ISSN No. 0976-5697

Volume 5, No. 7, September-October 2014

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

INTRUDER DETECION SYSTEM USING IMAGE PROCESSING

Laxman Tawade
VDF School of Engineering and Technoloy,
Latur India

Abida Bapu Aboobacker
Calicut University,
India

Abstract: this paper describes a knowledge-based vision system for analyzing image sequences resulting from a perimeter intrusion detection system (PIDS). In this paper, the effectiveness of this method in eliminating these erroneous factors is shown. That is, a change of image is detected, as an intruder candidate, using a histogram of the differences between the reference image and the observation image. These detected differences are further determined to be an intruder using a circumscribed rectangle, a number, an area, and the center of gravity. First, the problems in outdoor image processing and our basic policies are shown. Then, the algorithms to solve these problems are described. The performance of this method in field tests is also shown.

Keywords: Image Processing, perimeter intrusion detection system (PIDS))

1. INTRODUCTION

Researches regarding human being in image processing have been an important field to numerous applications. Many algorithms and methods have been developed by human being in order to have a better understanding on intruder behavior. Besides, these applications also can act as a warning system to human being from unauthorized intruders. Apart from various IEEE journals, a number of textbooks as well as websites are referred to understand various steps involved in the development of the entire working system. For development of Intruder Detection System there are many references are available. “Digital Image Processing uses MATLAB” by Rafael C. Gonzalez and Richard E. Woods describes the balanced treatment of Image Processing fundamentals and MATLAB software principles used in their implementation. Algorithms and MATLAB functions in the mainstream of digital image processing are discussed and implemented, including image restoration and reconstruction; geometric transformation and image registration; color image processing; wavelets; image and video compression; morphology; image segmentation and image representation and description [6]. IEEE paper of project “Intruder Detection System by Image Processing” describes this system. According to this paper the system can automatically give an alarm when it detects intruders in processing images taken with a web camera. Algorithm of this system is also given in this paper. There are three main branches for intruder detection, namely detection, tracking and identification of intruder. The first branch, which is the Intruder detection, has been applied in various fields of real life application. For example, a detection algorithm has been developed for light detection and ranging (LIDAR) data to detect intruder at long distances. The second branch, which is the intruder tracking, is the main topic in monitoring intruder behavior and its interaction with the environment. With the technology of sensor, radio-frequency identification (RFID), and global positioning system (GPS), one of the applications is the development of new systems for intruder trace ability, identification, and anti-theft for the management and security of private places. By tracking the intruder movements, it helps human to have a better understanding and better surveillance system. The third branch, which is the intruder identification, is used to identify the detected intruder. To better manage the intruders in dynamic information retrieving, location tracking, and RFID-based mobile monitoring system (RFID-MMS) has been designed to help users over a wireless network. Identification of intruder has helped human being to monitor and manage intruders easier. This project will give more attention and review for intruder detection methods. The review also limited to the methods that use digital images or digital video. This review will be given in the next section [7].

1.1 METHODS FOR INTRUDER DETECTION IN IMAGE PROCESSING FIELD:

1. Detection by Human Eyes.
2. By Power Spectral.
3. Using Face Detection Approach.
4. Based on Thresholding Segmentation Method.

The researches on intruder detection have been a major topic for various applications. Intruder detection methods are useful on the research on locomotive behavioral of targeted intruder and also to prevent intrusion in residential area.

1. Detection by Human Eyes:

Early researches on intruder detection are to observe how fast human eyes can detect the presence of intruder in natural scene. Intruder detection by human eyes has been considered as the most reliable detection method if seen from the computational point of view. This is because the image structure in natural images is complex. It is found that a human observer is able to decide whether a briefly flashed intruder scene contain an intruder as fast as 150ms. Median reaction time results indicate a speed accuracy of 92 percents for reaction time of 390ms and increase to 97 percent of correctness for 570ms. Though human detection is effective and achieve satisfactory level, human eyes can easily get tired causing decreasing of effectiveness. Furthermore, human eyes cannot work 24 hours a day to perform intruder detection. These flaws can be curbed by applying computer vision in image processing for intruder detection.

2. By Power Spectral:

The researchers also have tried to find whether the presence of intruder in the image scene will change the power spectral of the image or not. The power spectral can be defined as the amplitude of the signal in the frequency domain. This can be constructed by transforming the images from spatial domain into the frequency domain, by using transformation function such as the Fourier transform. The main idea is to help the human observer to realize the presence of the intruder in the scene by inspecting the power spectral. It is found that the human observer will not prefer to use this approach if they want to quickly detect the intruder.

3. Using Face Detection Approach:

For research regarding locomotive behavior of intruders method combining detection and tracking of targeted intruder faces has been applied in using Haar-like feature and Adaboost classifiers. The video recorders is only turn on when it is positive that targeted intruder been detected to prolong battery life time and to ensure recorded video contain research value. This method especially crucial in situation whereby video man is not suitable to present at the recording scene for safety issue or video man might scare off some intruder away. The intruder faces are measured by utilizing face detection method with different local contrast configuration of luminescence channel to detect the image region of intruder faces.

