e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:05/May-2022 Impact Factor- 6.752 www.irjmets.com

MOVEMENT DETECTION USING OPENCV

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ABSTRACT

Movement Detection using python is the technique of detecting of occurrence of any movement in front of the camera. In this article, I used Opencv2, Tracker, and Win Sound library. Using opencv2 it detects the person when the person is moving or makes any movement .then it will fire an alarm and count the person's movements using the tracker and win sound library. This Project can be used as a surveillance camera or to monitor a person's movements.

Keywords: Computer Vision; Raspberry Pi; Face Detection; Opencv; Motion Detection.

I. INTRODUCTION

Movement Detection is the technique of detecting of occurrence of any movement in front of the camera when a person makes any movement. In this Article it detects and counts the movements from the web camera using OpenCV and a bounding box will be rendered to the Movement detected as if any new object will introduce in the frame. Then a Box will appear surrounding the object. Using a tracker it will count the movements of an object/person. And it will fire the alarm using a winning sound. For movement detection, we calculate the difference between two continuous frames and if it's higher than the set threshold, it means Movement detection has been observed there. The main is to detect Movement in the frame i.e. if any change will occur in the frame. It can be done either through recorded video or using a live camera. In addition, it provides real-time support using the camera or web cameras in many applications Face Recognition and many more.

II. LITERATURE REVIEW

Ravi D. Simaria, Prof. D. S. Pipalia (2015) [1] this paper presents an implementation of real-time detection and tracking of an unknown object in a video stream with a 360° (azimuth) rotating camera. It also presents the adaption of different object tracking algorithms and their effect on implementation. The system described in this paper contains a camera that is connected to an embedded system (standalone board) or PC/laptop. They (board/PC) are having an image processing algorithm that detects an object first and then tracks it as long as it is in the line of sight of the camera. As the object moves, the PC/laptop/embedded Board gives a signal to the motor to rotate the camera which is mounted on a stepper motor. To monitor Objects in video users can have multiple options. If a user is using a laptop/PC to track an object it is very simple for him because he already has a screen but in the case of an embedded board user can monitor the activity of the object of interest using HDMI output or streaming video on the WEB server. The object can be defined directly by the end-user by selecting a portion of the frame in a video stream. The embedded board/PC also saves the video stream in a storage device for playback purposes

Huh. (2015)[2]In this base paper the author depicts the design and implementation of low-cost monitoring with the help of Raspberry Pi, a solitary board computer that takes after Movement Detection calculations written in the environment. Furthermore, the system uses Movement detection technology to overcome the utilization of large memory space to reduce investment costs. The algorithm for Movement detection is being implemented on Raspberry Pi, which empowers a live streaming camera alongside Movement detection. The live camera can be seen from any web browser, even from mobile phones.

Kamal Sehairi, Fatima Chouireb, Jean Meunier. [3] In this base paper the author compared five different threshold algorithms to find the best-suited threshold algorithm for Movement detection both indoors and outdoors. All these five threshold methods have been tested on different differential Movement detection algorithms, using four scenes with different complex backgrounds. A pixel-based evaluation has been done to determine the best combination. Five different threshold methods: Otsu's method, the iterative selection

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(ISODATA Iterative Self Organizing Data Analysis Technique), Kapur's Entropy thresholding, Ramesh's threshold method 8, and Tsai's threshold. The author tested all these five threshold methods and find out that Otsu's method and iterative selection method give the best result in both indoor and outdoor conditions.

III. METHODOLOGY

Movement Detection-

Movement Detection is the technique of detecting of occurrence of any movement in front of the camera. Movement detection is the most important stage in video surveillance systems, good results of this stage are not justified only by the choice of the method but also by the good segmentation and the adaptation to changes in luminance. Here the process of Movement detection is done through the Real-time Camera. Using a python script that would analyze the captured video and look for any difference in the frame from the last one the running script compares the difference between the last captured frame and the current captured frame, if there is a difference occurring it would be a fire Alarm and it will count the movements.

OPENCV2-

In this research paper, I am using the OpenCV library in my system for image processing purposes. Movement detection is an image processing process that needs a special library and OpenCV is that library that runs in the python programming language.

Tracker –

Object tracking is a deep learning application in which the algorithm takes an initial set of object detections and creates a unique identification for each of them, then tracks the detected items as they move through video frames. Object tracking, in other terms, is the task of accurately recognising objects in a video and understanding them as a series of trajectories. Often, an indication surrounds the tracked object, such as a surrounding square that follows the object and shows the user where the object is on the screen.

Win sound –

This beeps the PC or laptop speaker. This accepts two arguments: frequency and duration. The frequency parameter specifies the sound's frequency. The sound should be in hertz, with a range of 37 to 32,767. The duration option specifies how long the beep sound should last. And the duration is given in milliseconds. This raises the Runtime Error if the system is not able to play the sound. Syntax- wins sound. Beep (frequency, duration)

THRESHOLDING-

The beep sound's frequency is specified via the frequency parameter. The frequency range is 37 to 32,767 hertz. The duration parameter determines how long the beep sound will last. Most frequently, we use thresholding as a way to select areas of interest in an image, while ignoring the parts we are not concerned with.

