Summary (Simple Scenario)

이진영

Format Conversion

- RGB to **YCbCr**, because of high sensitivity of the eye to luminance
- Y for luminance, and Cb and Cr for color difference

```
Y = 0.299 * inputImg[j * stride + 3 * i + 2] + 0.587 * inputImg[j * stride + 3 * i + 1] + 0.114 * inputImg[j * stride + 3 * i + 0];
Cb = -0.169 * inputImg[j * stride + 3 * i + 2] - 0.331 * inputImg[j * stride + 3 * i + 1] + 0.500 * inputImg[j * stride + 3 * i + 0];
Cr = 0.500 * inputImg[j * stride + 3 * i + 2] - 0.419 * inputImg[j * stride + 3 * i + 1] - 0.0813 * inputImg[j * stride + 3 * i + 0];

R = Y + 1.402 * Cr;
G = Y - 0.714 * Cr - 0.344 * Cb;
B = Y + 1.772 * Cb;
```

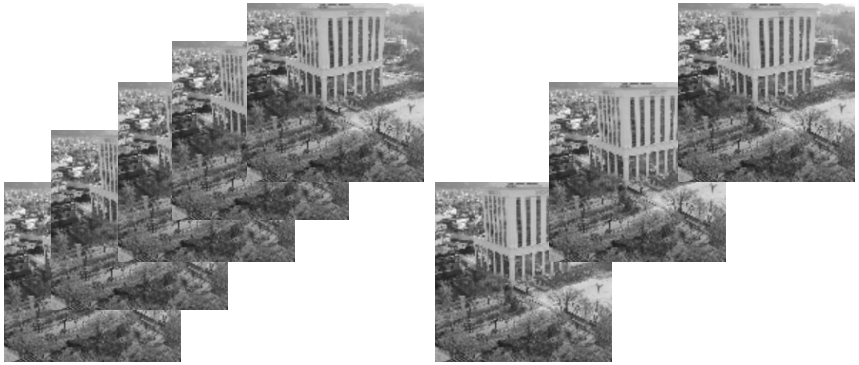
RGB→YYY in Our Experiments
(For Gray-Level Images)

Downsampling

- Downscaling from a high(original) resolution image to a low resolution image
- Information loss after downsampling such as **subsampling, average downsampling**, …