4. Based on Thresholding Segmentation Method:

Segmentation is the process that subdivides an image into a number of uniformly homogeneous regions. In other words, segmentation of an image is defined by a set of regions that are connected and no overlapping, so that each pixel in a segment in the image acquires a unique region label that indicates the region it belongs to. Segmentation is one of the most important elements in automated image analysis. Target extraction from background can be performed by using threshold segmentation method. The object is found by using background subtraction method after obtaining the background image. In threshold segmentation method based on the pixel values is performed. However, in this technique, researchers should carefully choose the threshold value as they also should consider the negative value obtained at certain pixel point by direct subtraction. The idea of threshold segmentation is simple, which pixel of gray that greater than threshold are set to white (i.e. intensity 255) and those less than the threshold value will be set to black (i.e. intensity 0). It is difficult to select the threshold accurately as the background image periodically changes. Therefore, different appropriate threshold should be chosen for different background scene [7].

This project describes a knowledge-based vision system for analyzing image sequences resulting from a perimeter intrusion detection system (PIDS). The PIDS contains a number of cameras viewing areas installed with a variety of Alarms. When an alarm is triggered the image sequence spanning the alarm event is stored. The vision system's task is to interpret alarm events, discriminating between alarms triggered by human intruders and the many false alarms caused by animals, weather-related events, or noise. In addition, the false alarms should be sub-classified to enable the performance of the PIDS to be monitored. The analysis system must cope with the variations in natural illumination (changing position of the sun, cloud cover, shadows), as well as at night, when artificial illumination is low in contrast and uneven. Tracking and recognizing complex articulated objects in two-dimensional images of outdoor real world scenes contains several difficulties for machine vision. Problems include occlusion, shadows, and variations in lighting conditions. The alarm sources are not easily represented by geometric models because of the wide variety in shape of natural objects. Moreover, the articulation and flexibility of animals in motion and the changing viewpoint causes their appearance to vary considerably within a sequence. The alarm classification system has been developed within a frame-based vision system called FABIUS which is implemented in Prolog. Frames provide a flexible and well structured representation for modeling the alarm sources [1]. The pattern matching and backtracking facilities of Prolog make it well suited to designing control structures. Image processing algorithms, written in C for efficiency, are triggered from frames as demons. In this project, the effectiveness of this method in eliminating these erroneous factors is shown. That is, a change of image is detected, as an intruder candidate, using a histogram of the differences between the reference image and the observation image. These detected differences are further determined to be an intruder using a circumscribed rectangle, a number, an area, and the center of gravity. First, the problems in outdoor image processing and our basic policies are shown. Then, the algorithms to solve these problems are described. The performance of this method in field tests is also shown [2].

1.2 PROBLEM DFINITION:

Standard web camera system only record activities that happen around the camera view which will be useful after a crime happened as an evidence for the investigation process. But this project will develop a web camera system that can react to the crime potential activities by giving a feedback from an analysis process in order to prevent the crime potential activities in a restricted area before it happen. Typical factors in erroneous image processing in intruder detection system are shown in Table 1. These problems are solved using the following countermeasures [3].

Table1. Typical erroneous factors in image processing for intruder detection [4].

ITEM	ERRONEOUS FACTORS	COUNTERMEASURES
Change in background brightness	Rapid change in background brightness (Due to cloud movement) Slow change in background brightness (Due to shadow movement)	• Histogram of the different image • Renewal of reference image

Swaying of object due to wind	Small resulting of leaves	• Smoothing of observation image • Circumscribed rectangle
Others	Mist, rain, flying objects etc. Birds, Small animals. Large resulting of leaves	• Circumscribed rectangle • Position of center gravity

Against rapid changes in brightness, a histogram of the difference between the reference image and the observation image is used to remove part of a uniform change in brightness. Against slow changes in background brightness, such as the move of shadows, the reference image is renewed in every sequence. Moreover, smoothing filters are used to remove small image changes caused by the rustling of leaves. The detected portion is further determined by investigating its rough shape using the circumscribed rectangle. From this investigation, false detection from the dislocations due to wind can be eliminated. Errors caused by mist, rain, and intrusion by small animals are reduced by using the number of detected portions, their areas, and their centers of gravity [4].

1.3 OBJECTIVE:

The objective of this project is to develop a system that can detect existence of object in the interested region of image data using image processing technique. This system will be applied in security system to help human guard to be alert with crime potential activities that happen around the area. This system will indirectly help to reduce weakness and careless from human guard observation.

- To introduce protection of precious items jewellery artifacts safety of buildings, homes, banks and mints using Web camera and also explain how it is going to be implemented in the project.
- To explain about image processing and how the images are monitored using Web cameras.
- Research into image processing techniques and algorithms used for processing the images and identifying the intruder.
- Literature survey and research into similar journals, books, articles and websites.
- Writing Mat Lab program for obtaining the result or output.
- Monitoring and preventing any intruder entering the fencing using Web cameras [5].

1.4 ORGANIZATION OF PAPER:

This paper is divided into several sections and a brief overview of the section is described here.

Chapter 2- This is system development section. This section describes about the Intruder Detection System. And also consists of methods implemented and

Chapter 3 It consists of Algorithm of intruder detection system. This consists of describing image processing techniques like thresholding, labeling, and actual procedure how project is done

Chapter 4 - This chapter describes performance analysis of the system, results and Snapshots.

