

Smart Security Surveillance System With Intrusion Detection and Handling

Pushkar. N. Sharma¹, Ms. Neha Jain², Karan .G .Rai³, Deepak. B .Mewada⁴
^{1,2,3,4}Dept of Computer, SLRTCE(Mumbai)

Abstract— Current video surveillance system which use CCTV camera require constant human vigilance for effective outcome. our project tries to remove that need of humans and makes those cameras smart by implementing human detection algorithms on them.

I. INTRODUCTION

Nowadays, research experience continuous growth in network surveillance. The reason being is the instability incidents that are happening all around the world. Therefore, there is a need of a smart surveillance system for intelligent monitoring that captures data in real time, transmits, processes and understands the information related to those monitored. This project makes use of Opencv library to capture camera images and detect intrusion using image detection techniques (Histograms of oriented gradients). Then when an intrusion is found, it sends the streamed image to computer. Once data is placed at server we can view the data at remote PC. We can view continuous streaming of video as well as sensor's data. At the remote location a log will be maintained which will contain records in timely manner about all the visitors. Since images are only captured when intrusion is detected it even saves the overhead of hours and hours of surveillance video recordings. Along with image capture, our project sends and immediate message to the user mentioning that an intrusion has been detected on his/her property. Hence making it possible to stop the crime. Even if it is already late the data can then be used as a forensic tool for after-crime inspection.

A. Need of Video surveillance.

There are many benefits of video surveillance like i. Availability- There was a time when the surveillance techniques were utilized only in shopping centres and malls. Now-a-days, you can notice closed-circuit televisions almost at any place you visit, from a small store to homes and holy places. As a result, they guarantee greater public security at a fraction of the cost. ii. Real-time monitoring- Traditionally big organizations have always had the benefits of video surveillance manned by security professionals. In the past times, the events captured on video were used to expose important information and work as proof after the event happened. But, modern technologies let users to check and reply to alarms immediately.

Using a number of video cameras, a large amount of visual data is captured that is to be monitored and screened for intrusion detection. Presently, the surveillance systems used requires constant human vigilance. However, the humans have limited abilities to perform in real-time which reduce the actual usability of such surveillance systems. Also such surveillance systems are not reliable for real time threat detection. From the perspective of forensic investigation, a large amount of video data obtained from surveillance video tapes need to be analyzed and this task is very tedious and error prone for a

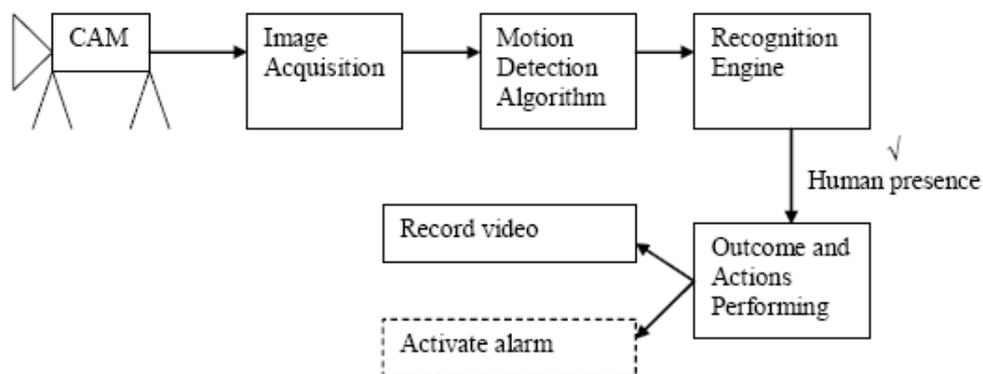
human investigator. To overcome this drawback, automatic video analysis system is developed that continuously monitors a given situation and reacts in real-time. The proposed system has an ability to sense intrusion and respond to it in real time.

B. Resources and Requirements.

Basically, the project is going to use a method described by David Moore's final thesis on "A real-world system for Human Motion Detection and Tracking" [1] from California Institute of Technology. Mainly, this module requires functions and algorithms written in the Intel's open CV library. In the hardware's perspectives, we had used a webcam for testing purposes with specifications up to 30 frames per second and support up to 600x800 screen sizes. However, the project had only implemented 300x200 of resolution. The reason behind is because of speed performance issues and also limitation by the Intel OpenCV [19] libraries' rectangles drawing functions which did not draw well with larger resolution. This however maybe be only a problem in the version implemented here which is beta3.1.