512×512

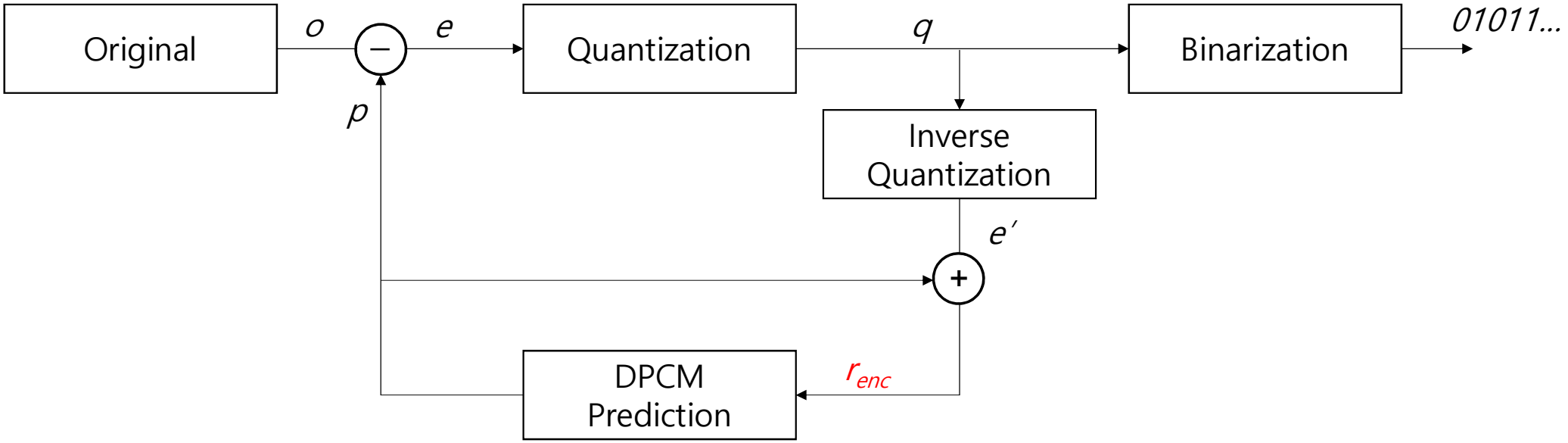
256×256



128×128

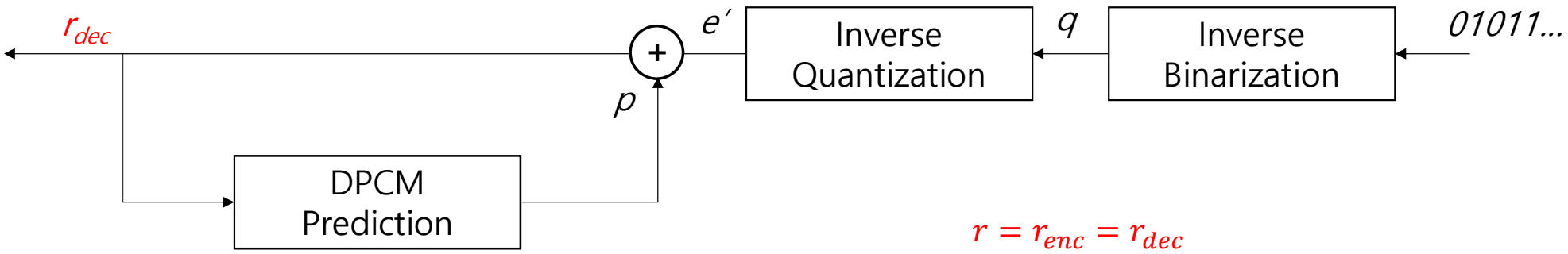
Encoding

- **Compression** from images to bitstream in a sender (Original image → Encoded bitstream)
- Quantization for lossy coding



Decoding

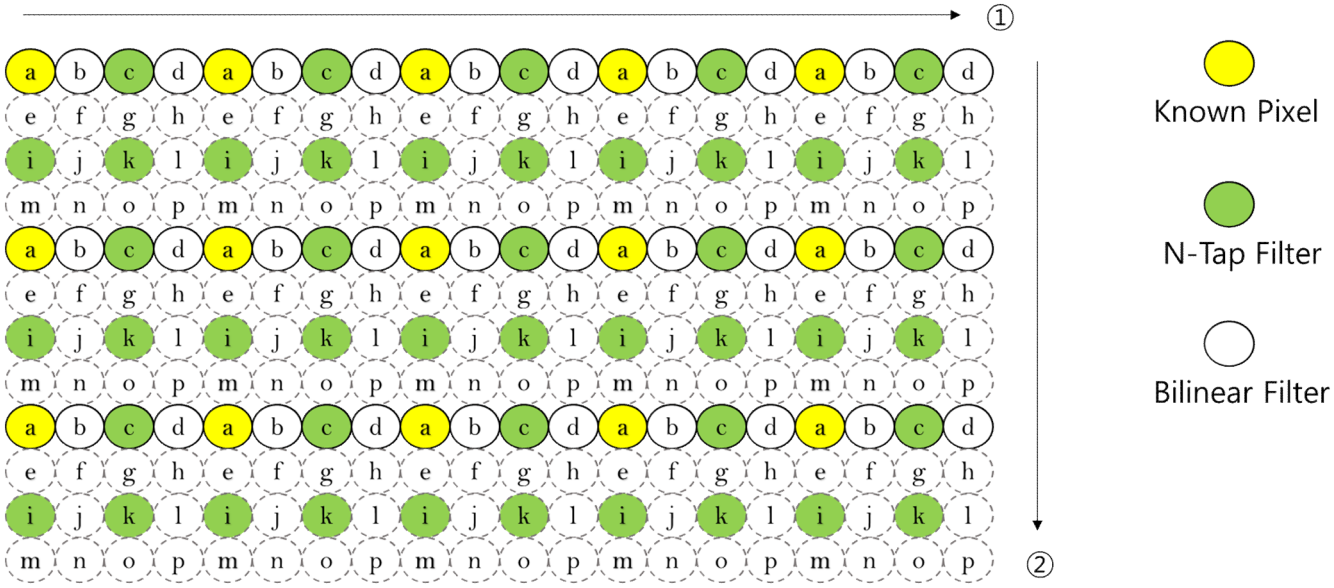
- **Decompression** from bistream to images in a receiver (Encoded bitstream → Reconstructed image)