2. SYSTEM DEVELOPMENT

2.1 FUNDAMENTAL STEPS IN DIGITAL IMAGE PROCESSING:

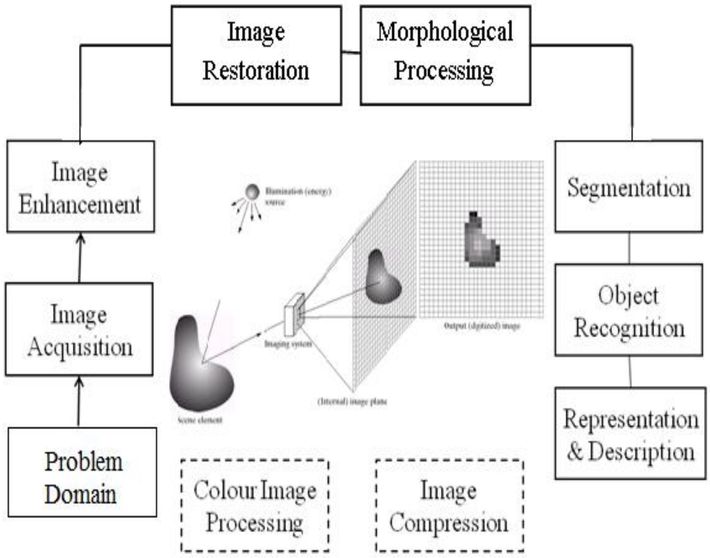


Fig.2.1 Fundamental Steps in Digital Image Processing

i. Image acquisition:

The first step towards designing an image analysis system is digital image acquisition using sensors in optical or thermal wavelengths. To create a digital image we need to convert the continuous sensed data into a digital form, this involves two processes: Sampling and quantization, digitizing the coordinate values is called sampling, digitizing the amplitude values is called Quantization. Image acquisition in image processing can be broadly defined as the action of retrieving an image from some source, usually a hardware-based source, so it can be passed through whatever processes need to occur afterward. Performing image acquisition in image processing is always the first step in the workflow sequence because, without an image, no processing is possible. The image that is acquired is completely unprocessed and is the result of whatever hardware was used to generate it, which can be very important in some fields to have a consistent baseline from which to work. One of the ultimate goals of this process is to have a source of input that operates within such controlled and measured guidelines that the same image can, if necessary, be nearly perfectly reproduced under the same conditions so anomalous factors are easier to locate and eliminate.

ii. Image Enhancement:

Image enhancement processes consist of a collection of techniques that seek to improve the visual appearance of an image or to convert the image to a form better suited for analysis by a human or a machine. The principal objective of image enhancement is to process a given image so that the result is more suitable than the original image for a specific application. It accentuates or sharpens image features such as edges, boundaries, or contrast to make a graphic display more helpful for display and analysis. The enhancement doesn't increase the inherent information content of the data, but it increases the dynamic range of the chosen features so that they can be detected easily.

iii. Image Restoration:

This block is for improving the quality of images acquired by optical, electro-optical or electronic means is one of the basic tasks in digital image processing. Image restoration is the operation of taking a corrupted/noisy image and estimating the clean original image. Corruption may come in many forms such as motion blur, noise, and camera miss focus.

iv. Morphological processing:

This block deals with tools for extracting image components that are useful in the representation and description of shape. Morphological image processing is a collection of non-linear operations related to the shape or morphology of features in an image. Morphological operations rely only on the relative ordering of pixel values, not on their numerical values, and therefore are especially suited to the processing of binary images. Morphological operations can also be applied to grey scale images such that their light transfer functions are unknown and therefore their absolute pixel values are of no or minor interest.

v. Segmentation:

It is the process that subdivides an image into a number of uniformly homogeneous regions. In other words, segmentation of an image is defined by a set of regions that are connected and no overlapping, so that each pixel in a segment in the image acquires a unique region label that indicates the region it belongs to. Segmentation is one of the most important elements in automated image analysis.

2.1.6 Object Recognition:

Pattern recognition is an integral part of machine vision and image processing. There are many types of features and each feature has a specific technique for measurement. Some of the features of a two-dimensional object pattern are the area, volume, surface, etc. which can be measured by counting pixels. Similarly the shape of an object may be characterized by its border. Some of the attributes to characterize the shape of an object pattern are Fourier descriptors. The color of an object is an important feature, which can be described in various color spaces. Also various types of textural attributes characterize the surface of an object.

2.1.7 Representation and description:

Almost always follow the output of a segmentation stage, which usually is raw pixel data, constituting either the boundary of a region (i.e., the set of pixels separating one image region from another) or all the points in the region itself.

2.1.8 Image Compression:

Another aspect of image processing involves compression and coding of the visual information. With growing demand of various imaging applications, storage requirements of digital imagery are growing explosively. Compact representation of image data and their storage and transmission through communication bandwidth is a crucial and active area of development today. Image data generally contain a significant amount of redundant information in their representation. Image compression techniques help to reduce the redundancies in raw image data in order to reduce the storage and communication bandwidth.

2.1.9 Color image processing:

It is an area that has been gaining in importance because of the significant increase in the use of digital images over the Internet [6].

