Motion Detection Method to Compensate Camera Flicker Using an Algorithm

[1]Alam Inder Singh, [2]Gagandeep Kaur

[1]Student, M.tech Electronics and Communication Section, YCOE, Talwandi Sabo, Guru Kashi Punjabi University Campus, Patiala

[2]Asst Prof., Electronics and Communication Section, YCOE, Talwandi Sabo, Guru Kashi Punjabi University Campus, Patiala

Abstract

This paper presents an improved motion detection system that is based on background subtraction method and threshold comparison method. Motion detection is used in many computer vision tasks like human tracking, pose estimation and recognition. It is a basic part for many computer vision tasks. Our purposed method makes background image using 10 previous consecutive frames. Our method detects motion via a standard webcam in real-time YUY2_640x480 resolution. Experimental results showed that the proposed method is more robust in nature as it can avoid the noise in motion detection due to camera flicker and useful to reduce the number of false positive alarms.

Keywords - background subtraction method, consecutive frames, motion detection, threshold comparison **method.**

I. Introduction

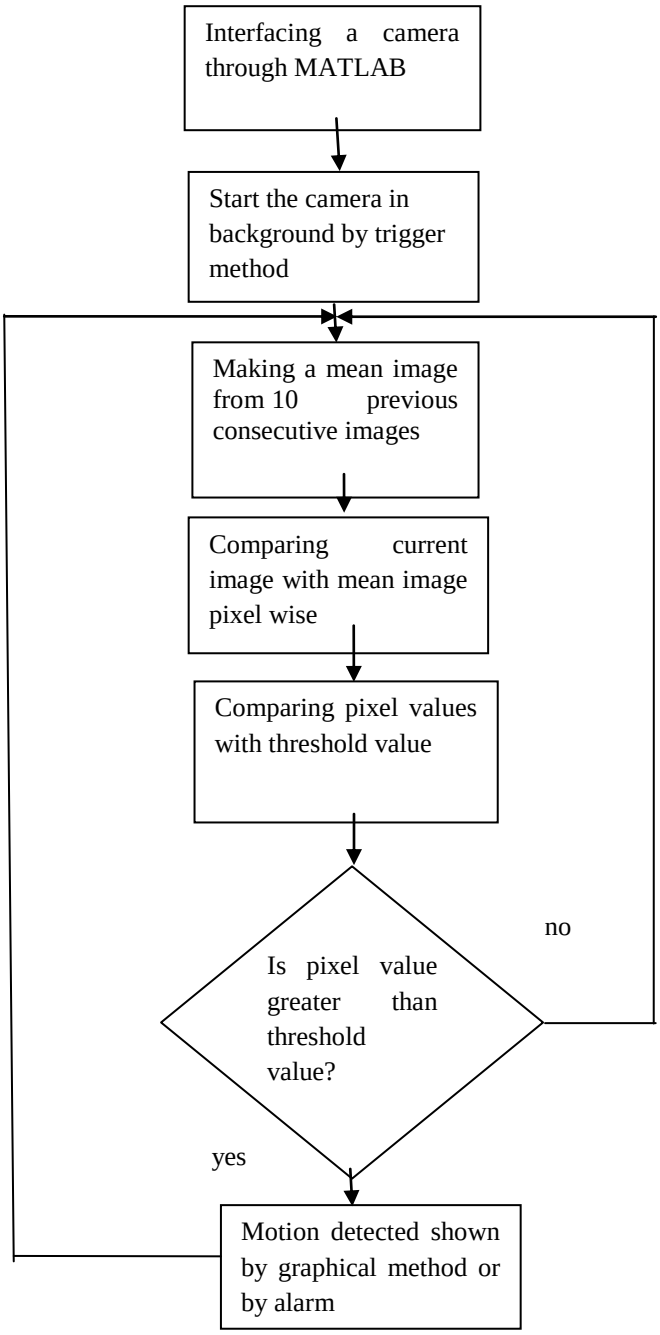
Motion detection is a process of confirming a change in position of an object relative to its surroundings or the change in the surroundings relative to an object. The task of a motion detection system is to detect a "area of motion" present in a "area of environment being monitored". The area of motion in this case refers to portion of the environment with activity due to the motions of moving objects. Motion detection is usually a software-based monitoring algorithm which, when it detects motions will signal the surveillance camera to begin capturing the event or simply shows the motion detection using graphical method.