$$r = r_{enc} = r_{dec}$$

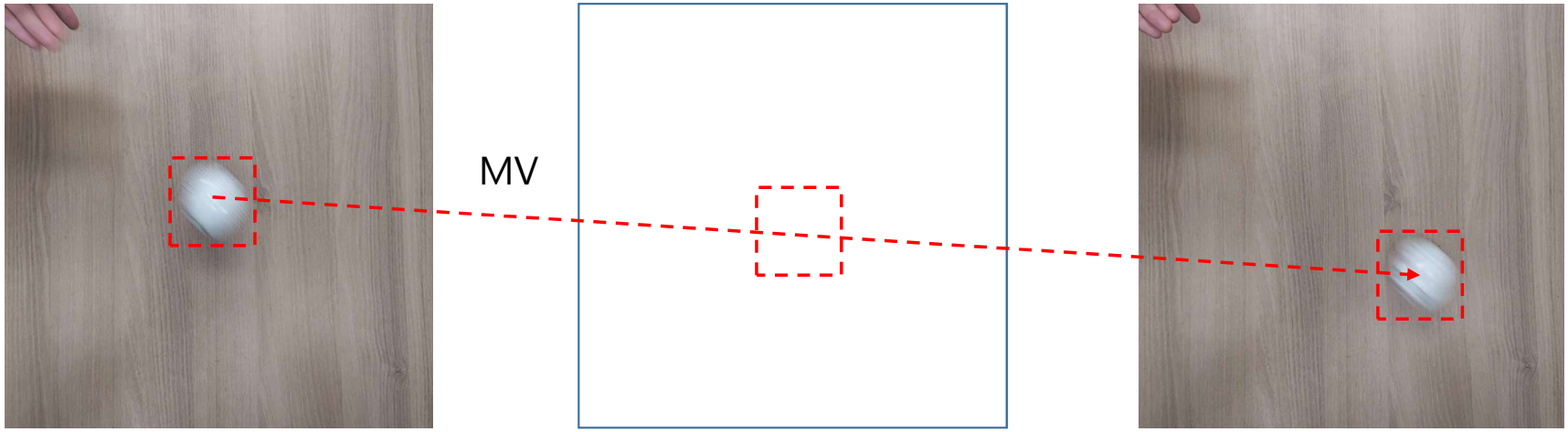
Upsampling

- Upscaling from a low resolution image to a high(original) resolution image
- Various **n-tap interpolation filter** that takes more surrounding pixels into consideration