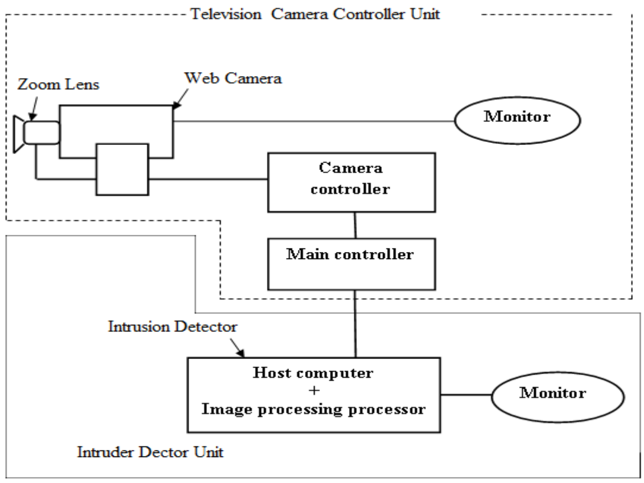


Fig.2.2 Intruder Detection System

The Intruder Detection System is composed of Intruder Detection Unit and Web Camera Control Unit. Two separate units make system's algorithm simple and disperse loads of it. Figure 2.2 shows the components of the system.

2.2 Intruder Detection Unit:

The Intruder Detection Unit is made up of a TV monitor, and Intrusion Detector. The intrusion detection consists of a host computer, and an image processing processor. A certain simple data processing and data compression technique makes a personal computer available for the host computer. The image processing processor shortens processing time because it can speed up the rates of digitizing pictures, doing difference arithmetic, and reading data.

2.2.1 Image processing processor:

Image Processing Toolbox provides a comprehensive set of reference standard algorithms, functions, and apps for image processing, analysis, visualization, and algorithm development. You can perform image analysis, image segmentation, image enhancement, noise reduction, geometric transformations, and image registration. Many toolbox functions support Multicore processors, GPUs, and C-code generation. Image Processing Toolbox supports a diverse set of image types, including high dynamic range, gigapixel resolution, embedded ICC profile, and tomographic. Visualization functions and apps let you explore images and videos, examine a region of pixels, adjust color and contrast, create contours or histograms, and manipulate regions of interest (ROIs). The toolbox supports workflows for processing, displaying, and navigating large images. Image Processing Toolbox supports images and video generated by a wide range of devices, including webcams, digital cameras, satellite and airborne sensors, medical imaging devices, microscopes, telescopes, and other scientific instruments. You can use functions and apps to visualize, analyze, and process these images in many data types. With Image Acquisition Toolbox you can acquire live images and video from frame grabbers, GigE Vision cameras, DCAM cameras, and other devices. The toolbox provides a suite of image processing apps to explore and discover various algorithmic approaches. With the Color Thresholder app, you can segment an image based on various color spaces. The Image Viewer app lets you interactively place and manipulate ROIs, including points, lines, rectangles, polygons, ellipses, and freehand shapes. You can also view pixel information, pan and zoom, adjust contrast, and measure distances. Alternatively, you can perform these tasks programmatically and use individual functions to create custom interfaces.

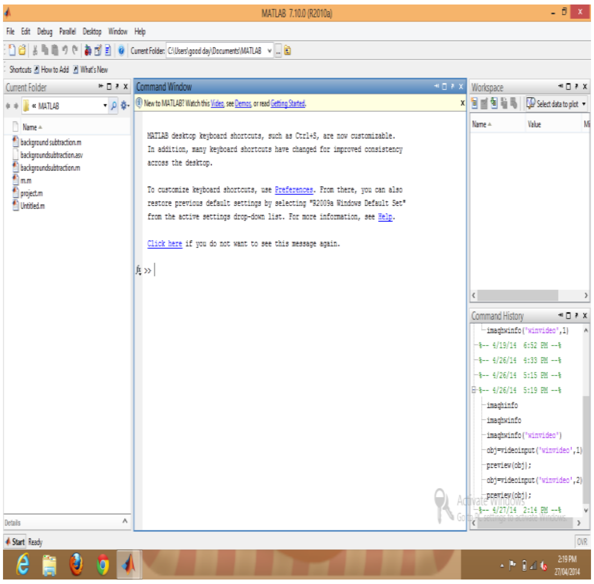


Fig 2.2.1: Matlab toolbox

2.2.1.1 Key Features:

1. Image analysis, including segmentation, morphology, statistics, and measurement
2. Image enhancement, filtering, and deploring
3. Geometric transformations and intensity-based image registration methods
4. Image transforms, including FFT, DCT, Radon, and fan-beam projection
5. Large image workflows, including block processing, tiling, and multiresolution display
6. Visualization apps, including Image Viewer and Video Viewer
7. Multicore- and GPU-enabled functions and C-code generation support

2.2.2 Television Camera Control Unit:

It consists of Web Camera, camera controller, Main controller and monitor. The Main Controller receives the coordinates' data of an intruder on the TV monitor from the Intruder Detection Unit. Then it calculates data to zoom in on the intruder and sends them to the Camera Controller. The Camera Controller controls the operation of a close-up camera to according to the data from the Main Controller [9].

