MOTION DETECTION AND ANALYSIS USING OPENCV

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ABSTRACT: Python's movement detection utility can detect motion in front of a camera. I created this piece using the Win Sound library, Tracker, and OpenCV. OpenCV2 can identify motion, whether it comes from a moving object or a person.After that, a warning will be issued, and the tracker and sound library will be utilized to monitor the subject's movements. This gadget can be used as a security camera or for espionage.

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 essay investigates the use of a 360-degree rotating camera to observe and verify an unidentified object in a real-time video feed. Furthermore, the practical implications of changes made to various object tracking systems are thoroughly considered. This study demonstrates the ability of an integrated camera to connect with either an independent device or a personal computer. Prior to tracking an object, an image processing program installed on the board or computer can detect it as long as it is inside the camera's field of view. To function, the integrated device, laptop, or desktop computer must be powered on. The device directs the stepper motor to spin the camera while it does the duty. There are several approaches for monitoring video material. The integrated screens featured in desktop and laptop computers make it easy to trace an item. In contrast, an embedded board enables the user to observe the device's operation via an HDMI output or via streaming video from a web server. The user can select an object by pinpointing a specific instant in a video stream. An integrated board or personal computer uses a storage device to save and save visual data for later viewing.

Huh. (2015)[2] The author of this piece demonstrates how to build and set up inexpensive monitoring systems using a Raspberry Pi, a specialized single-board computer built to perform motion detection calculations based on environmental inputs. Furthermore, the system incorporates motion detection technologies, which cut costs by eliminating the requirement for significant memory capacity. The Raspberry Pi allows for the seamless integration of a motion detection program and a camera that transmits live video. Users can access the live camera via a web

browser on a variety of devices, including mobile devices.

Kamal Sehairi, Fatima Chouireb, Jean Meunier. [3] The author of this seminal paper evaluated the effectiveness of five threshold methods for detecting both internal and external motion. Each of the five threshold methods was evaluated using a unique differential movement recognition algorithm. The assessment technique involved evaluating four separate and difficult scenarios. To discover the best combination, each pixel must be carefully analyzed. Currently, five major thresholding methodologies are being used. Ramesh and Tsai, Kapur and Otsu, and Ramesh himself have all proposed the concept of entropy thresholding. After carefully evaluating all five cutoff strategies, the author determined that the stepwise selection method and Otsu's approach performed well in both indoor and outdoor settings.

III. METHODOLOGY

Movement Detection-

The camera can detect motion within its visual range. Typically, this phenomena is known as "motion detection." Many video surveillance systems rely heavily on motion recognition technology. This element's usefulness is determined by factors other than the chosen approach, such as picture segmentation accuracy and the elements' reactivity to changes in illumination. A live camera is used to detect movement in such scenarios. A Python application is used to analyze the collected video and discover inconsistencies between the current and previous frames. The script starts counting movements and sends an alert when it notices a change between the current frame being recorded and the previous frame.

OPENCV2-

As part of my study project, I'm using my own computer's OpenCV library to perform photo analysis. OpenCV may be used to detect motion in images with specific software. It was created using the Python programming language.

Tracker –

Object tracking is a deep learning application that uses an algorithm to detect and document the movement of certain objects over a sequence of video frames. To accomplish this, each object in the initial set of detections is given a unique identifier. Object tracking is the study and interpretation of an object's movement in a video using its trajectory. Frequently, the location of an object is captured and displayed on the screen using a square or another visual indicator.

Win sound –

The speaker on the laptop or PC produces unwanted sound distortions. Numerous reasons support the concepts of lifespan and consistency. Frequency selection is the process by which the precise frequency at which an auditory signal is produced is decided. The sound's frequency spectrum should fall between 37 and 32,767 hertz. The length of discordant sounds can be altered by changing their temporal sequence. In addition, milliseconds are used to quantify duration. A Runtime Error occurs when the computer is unable to decode the provided sound. In terms of sound, grammar takes primacy. Find the frequency and duration of the sound.