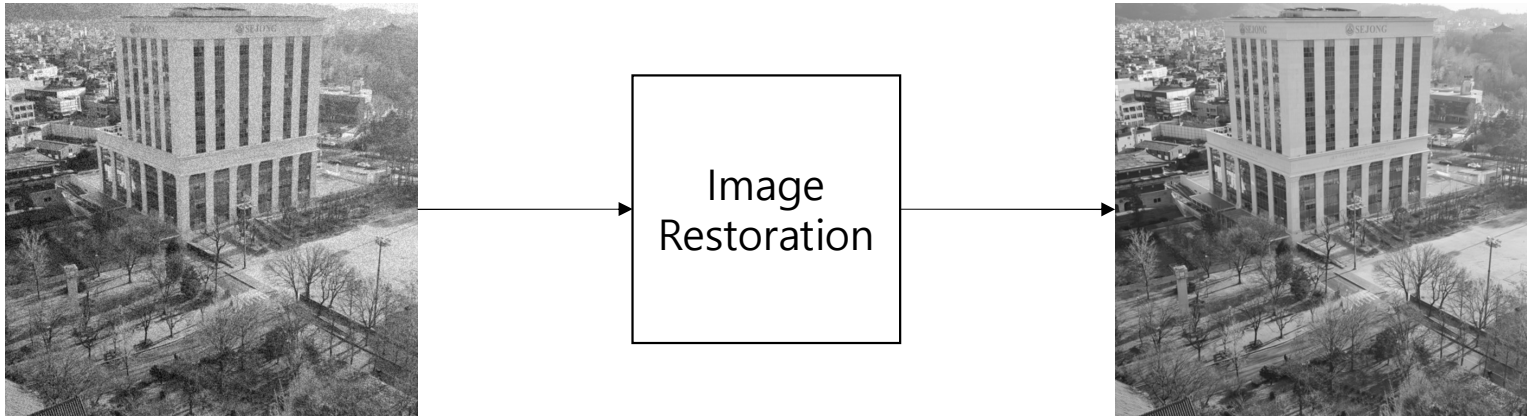
Frame Rate Up Conversion (FRUC)

- Generation of higher frame-rate videos from low frame-rate videos through frame interpolation
- Smooth continuity of motions across frames



Restoration

- Operation that obtains a high quality image from a corrupted image
- Removal of noise using **median and loss-pass filters**, such as mean filter, Gaussian filter, weighted average filter…

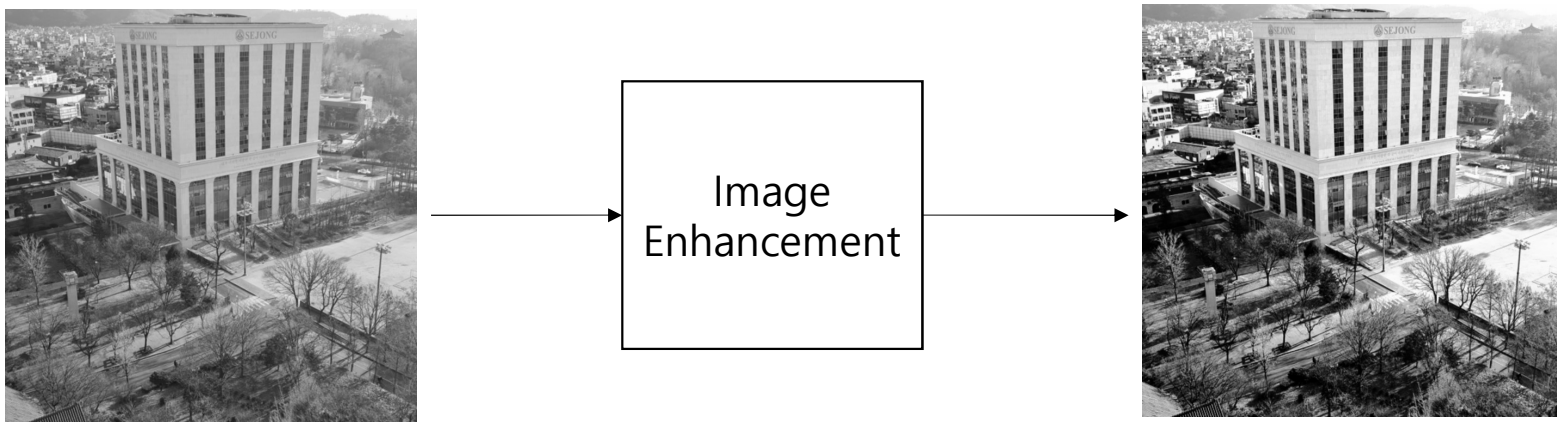


Low Quality
(Corrupted)

High Quality

Enhancement

- Image processing that emphasizes certain information of an image
- Operation that improves a (subjective) quality of images, such as **histogram equalization**, gamma correction, image sharpening…



Low Contrast

High Contrast