3. ALGORITHM OF INTRUDER DETECTION PROCESS

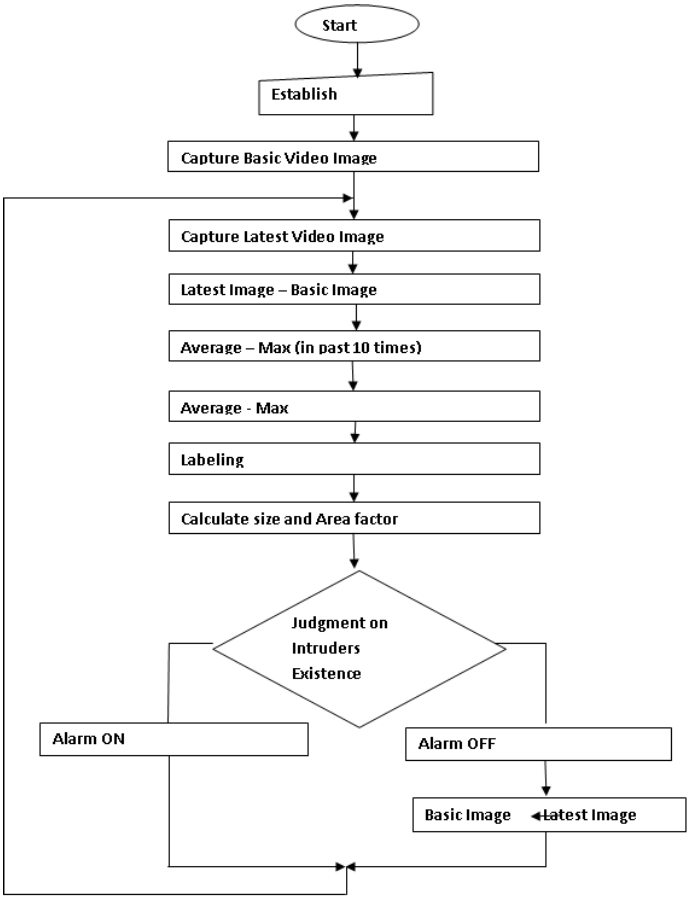


Fig.3 Flowchart of the system [5]

Figure 3 shows the Intruder Detection process. It consists of two parts. One part is to extract images of mobile units from pictures. The other is to discriminate intruders and other moving objects. Before the process can be presented, it is necessary to define several terms.

3.1 Outlines of Process:

Step 1:

The primary inputs to the process are the size of judgment rectangle, no-judgment area, area factor threshold and a threshold value for converting procedure. (Step four describes the information of converting procedure.) These parameters should be suitable for viewing area

Step 2:

This step aims to extract some motions from pictures by brightness differentials. The Intrusion Defector captures a "basic video image" and a latest video image from a surveillance TV camera and converts them into numbers.

"Basic video image" is an image in which there are no mobile units under surveillance. It is an initial image for the process. Then the intrusion detector computes the absolute values of brightness differentials between the basic image and the latest image about every pixel. Next it computes averages of absolute values about every block. One block is equal to four by four pixels. This procedure allows to compress the amount of data.

Step 3:

This step intends to cancel swinging or vibrating Objects. There are the averages of the past ten times in the memory about every block. The Intrusion Detector subtracts the maximum of them from the latest average about every block. If the remainder is negative, zero will be substituted into the calculation. This procedure can eliminate periodical motion in the limited space.

Step 4:

The intrusion detector converts the calculations into digital 1 or digital 0 by a threshold value. Digital 0 means there is no change on the TV monitor. Next if a block of digital 1 neighbors another block of digital 1 in any direction, up and down or right and left, these blocks will be handled as one group. Each group means each mobile unit. Then a rectangle circumscribed is drawn with a mobile unit.

Step 5:

The system determines the presence or absence of intruders according to following three judgment conditions.

(a) The center coordinate of the circumscribed rectangle is outside all the non-judgment areas.

(b) The size of the circumscribed rectangle is large than that of judgment mangle.

(c) The area factor of the circumscribed rectangle is larger than the area factor threshold.

If all the conditions are satisfied, the system will judge that there is an intruder and raises an alarm. If one of them is not satisfied, the system will stop alarming and replace the basic video image with the latest video image.

3.2 Characteristic of System :

Conventional intrusion alum systems with image processing techniques detect intrusion by comparison with alternate frames. This method would produce many false alarms, and therefore it is not useful. On the other hand, the Police Communications Research Center has success to reduce false alums due to employing new ideas: judgment rectangle, no-judgment area, area factor, and area factor threshold. For instance, an area factor is used for reducing false alarms by swaying objects. In this case, if a user set the threshold to 45% false alarms can be decreased to 1/3. Adequate parameters with viewing area would eliminate a lot of failures in detection and false alarms. Moreover, this system takes less than 0.3 second per one cycle of the process. It means that the system has the possibility of detection about automobile running in usual speed.

4. RESULTS AND PERFORMANCE ANYALYSIS

In this chapter we have described the MATLAB coding for Intruder Detection System using Image Processing. And the images processed are database images of our project. Coding for each process on image and its results are given below.

4.1 Image Acquisition:

Step 1: Install Image Acquisition Device

This process involves connecting a camera to a connector on the frame grabber board and Verifying that the camera is working properly by running the application software that came with the camera and viewing a live video stream. Generic Windows image acquisition devices, such as webcams and digital video camcorders, typically do not require the installation of a frame grabber board. We connect these devices directly to your computer via a USB or FireWire port.

Step 2: Retrieve Hardware Information

In this step, you get several pieces of information that the toolbox needs to uniquely identify the image acquisition device you want to access. You use this information when you create an image acquisition object..

Table 2

Device Information	Description
Adaptor name	An *adaptor* is the software that the toolbox uses to communicate with an image acquisition device via its device driver. The toolbox includes adaptors for certain vendors of image acquisition equipment and for particular classes of image acquisition devices.
Device ID	The *device ID* is a number that the adaptor assigns to uniquely identify each image acquisition device with which it can communicate.
Video format	The *video format* specifies the image resolution (width and height) and other aspects of the video stream. Image acquisition devices typically support multiple video formats.

