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Intruder Detection System using Camera with Alert Management

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Abstract - *In the world of Internet of Things (IoT) when we have all the technologies to revolutionize our life, it's a great idea to develop a system which can be controlled and monitored from anywhere. There are many types of good security systems and cameras out there for security but they are much expensive so we will build a low-cost Intruder. Intruder detection system is a security system that acts as a protection layer of an infrastructure. Throughout the year, Intruder detection system has grown enormously to keep up with the advancement of crime. Alert System, which not only alert you through an email or message but also sends the picture of Intruder when it detects any. The goal of the project is to make a detection system using camera, which detects the human presence in a secure region and raises an alert. This method involves the following steps image acquisition, image processing, intruder detection and raising an alert.*

Key Words: **Image Acquisition, Image Processing, Intruder Detection**

1. INTRODUCTION

At present, safety is very important to the well-being, so people have developed and applied a variety of security systems, which have different features and equipment. Normally, there are 4 major security systems used in important places, including closed circuit television (CCTV), alarm system, access control system and fire alarm system, which have been used for a completely different purpose. Thus, to choose which system, it depends on the desired purpose.

Security system are gaining increase importance in recent times to protect life and valuable resources, many advanced method of providing security have been developed and are in use in the last few decades. Of this one important area is the security system required for military /strategic applications, which has advanced greatly. But such systems being complex and expensive are useful to high end application only. However with recent progress in technology and the growing need for increased security in civilian and other applications, many low cost solutions for security system have now emerged. In the field of IDS using alarm through email, using modern approaches has become a major means of providing security in all applications, both military and civilian. Due to high state of insecurity being experienced in the entire world the need to keep the occupants of the office aware of any intrusion in to their premises forms part of the project.

2. RELATED WORK

DETER can detect and track humans, and can analyze the trajectory of their motion for threat evaluation. There are many human detection techniques developed for tracking and detection of human presence in the environment. FIFA World Cup 2014 and Olympics 2016 have captured maximum market for video tracking in Brazil. According to 6W research, the Brazil video surveillance market is expected to reach $362.69 million by 2016.According to Marcus Nieto , in the California; many local public agencies deploy CCTV surveillance systems with the primary function to protect property rather than monitoring public movement. In cloud video surveillance report 2014, Dean Drako [2]. Kalman filters are ideal for systems which are continuously changing**.** They have the advantage that they are light on memory (they don't need to keep any history other than the previous state), and they are very fast, making them well suited for real time problems and embedded systems.

3. METHODOLOGY

We are going to build a detector with camera using embedded system and with the help of concepts of Image processing. The main goal of this detection system is to check the for the intruder. The problem that the intruder detection system solves is that capture the latest video frame and compares it with the static video frame which would be the threshold value and if a intruder is found then it raises a alert. It is easy to understand that such a security alert system provides peace of mind when you are away from the place or place of business.

The following figure mentions a basic idea of the intruder detection system we have proposed.

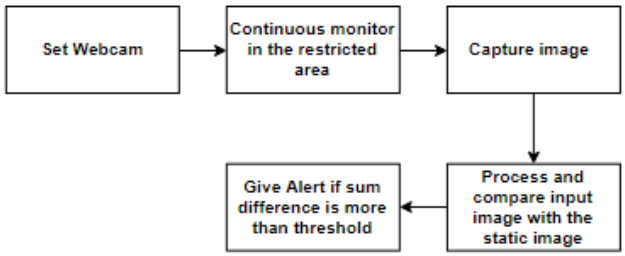

Fig.1 Working of the System

- The system consists of camera and image processing processor.
- Here we will be using Sum of Absolute difference (SAD) algorithm.
- It is calculated by taking the absolute difference between each pixel in the original block and the corresponding pixel in the block being used for comparison.
- It will calculate the difference estimated in a frame.

Sum of Absolute Difference (SAD)

In image processing, the sum of absolute differences (SAD) is a measure of the similarity between image blocks. It is calculated by taking the absolute difference between each pixel in the original block and the corresponding pixel in the block being used for comparison. These differences are calculated and then summed to create a simple metric of block similarity, the L^1norm of the difference image or Manhattan distance between two image blocks.

The sum of absolute differences may be used for a variety of purposes, such as object recognition, the generation of disparity maps for stereo images, and motion estimation for video compression.

Task 1: Read and write bitmap images.
Task 2: Convert the image from RGB to GRAY.
Task 3: Find the difference in pixel between two images.
Task 4: Implement an image grabber and log the image every 500ms.
Task 5: Compare the two images and establish the change in scene and hence conclude the presence of the Intruder.

The main functions of the Intruder Detection System are as follows:

(1) It compares a video image from a camera with a basic one to find out motion of objects.
(2) It ignores unnecessary parts of pictures: oscillatory moving objects in certain space, like branches swaying in the wind.
(3) It distinguishes an intruder from other moving objects by their sizes and locations on a monitor.
(4) It raises an alarm when detecting the intruder[10].

4. HARDWARE

Fig.2 LOGITECH C310 HD WEBCAM

5. CONCLUSION

The Intruder Detection System permits a very significant reduction in the false alarm rate and burden of supervision. This system can be use for not only vigilance but also plant investigation against, trespassing, trafficking in narcotics, and abduction for ransom. This paper proposes a system that detect intruder and distinguishes human and other moving objects and burden of supervision.

5. REFERENCES

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