II. MOTION DETECTING METHOD

Human Motion Detection System can be used in surveillance and security systems. The system that this project came up with will be useful for security in a fixed restriction area. Therefore, the background of the targeted area is assumed to be non-moving and considerations of sudden change in lightings are ignored as well. However, the considerations of other factors are taken into consideration. Basically, the initial plan was to use a technique called image segmentation to abstract the foreground image from the source image obtained and later processed to filter out noises or small images disturbance. To perform this, we would use Open Source Computer Vision Libraries [19] from Intel to obtain contours from the foreground image subtracted. We will map these contours' pixels with the original images' to send raw data into the other module of the project performed by our partner on classifying the image frame obtained on whether it's a human motion or not. His module would return a percentage of recognition rates on whether the motion belongs to human or not. Based on a level on acceptable percentage that it is sure it's a human motion, the program would detect and displays the motion with a bounding box on the human which is in a different colour to other moving objects that caused motion as well since all moving objects are bounded by the rectangles. The program will record down the scene when the motion event occurs.



(1)

the basic human motion detection would have an alarm system integrated. However, the development of the prototype system did not include the alarm interfaces. Since there's no hardware for the research team to test, the program would only go as far as recording the video where motion events occurred in a scene. Thus, to get a clearer picture of the system developed.

III. LITERATURE SURVEY

Fast development in the technology has increased the risk of intrusion. Using security cameras allows a person to monitor his property. The majority of organization and administrations are making use of such security cameras with the intention to save their business as well as property from terrorists and illegal entry. Nowadays, the security cameras have become much more advanced, reasonable, smaller and straight forward.

A number of video surveillance systems have been proposed for different purposes.

Few years back a system was proposed in which an automated and distributed real-time video surveillance system which can be used for the detection of objects and events in a wide range of applications. The system captures video from multiple sources which is then processed and streamed over the internet for viewing and analysis. The proposed system is flexible as the components of the system can be interconnected in several manners. The experimental results of the system show that it can handle multiple video data running on standard computers and yielding fluid video. Another system was proposed where in a semantic event detection system based on a neural classifier that screens continuous video streams and detect relevant events for video surveillance.

Our system captures images of anyone entering the premises and will take necessary actions whenever it those not recognize intruder. Our system checks if any human has entered the area using Histograms of oriented Gradients.

IV. CONCLUSION

Smart surveillance systems significantly contribute to situation awareness. Such systems transform surveillance from data acquisition tool to information and intelligence acquisition systems. Real-time analysis provides smart surveillance systems with the ability to react in real-time. Our system senses the intrusion and sends notifications to authorized persons so that action can be taken in response to the intrusion.

In the future, as time permits we could plan to enhance the scope of our project by incorporating face detection into our project. The advantage of this implementation would be that if intruder entering into the house is not recognized by the face detection algorithm, the designated owner could be informed about this via SMS. For face detection we could use Template based matching method, using predefined Open CV functions which is an open source framework that offers various predefined functions for image processing. This would in turn develop our system into a more secure one.

V. FIGURES

(1) System overview: Describes the basic layout of our proposed system.

VI. ACKNOWLEDGMENT

Here, we would like to take this opportunity to express our heartfelt gratitude to our supervisor for this research project, Mrs. Neha Jain for her patience with us and her down to earth personality which have given many pointers to guide us during our work in this research project. Next, we would like also thank

the head of computer engineering department at SLRTCE Prof. Vinayak Shinde. Also we would like to thank the University for approving our proposal for this project. We would also like to thank the people who have published their papers for our reference and also Intel for making OpenCV open source.

REFERENCES

- [1] T. Mandrupkar, M. Kumari, R. Mane, International Journal of Advanced Research in Computer Science and Software Engineering Research Paper, 128X, Smart Video Security Surveillance with Mobile Remote Control.
- [2] J. Yiu, White Paper, May 2014, Smart Sensors Why sensors need intelligence?
- [3] S.A. Nirmal, A.W. Mudasser, S.V. Altaf, Location Based Industrial Monitoring & System using wireless technology.
- [4] www.wikipedia.org.
- [5] <http://msdn.microsoft.com/en-IN/library/ms189852.aspx>
- [6] <http://www.emgu.com>.
- [7] <http://www.opencv.org>
- [8] Learning openCV: Computer Vision with the openCV Library by Adrian Kaehler and Gary Bradski.