We use the imaqhwinfo function to retrieve each item:

```
>>imaqhwinfo

ans =

InstalledAdaptors: {'coreco'  'winvideo'}

MATLABVersion: '7.10 (R2010a)'

ToolboxName: 'Image Acquisition Toolbox'

ToolboxVersion: '3.5 (R2010a)'


>>  imaqhwinfo('winvideo')

ans =

AdaptorDllName:'C:\ProgramFiles\MATLAB\R2010a\toolbox\imaq\imaqadaptors\win32\mwwinvideoimaq.dll'

AdaptorDllVersion: '3.5 (R2010a)'

AdaptorName: 'winvideo'
```

DeviceIDs: {[1] [2]}

DeviceInfo: [1x2 struct]

>> a=imaqhwinfo('winvideo',1)

a =

DefaultFormat: 'YUY2_1024x576'

DeviceFileSupported: 0

DeviceName: 'iBall Face2Face CHD 12.0 Webca'

DeviceID:

ObjectConstructor: 'videoinput('winvideo', 1)

SupportedFormats: {1x17 cell}

Step 3: Create a Video Input Object

In this step you create the video input object that the toolbox uses to represent the connection between MATLAB and an image acquisition device. Using the properties of a video input object, you can control many aspects of the image acquisition process. For more information about image acquisition objects. To create a video input object, use the videoinput function at the MATLAB prompt. The DeviceInfo structure returned by the imaqhwinfo function contains the default videoinput function syntax for a device in theVideoInputConstructor field. For more information the device information structure

Step 4: Preview the Video Stream (Optional)

After you create the video input object, MATLAB is able to access the image acquisition device and is ready to acquire data. However, before you begin, you might want to see a preview of the video stream to make sure that the image is satisfactory. For example, you might want to change the position of the camera, change the lighting, correct the focus, or make some other change to your image acquisition setup. To preview the video stream in this example, enter the preview function at the MATLAB prompt, specifying the video input object created in step 3 as an argument: Preview (vid)

4.1.1 MATLAB Code for image acquisition:

```
Clear all;
clc;
obj = videoinput('winvideo',1,'YUY2_1024x576');
preview(obj);
```

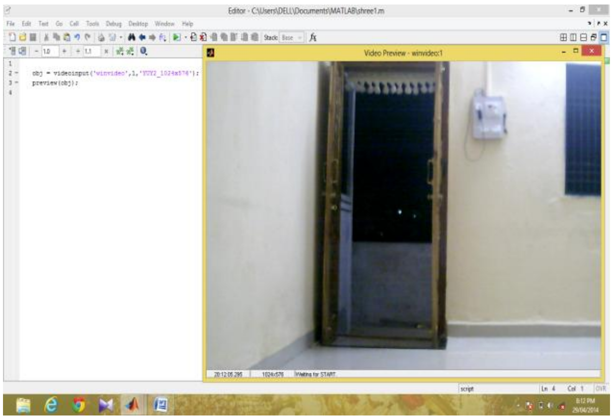


Fig: 4.1 Image acquisition

4.2 Image Capturing:

frame = getsnapshot(obj) immediately returns one single image frame, frame, from the video input objectobj.The frame of data returned is independent of the video input object Frames Per Trigger property and has no effect on the value of the Frames Available or Frames Acquired property.

MATLAB code for original Image and secondary Image:

```
obj = videoinput('winvideo',1,'YUY2_1024x576' );
preview(obj);
org=getsnapshot(obj);
org=ycbcr2rgb(org);
org=rgb2gray(org);
sec=getsnapshot(obj);
sec=ycbcr2rgb(sec);
sec=rgb2gray(sec);
imshow(org);
imshow(sec);
```

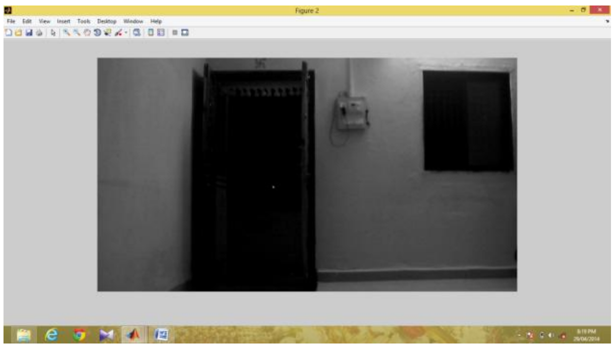


Fig 4.2 Original Image

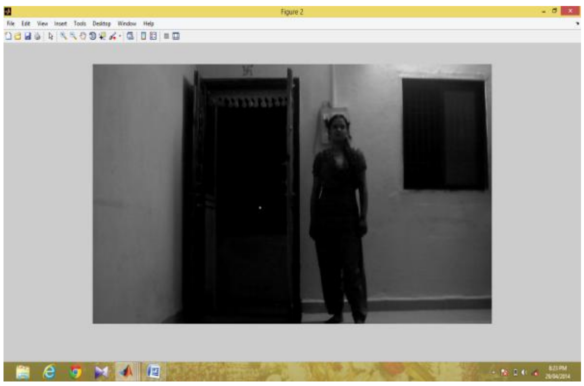


Fig 4.3 Secondary Image

4.3 Image Subtraction:

Subtract one image from another or subtract constant from image

Z = imsubtract(X, Y)

Z = imsubtract(X,Y) subtracts each element in array Y from the corresponding element in array X and returns the difference in the corresponding element of the output array Z. X and Y are real, no sparse numeric arrays of the same size and class, or Y is a double scalar. The array returned, Z, has the same size and class as X unless X is logical, in which case Z is double. If X is an integer array, elements of the output that exceed the range of the integer type are truncated, and fractional values are rounded.

