Detection of Suspicious Activity through Video Surveillances

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Abstract: *Since the video surveillance are usually covering large area, faces of human come into view quite small. Therefore, their features are not identifiable so that the face/head area cannot be detected. To detection of small faces/Heads in the surveillance systems, this paper proposes the algorithm: in which we subtract frame with background and get the top of object head is at the top and shap of the head is round counting maximum pixsels .The experimental results have shown that the proposed algorithm shows the performance superior to the other methods' in detection of heads .*

In this report we further discussing an algorithm to detect suspicious activity in ATM Both by video processing (image processing), there are so many techniques used to detect suspicious activity I used background subtraction for video processing. Using detection of head of human and counting how many humans are entered what type of movement performed by them and setting different level of alarm as required..

Keywords: *Video surveillances, Image processing, background subtraction.s*

1. INTRODUCTION

Digital image processing techniques began in the late 1960s and early 1970s used in medical imaging and astronomy. An image is may defined as a two-dimensional f(x,y), where x and y are co-ordinate, and amplitude of function f at any x and y co-ordinates is intensity or gray scaled of image at that point i.e x and y. when x and y of function f are all finite and discrete we say the image is a digital image. The field of digital image processing refers to processing of digital images.

Now days, Detection of suspicious activity by video surveillances is very common. In previous decade monitoring of video by humans those are sited in front of screen of videos captured by either CCTV or any other cameras. Now we are going to automate this type of monitoring the best techniques which is used by most cases is image processing.

1.1 Digital Image Processing

In the middle era of 2oth century, digital image processing was done by the help of optical devices. Such data dealing out was analogue generally. Since computers were invented and they used widely later, a real need in digital image processing emerged.

Many types of remote sensing images are routinely recorded in digital form and then processed by computers to produce images for interpreters to study. The simplest form of digital image processing employs a microprocessor that converts the digital data tape into a film image with minimal corrections and calibrations. At the other extreme, large mainframe computers are employed for sophisticated interactive manipulation of the data to produce images in which specific information has been extracted and highlighted.

1.2 Efficiency In MATLAB

MATLAB functions which are User-defined translated, not compiled. This shows approximately when an m-file is executed, each statement is read before executed, infect full program being parsed and compiled into machine language. For this cause, MATLAB programs can be much slower than programs which are written in a language such as FORTRAN. It is mandatory to use built-in functions and operators whenever its possible, In order to get the most out of MATLAB.

For example,lets consider the following two command sequences both have same effect:

```
>> l = (0:.001:1)';
>> x=sin(l);
and
>> l = (0:.001:1)';
>> for i=1:length(l)
    x(i) = sin(l(i));
  end
```

2. INTELLIGENT SURVEILLANCES WITH RESPECT TO IMAGE PROCESSING

This region of the possibility and information program focuses on research in various statistical image processing techniques to address problems in repeated aim detection applications.

The goal of computerized surveillance system is to support the human operator in prospect investigation and event categorization by without human intervention detecting the objects and analyzing their actions using computer vision, techniques of pattern recognition and signal processing. This review addresses more than a few advancements made in these fields' while bringing out the detail that realizing a practical end to end surveillance system still relics a hard job due to more than a few

challenges faced in a real world situation. With the improvement in computing technology and sensor, it is now inexpensively and technically possible to adopt multi-camera and multi-modal structure to gather the require of well-organized surveillance system in broad range of security applications like security guard for important buildings, military applications and traffic surveillance in cities[8].

3. TERRORISM SURVEILLANCES WITH RESPECT TO IMAGE PROCESSING

Visual surveillance has been an energetic study area in computer vision and image processing, due to its vital position in helping military intelligence and law enforcement agencies to battle alongside offense and terrorist actions. The objective of a visual surveillance system is to identify irregular object behaviors and to lift alarms when such behaviors are detected. After moving objects are detected, it is necessary to categorize them into predefined categories, so that their movements behaviors can be suitably interpret in the background of their identities and their connections with the surroundings. Therefore, object categorization is a very important part in a complete visual surveillance system. RADAR (Radio Detection and Ranging) images are often unwanted in military applications / systems / software's since they reveal the position of the imaging system. So we discover

4. ALGORITHM ANALYSIS

First lets have a look what we have. We have video stream that we break it into several frames, after words we take one by one these by time setting ,Here is the code that does exactly;
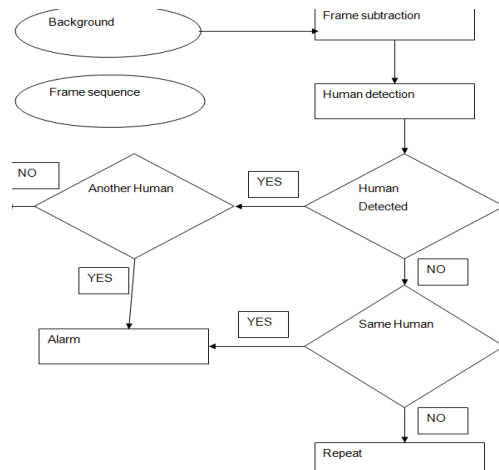

Table 1. Flow Chart

4.1 Abbreviations and Acronyms

The code for loading video in Matlab is given below:

```
clc;
close all;
filename = '~\ \videoA1_part_1.avi';
mov = aviread(filename);
opFolder = fullfile(cd, 'Frames');
if ~exist(opFolder, 'dir')
mkdir(opFolder);
end
```