THRESHOLDING-

Modulating the numerical value corresponding to the frequency allows for control of the strength of the discordant sound. A frequency range of 32,767 hertz to 37 hertz has been recorded. The duration parameter describes the noise's magnitude in seconds. Thresholding is a technique for emphasizing important aspects in an image while ignoring less significant ones.
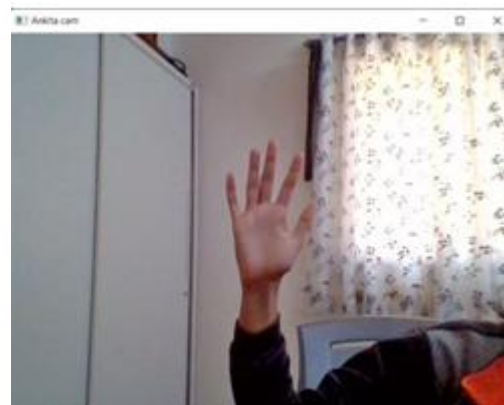
IV. RESULTS AND DISCUSSION

Figure 1: Prior to implementing thresholding,

Figure 2: Following the determination of the threshold.

Figure 3: Following thresholding, contours are used to define each individual's unique characteristics.
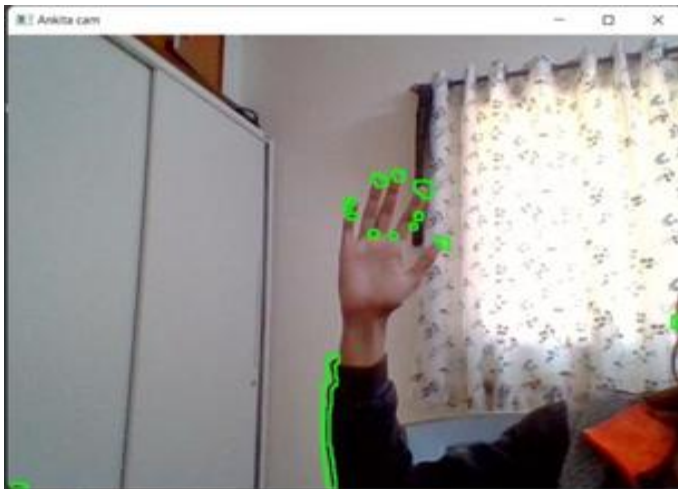

Figure 4: Using an if condition, it was feasible to determine whether the desired rectangular shape had been obtained.
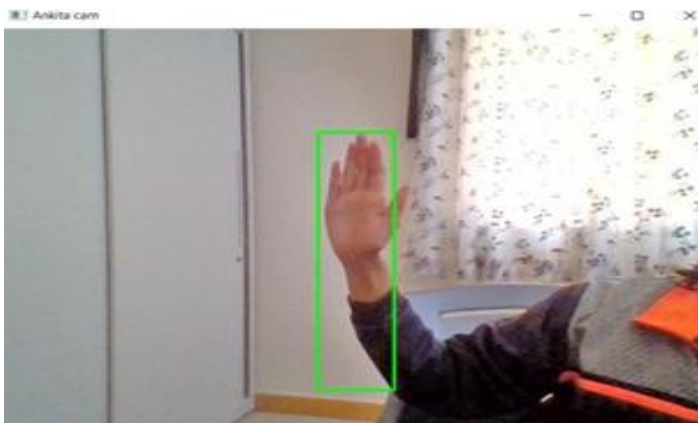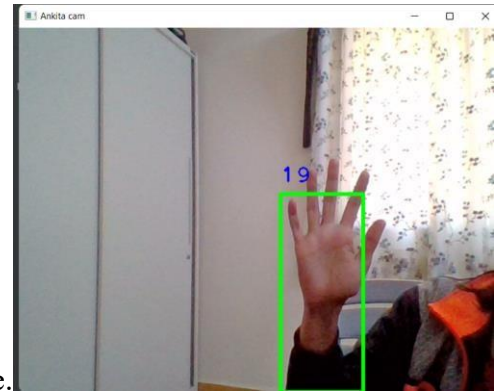

Figure 5: To track an individual's movements, use

the Python tracking

package.

Figure 6: Surveillance will be used to locate specific individuals.

V.   CONCLUSION

Furthermore, this paper proposes a financially realistic alternative to the current security systems, which are prohibitively expensive, need significant storage capacity, and are inaccessible to the general population. This is a straightforward task that does not require a change to the existing system. In addition, it is simple to implement. Following a rigorous battery of tests, it was determined that the project has a remarkable success rate of 98%. The project's strategic and operational phases were completed effectively with minimal financial investment. Each resolution is implemented in a timely manner, with painstaking attention to detail.

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