

# Intelligent Surveillance System For Motion Detection Using Raspberry Pi

Kodinaria Brijesh

Wireless & Mobile Computing  
Gujarat Technological University, CDAC-ACTS  
Ahmedabad, Gujarat  
*brijeshkodinaria@gmail.com*

Vineeta Tiwari

Senior Technical Officer  
CDAC-ACTS  
Pune, India  
*vineetat@cdac.in*

**Abstract**—Motion detection is one of the key techniques for automatic video analysis to extract crucial information from scenes in video surveillance systems. The method of foreground and background detection start from second frame onwards it employs new object tracking method which detects and remove ghost objects rapidly while preserving abandon objects from decomposing into background. It mainly focuses to improve motion detection based on Low Computing system. This research project is carried out to determine some of the basic human motion detection algorithm that had been founded or developed or even researched in past. As, the report is mainly aimed for the readers that the architecture of a human motion detection system in applications.

Also in recent years, Ambient Intelligence has attracted a number of researchers due to the widespread diffusion of unobtrusive sensing devices. Thus, the availability of acquired data has driven the interest of the scientific community in producing novel methods for combining raw measurements in order to understand what is happening in the monitored scenario.

**Keywords**—Activity Recognition; Ambient Intelligence; background modeling; Motion Detection; Video Surveillance; Object Detection; Object Tracking; Background Subtraction; Raspberry Pi

\*\*\*\*\*

## I. INTRODUCTION

Motion detection is one of important task in video processing and understanding the systems. It is useful to take out the information from scenes which are used in many computer vision applications such as Automatic video surveillance, object tracking and classification, activity understanding etc. This makes motion detection a very active research area in computer vision and its implementation in automated visual surveillance systems.

This inspiration is for the development of an accurate automatic processing system, a necessary tool for protection and safety.

Tracking involves matching of detected foreground objects between consecutive frames using different features of an object like motion, velocity, colour, texture. Object tracking is the process to track the object over the time by locating its position in each and every frame of the video in the surveillance system.

So the primary requirement for further analysis of an object is to detect first. If the object detection can be done perfectly then it is possible to make any kind of analysis of that object.

In particular, Internet of Things (IoT) is a new paradigm in computer science that aims at exploiting the information about the environment state in order to personalize it, that is to adapt the environment to the user preferences.

The personalization process should be invisible to the user, thus the intrinsic requirement of any IoT system is the presence of pervasive sensory devices. In this scenario we consider sensor nodes deployed in many rooms close to sensitive indoor areas. In order to preserve the pervasiveness of the system, the motion detection sensor provided connected to a miniature fan less computer with reduced computation capabilities.

In today's world developing fully automatic video surveillance systems has recently renewed the interest for fast and reliable motion detection algorithms, in order to target real-time implementation for low power consumption processors and embedded systems with alert on mobile device.

