

3. Image / Video Processing I



(a) Example foreground frame (b) Example background frame (c) Example result frame

Figure 3.1: An illustration of background replacement.

3.1 Video Background Replacement

This task is to access and modify each frame of a video ‘monkey.mov’ and replace the blue background with ‘quadrangle.mov’.

1. Download video extension for Processing through plug-in manager
2. Play the background video
3. Save each frame as ‘PATHTOBACKGROUND/*i*.png’, where *i* is the frame index.
4. Play the foreground video. For each non-blue pixel per frame, draw it onto a background frame which is sequentially loaded
5. Save the resulted frame
6. After all frames are generated, merge the saved frames into a QuickTime video using Processing Movie Maker (Menu/Tools-Movie-Maker).



Video I/O APIs of Processing: <https://www.processing.org/reference/libraries/video/>

- (R) Video I/O APIs of OpenCV: https://docs.opencv.org/3.0-beta/doc/py_tutorials/py_gui/py_video_display/py_video_display.html

- (R) The *MovieEvent()* and *draw()* functions are not called at the same rate. So it would be nice to do your frame processing all within *MovieEvent()*. Or you can save all the frames at first and load them sequentially as image files in *draw()*.

- (R) You can manipulate frames when you load them from the original video and then write them into a newly created empty video.

- (R) An example of removing background: <http://learningprocessing.com/examples/chp16/example-16-12-BackgroundRemove>

- (R) saveFrame API: https://processing.org/reference/saveFrame_.html

- (R) Image I/O APIs of OpenCV API: https://docs.opencv.org/3.0-beta/modules/imgcodecs/doc/reading_and_writing_images.html

3.2 Motion estimation with Macroblock matching (Lab Submission 1)

- (R) Please refer to the LabSubmission1 specification released in week4.