IV. RESULTS AND DISCUSSION

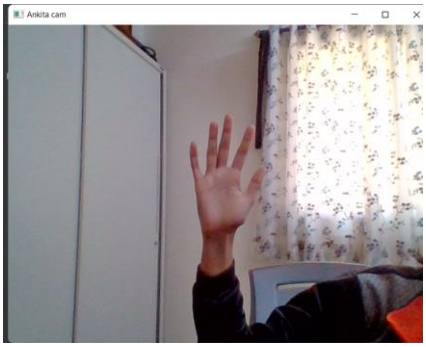

Figure 1: Before thresholding

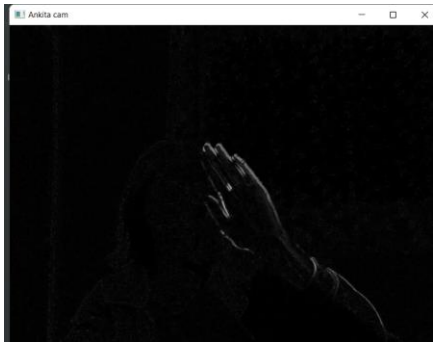

Figure 2: After thresholding

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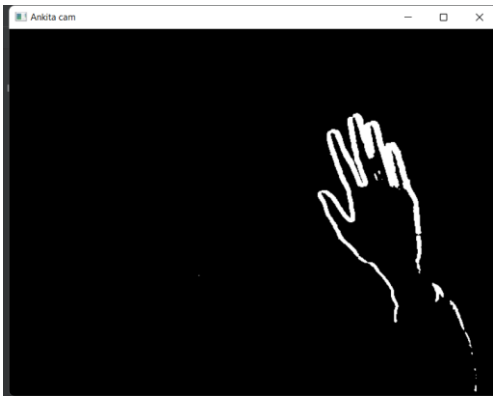

Figure 3: After thresholding to make border around the the person I use contours

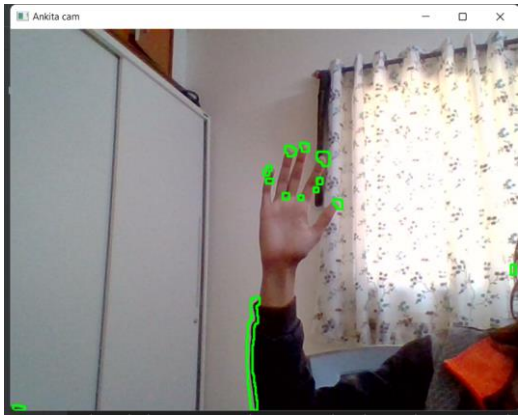

Figure 4: To make perfect rectangular I used if condition

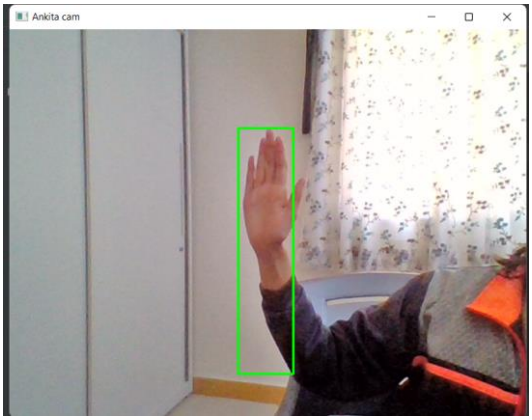

Figure 5: Using python tracker library it will count the movements of person

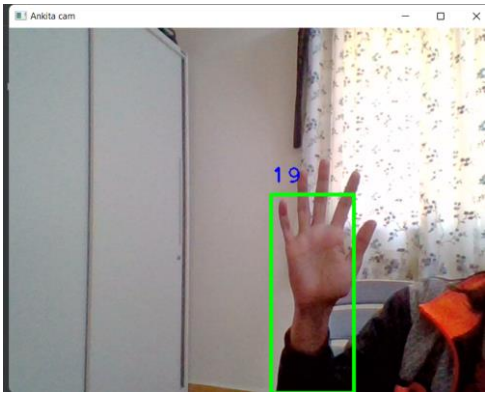

Figure 6: It will count the movements of person

V. CONCLUSION

This Article can also be introduced as a better alternative to the expensive traditional security systems that take up much storage space and are not affordable for everyone. This Project is compact and doesn‘t require any special modifications in the system can be implemented easily also. As I tested this Project several times and found that the accuracy of this project is 98%. The cost of making and implementing this project is also very low. It gives all results accurately and on a given time limit.

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