MATLAB code for Image Subtraction:

```
obj = videoinput('winvideo',1,'YUY2_1024x576' );
preview(obj);
org=getsnapshot(obj);
org=ycbcr2rgb(org);
org=rgb2gray(org);
sec=getsnapshot(obj);
sec=ycbcr2rgb(sec);
sec=rgb2gray(sec);
result = imsubtract(sec,org);
figure;
subplot(3,1,1), imshow(org);
subplot(3,1,2), imshow(sec);
subplot(3,1,3), imshow(result);
```

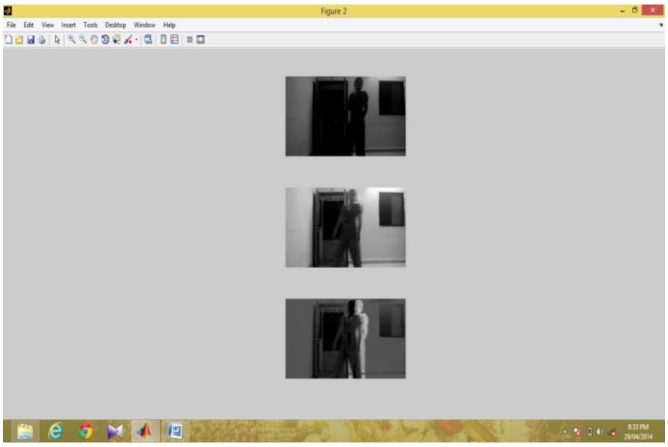


Fig 4.4 Image Subtraction process

4.4 Block processing:

Matlab code for block processing:

```
obj = videoinput('winvideo',1,'YUY2_1024x576' );
preview(obj);
fun = @(block_struct) mean2(block_struct.data);
new=blockproc(result,[4 4],fun);
for i=1:10
I{i} = blockproc(result,[4 4],fun);
end
imshow(fun);
```

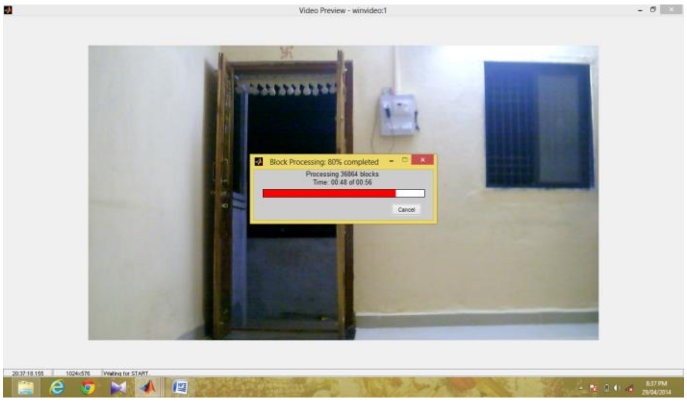
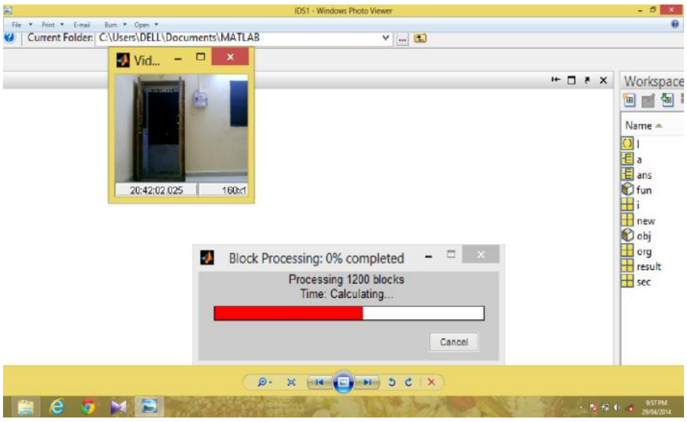
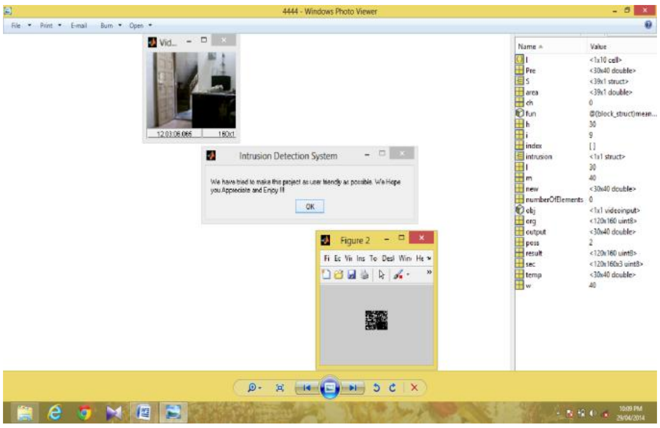
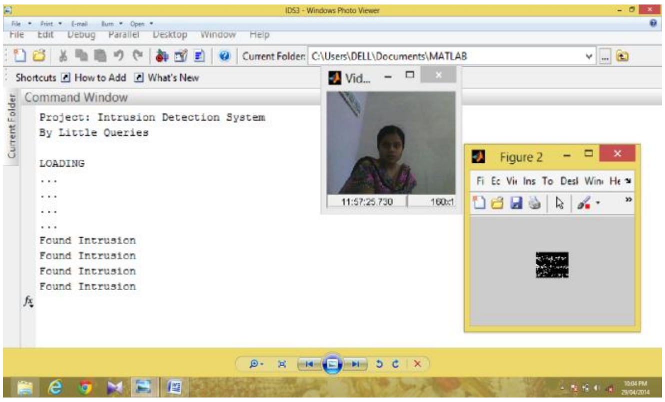


