

Project 2 documentation

FCV Lab

1. INTRODUCTION

In this project I tried to remove (mark) video frames containing no motion ("blank sequences") from the input video stream. (e.g. it can be used to avoid unnecessary recording and processing on surveillance videos.)

Using Python and OpenCV I wrote a program that:

- Opens the video stream (e.g. by capturing video from the connected camera using `cv2.VideoCapture()`)
- Examines in "real-time" all captured frames to
 - a) Display each frame in a window as following
 - IF there is no "significant" motion between the previous frame and the current frame (black sequences) the displayed image should be marked as removed (e.g. with red diagonals over it);
 - IF some movement exists between the previous frame and the current frame the displayed image will show the unaltered content of the current frame
 - b) Save the current frame in an output video file only if the frame is not marked as "removed".

2. ALGORITHM

- I opened the video stream and initialized the video writer and wrote the first frame.
- I kept the first frame and assigned it to a variable called *previous_frame*.
- In a while loop I keep reading the frames of the video.
- In the loop I make use of the *current_frame* and the *previous_frame*.
- I reduce the brightness of the frames by 15 using the function from the last project.
- I convert both frames to grayscale.
- I apply gaussian blur to both gray frames.
- I calculate the absolute difference between the 2 frames.
- I apply thresholding to the image resulting from the above operation.
- I find contours on the thresholded image.
- I calculate the maximum area of the contours.
- If the maximum area is less than a threshold or bigger than another (for quick changes in brightness), then we consider that there is no movement and mark the frame with a red X.
- Else if there is movement in the frame, we save the frame in the output video containing frames with action.

CONCLUSION

In conclusion, I succeeded in creating an accurate system for detecting blank sequences in a video. This system can be used in a real world environment so as to improve processing times and computation power by eliminating irrelevant frames.