / x = 512,000 => x = 78.19.