Motion detection is used in many computer vision tasks like human tracking [3], pose estimation [4] and recognition [5]. It is a basic part for many computer vision tasks. Many methods are used for motion detection such as optical flow method [6, 7, 13], background subtraction method [2, 10] and consecutive frames subtraction method [1].

Optical motion detection method uses Infrared light or laser technology for motion detection. Devices, such as PIR motion detectors, have a sensor that detects a disturbance in the infrared spectrum, such as a person or an animal. Once detected, an electronic signal can activate an alarm or a camera that can capture an image or video of the motioner. Background motion detection method is a simple method for motion detection by a fixed camera compares the current image with a reference image or background image pixel by pixel and simply counts the number of pixels with change more than the threshold value and thus motion is detected. Consecutive frame subtraction method simply compares the current image with previous image to find the change in value of pixels above threshold to detect the motion.

In this paper, a new approach is purposed which is a combination of background subtraction method and consecutive frame subtraction method. As in this method background image is formed by taking mean of previous ten consecutive frames and then current image is compared pixel wise with the background image to detect motion. This method will brought some robustness in motion detection because previous background subtraction method is very sensitive to the very little motion that can be called noise

II. Flow chart



The focus of this paper is on making a background image from ten previous consecutive frames in real time by trigger method. Then current image is compared pixel wise or subtracted from background image to detect any motion. The image received after subtraction is called difference image. Values of pixels can be positive or negative in difference image. Therefore absolute of difference image is taken and then values of pixels in difference image is compared with threshold value and if the pixel value is more than threshold value then it means there is motion in the area being monitored. This method continuously keep making background image using ten previous frames in real time. To make it practical and useful warning system or graphical method is used. This method will also show the number of objects detected in motion and percentage area of total area in which motion is present. This

background image formation and motion detection process happens in while loop because it continuously detects motion in real time, it did not stop until required it to stop.

III. Image processing

This method analyzes the images captured by camera to detect motion in the area being monitored using MATLAB Software. Using image processing technique to create the mean image or average image of previous ten consecutive frames and then subtracting this mean image from current image to detect the motion. In addition this method also shows number of objects in motion.

IV. Output/warning unit

Two approaches are used for indication of motion detection, one by blowing alarm upon motion detection and second is the graphical method to take a record which shows number of objects in motion and percentage of area in which motion is present.

V. Motion detection

This method is used to detect motion by comparing the pixel value of difference image with threshold value provided by us in the algorithm. As shown in TABLE I, object in motion is said to be detected when pixel value is more than the threshold value. Threshold value is provided according to our requirement depending upon environment. This method can detect number of objects in motion. The motion is said to be caused by object or living being by counting the number of pixels with more than threshold value grouped together. This method can detect more than one object in motion by counting the number of groups of pixels. Detected motion can be considered appropriate depending on the number of pixels present in a group of pixels as we can ignore a group of pixels having less than 5 numbers of pixels in it as it can be due to noise. This method can also show the percentage area in which motion is present using graphical method.

Comparison of threshold value and pixel value	Motion Detection
Pixel value > threshold value	Motion is present
Pixel value < threshold value	Motion is not present

Table1-Comparison of threshold value and motion detection

VI. Conclusion

In this paper, a new method is purposed to detect motion using the algorithm. The proposed method is adjustable to the camera movements which were shown as detected motion in other approaches because of their over sensitivity. Therefore this method is useful to reduce the number of false positive alarms.

In addition this method shows the number of objects in motion detected if there are many and it also shows the percentage of total area in which motion is present. It runs at a 640×480 resolution which is acceptable for real-time scenarios. Experiments showed that the proposed method is more robust in nature as it can avoid the noise in motion detection due to camera flicker. According to the real world experiments motion detection and graphical method used for taking record is taken in the experiment in real time.

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