Programming Assignment #1

Due date: October 11 (Thurs.), 2018, 23:59 pm

Submission: FTP Server Upload

1. Implementation of Lucas-Kanade algorithm to estimate an optical flow.

(a) Using Lucas-Kanade method, find optical flows and draw them as the following example (use 10th and 11th frames and use a block size of 16x16 pixels)

Fig. 1. Example of Optical Flows.

(b) After that, perform reconstruction by using the extracted optical flows. Then, calculate peak signal-to-noise ratio (PSNR) by reconstructed frames (use the first 20 frames) as shown in Fig. 2.

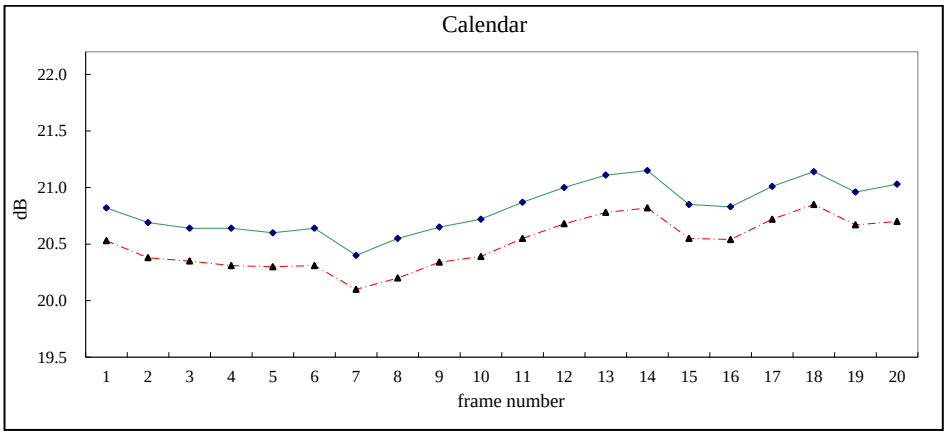

Fig. 2. Example of PSNR by reconstructed frames.

(c) Draw difference images between reference and motion-compensated frame as the following examples (use 10th and 11th frames).

Fig. 3. Example of difference image between reference and motion-compensated frame.

(d) Repeat the problem 1-(a) and (b) using different block size (32x32 and 64x64). And discuss ″aperture problem″ based on the results.

2. Implementation of Horn-Schunck algorithm to estimate an optical flow..

(a) Using Horn-Schunck method, find optical flows and draw them as the following example (use 10^{th} and 11^{th} frames and use a block size of 16x16 pixels)

(b) After that, perform reconstruction by using the extracted optical flows. Then, calculate PSNR by reconstructed frames using the first 20 frames and compare the result with the Lucas-Kanade method.

(c) Draw difference images between reference and motion-compensated frame (use 10^{th} and 11^{th} frames).

(d) Discuss the occlusion problem based on your observation during the implementation.

 # FTP Server Information (FTP Server: 210.107.130.66)

- Please make a ″*.zip″ file that includes program source code and report.
- Then, submit to the folder (″**07_PA_submission**″) in the FTP server (Ex: ″PA#1_HongGilDong.zip″).
  - ■ Do not write your student ID
- C/C++, MATLAB, or openCV are allowed (but the core algorithm should be written by yourself).

 # Following files can be downloaded in the course web page (ftp:// 210.107.130.66/06_PA/).

- Video file: ″Calendar_CIF30.yuv″
- YUV viewer: ″YUV viewer.exe″

 # Evaluation policy: Report (50%) and Source code (50%)