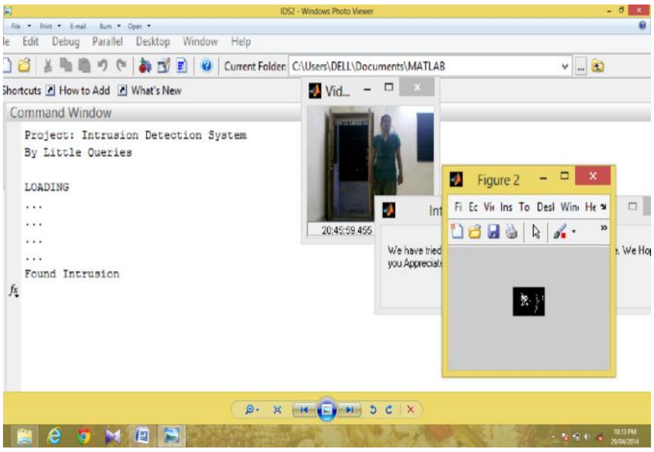
Fig 4.5 Block Processing

4.5 Intruder detection process:









5. CONCLUSION

Finally it is concluded that, the Intruder Detection System permits a very significant reduction in the false alarm rate and burden of supervision. This system can be used for not only vigilance but also plant investigation against, trespassing, trafficking in narcotics, and abduction for ransom.

FUTURE SCOPE:

- Possibility as long-term project like pedestrian detection system.
- Advanced alarm systems – integrated biometric systems
- Incorporating micro-controllers
- Advanced frequency distribution.
- Dynamic image pixilation.
- Advanced MATLAB techniques – blurring and anti-aliasing.

6. REFERENCES

[1]. Bernardes and Moreira, "Implementation of an Intrusion Detection System Based on Mobile Agents", International Symposium on Software Engineering for Parallel and distributed systems, 10-11, June 2000, IEEE Computer Society, Pages 158-164..
[2]. Jansen, "Intrusion Detection with Mobile Agents", Computer Communications, Volume 25, Issue 15, 15 Sep 2002, Pages1392-1401.
[3]. Oh and Lee, "An anomaly intrusion detection method by clustering normal user behavior", Computers & Security, Volume 22, Issue 7, October 2003, Pages 596-612.
[4]. J. Pikoulas, W.J. Buchanan, M. Mannion and K. Triantafyllopoulos, "An Intelligent Agent Intrusion Detection System. In Proceeding of 9th IEEE International Conference and Workshop on Engineering of Computer Based System. IEEE Computer Soc., April 2002, pages: 94-102.
[5]. Warrender, C., Forrest, S., And Perlmutter, B., "Detecting intrusions using system calls: Alternative data models". In the Proceedings of the IEEE Symp. Security and Privacy, pages 133-145.
[6]. Verwoerd and Ray Hunt, "Intrusion Detection techniques and approaches", Computer Communications, Volume 25, Issue 15, 15 September 2002, Pages 1356-1365.
[7]. Yeung and Ding, "Host-based Intrusion detection using dynamic and static behavioral models", Pattern Recognition, Volume 36, Issue 1, January, 2003, Pages 229-243.
[8]. Zhong, Song, Cheng and Zhang, "A safe mobile agent system for distributed intrusion detection", International Conference on Machine Learning and Cybernetics, 2003 Volume 4, 2-5 Nov. 2003 Page(s):2009 - 2014.
[9]. Ragsdale and Sirdu, "A hybrid approach to the profile creation and intrusion detection", DARPA Information Survivability Conference & Exposition II, 2001. DISCEX '01. Proceedings, Volume: 1, 12-14 June 2001 Pages: 69 - 76.
[10]. CSI/FBI. "Issues and Trends: 1999 CSI/FBI Computer Crime and Security. Survey", 1999. URL:http://www.gocsi.com (05/08/1999).

Abida Bapu Aboobacker is working as associate professor in Holy Grace Engineering College, kerala from 2012 till date. She was working with IES College of engineering from 2006 to 2012 as Assistant Professor cum head of department incharge. She had worked in Almihad Institution Alrigga, dubai from 2004 to 2005 as IT department in charge. She has worked as lecturer in Ansar Computer College from 2002 to 2004 for MCA students. She was incharge of R&D Lab, AICTE, DTE, IEEE students chapter of the institution .She is member of IEEE and CSI. She also participated in various national level conferences .Her research interest include Image Processing, computer vision and Robotics.