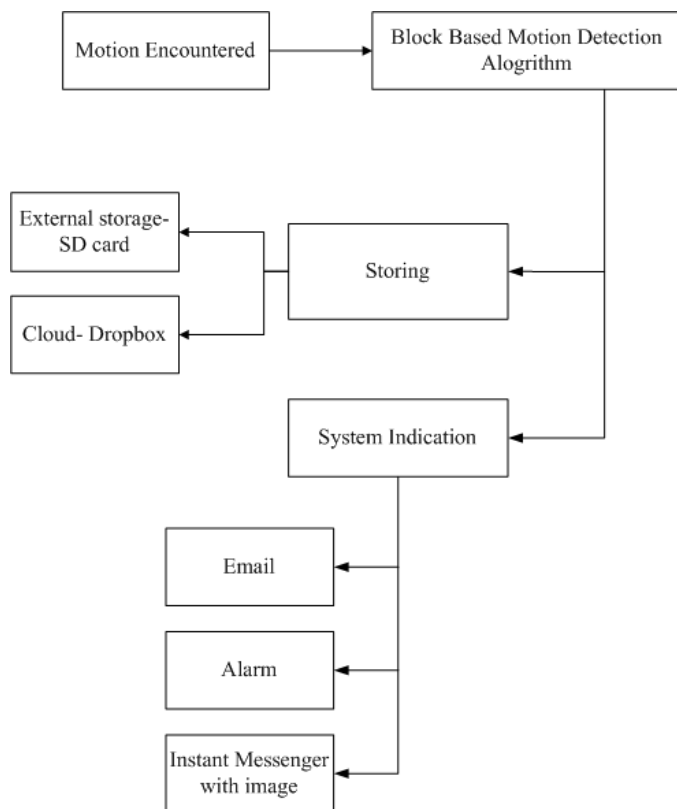
## II. OVERVIEW OF OUR FRAMEWORK

In our project we have aimed to build such a surveillance system, which not only detect motion.

It provides some necessary features like-

Intimate the User of the Intrusion by Setting on the Alarm,

- A. Captures the Footage from the Moment the Motion Was Detected,
- B. Email is being send to the administrator,
- C. Sends Message in via WhatsApp on the Mobile Phone Of The User.
- D. Sends a link of Dropbox to administrator's mail Message in via WhatsApp on the Mobile Phone of the User.



## III. PROPOSED ALGORITHM

1. Select a certain number of frame after that we update our background.

2. For updating background:

Step 1. Temporary background is made by using last n number of frame

Step 2. Compare last frame of considered frames with temporary background

Step 3. Same pixels are known for the permanent background for the next upcoming frames

Step 4. Compare last frame of considered frames with all pervious permanent background one by one (except those pixel bits which are already fixed by step 3 last to first.

Step 5. Common pixels are considered for permanent background for the next upcoming frames

Step 6. Updated background

3. When the background is updated then for motion detection we have to select a threshold. Then if any frame has a difference with the permanent background frame value more than the threshold a motion is detected.

## IV. CONCLUSION

This report was conducted on surveillance system for motion detection using raspberry pi. Various literature found in this survey was selectively reviewed and summarized in this report. This review assesses the strengths and weaknesses of motion detection algorithms, The communication via WhatsApp and Dropbox is completed so that we can upload the image or videos to dropbox, live surveillance is also done till now so that it can be viewed from anywhere using internet and also the detection of motion is achieved.

## ACKNOWLEDGMENT

I would like to thank sincerely to my guide Mrs. Vineeta Tiwari invaluable guidance, constant assistance, support, endurance and constructive suggestions for the betterment of the Project.

I would like to convey my heartfelt thanks to our Prof. Rajesh Sola of CDAC for giving me the opportunity to embark upon this topic and for his continued encouragement throughout the preparation for this project.

I also wish to thank all the staff members of the Wireless & Mobile Computing department for helping us directly or indirectly in completing this work successfully.

Finally I am thankful to our parents and friends for their continued moral and material support throughout the course

and in helping me finalize the presentation and report for Dissertation.

#### REFERENCES

- [1] SinghBirmohan, SinghGurwinder, Vicky Sibal, Neeraj Sharma and SinghDalwinder, - " In International Conference on Signal Propagation and Computer Technology(ICSPCT) in 2014 - Motion Detection for Video Surveillance"
- [2] Michael Kamaraj and Balakrishnan - " An Improved Motion Detection and Tracking of Active Blob for Video Surveillance", IEEE - 31661 in 4th ICCCNT – 2013Tiruchengode, India ,July 4-6, 2013
- [3] ArifurRahaman, Md. MehediHasan, S.M. NafiulHossain, M. M. Farhad, Md. NazmulAhassan, Mirza Md. ShahriarMaswood, Md. MostafizurRahman - "An Efficient Background Updating Model for MotionDetection"
- [4] PietroCottone, Giuseppe, Gabriele Maida and Marco Moran - "Motion Sensors for Activity Recognition in an Ambient-Intelligence Scenario" - 5th International Workshop on Smart Environments and Ambient Intelligence 2013, San Diego (22 March 2013), pp.646-651
- [5] Cynthia Tuscano,BlossomLopes,Stephina Machado, PradnyaRane," Smart Web Cam Motion Detection Surveillance System" - International Journal of Modern Engineering Research Vol.3, Issue.2, March-April. 2013 pp-1 169-1 171 ISSN: 2249-6645