4.2 Spliting Of Video In Frames

Now we getting frames from video stream and save it temporarily
```
numOfFrames = size(mov, 2);
numOfFramesWrtn = 0;
for frame = 1 : numOfFrames
Current Frame = mov(frame).cdata;
Op Base File Name = sprintf('Frame %4.4d.png', frame);
Op Full File Name = fullfile(opFolder, opBaseFileName);
imwrite(CurrentFrame, opFullFileName, 'png');
progressIndication = sprintf('Wrote frame %4d of %d.', frame,numOfFrames);
disp(progressIndication);
numOfFramesWritten = numOfFramesWritten + 1;
end;
```

4.3 Getting and Setting Video Background
That frame is set by user defined

```
Base = imread('FirstFrame.png');
Imshow(Base);
```


Figure 1: (color image of background)

Converting base frame to gray
```
Base_Gray = rgb2gray(Base);
```

Figure 2: (binary image of background)

Getting next frame after some time (time length defined by user)

Frame = imread('Frame0001.png');
Imshow(Frame);

Figure 3: (color image of Frame0001)

Converting the frame into binary image or gray scale
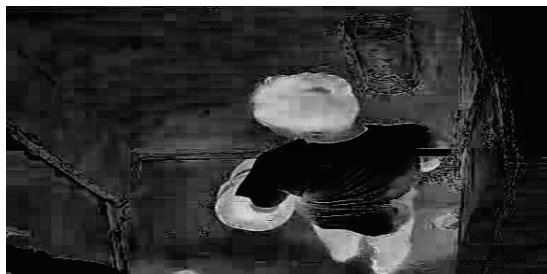Frame_Gray = rgb2gray(Frame);
Imshow(Frame_Gray);

Figure 4: (binary image of Frame0001)

4.4 Subtraction From Background

Now subtracting frame from background;

Frame_bg_sub = imabsdiff(Frame_Gray,Base_Gray);
Imshow(Frame_bg_sub);

Figure 5: (Image Difference of Frame and Background)
Now setting contrast for better results

Iq_Frame_bg_sub = Adapthisteq(Frame_bg_sub);
imshow(Iq_Frame_bg_sub);

Figure 6: (removed required less area)

Figure 7: (removed required less area)

Now, let's try to use the objects, which are bright in image which I suppose as nuclei. The extended maxima operator can be used to recognize groups of pixels that are significantly higher than their appearing neighboring.

Frame_sub_bg_Mask_em = imextendedmaz(Iq_Frame_bg_sub, 93);
imshow(Frame_sub_bg_Mask_em);

Now it's time to labeling the connected components and compute the PixelIdxList property for each labeled region, the PixelIdxList is essential for the extracting pixels from grayscale image that adjacent to each labeled region in the binary image

L_Frame_sub_bg_Mask_em = bwlabel(Bw_Iq_Frame_bg_sub);
S = regionprops(L_Frame_sub_bg_Mask_em);

Compute the maximum pixel value for each labeled region

Mx_val = zeros (numel(s),i);
For K=1: numel(s)
Mx_val (K) = max (Frame_bg_sub(S(K). PixelIdxList));
End
Bar (Mx_val);
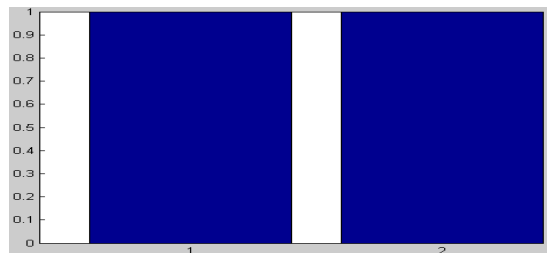
Figure8: (bar chart for objects/Humans)

Now by using find to determine which objects have a maximum value greater than 170, to finish than we will display those objects using ismember.

Frm_sub_bg_Bright = find(Mx_val > 170)
Frm_sub_bg_Bright
2
imshow(ismember(L_Frame_sub_bg_Mask_em, Frm_sub_bg_Bright))

Figure 9: (heads of human)

Finding centroid of object and labeling

S = regionprops(L_Frame_sub_bg, 'Centroid');
imshow(Bw_Iq_Frame_bg sub));holdon for k=1:numel(s)c
= s(k).Centroid; text(c(1), c(2), sprintf('%d', k) ,
…'HorizontalAlignment', 'centre', …
'VerticalAlignment', 'middle');
End hold off

Figure10: (heads of humans as numbered)

imshow(L_Frame_sub_bg_Mask_em = =2);

Figure11: (exactly head which required)

In the conclusion, we detect the head of a human after using above mentioned commands/algos for matlab by image processing

5. METHODS /PROGRAM FLOW

If(object_found == false)

{if(frame-base ~= base-base)
{object_found = true;if(m_object_count == 0)
{m_object_count = bwlabel(bw)}
elseif(Counter_start > 30)
{object_count = bwlabel(bw)}
if(Counter_start > 0)
{Counter_start = Counter_start + 15}
else{Counter_start = 15}
if(Counter_start > 300)
{Alarm('A');}
if(m_object_count > object_count)
{Alarm('B')}}else
{object_found = false;m_object_count = 0;object_count = 0;Counter_start = 0;}}

6. CONCLUSIONS

In the end, this report concludes that suspicious activity identified by Image Processing is not more difficult. As it has been mentioned above if a person enters in a specific place (ATM Cabin) and it stays more than 15mints (normally it takes 5 to 10 mints) then its been detected there is some suspicious activity takes place. If a 1st person didn't leave the cabin and at the meantime another person enters then also its been detected there is some suspicious activity done.

REFERENCES

1. Benjamin, M., Osama, M., Nikolaos P.P.: Tracking All Traffic. IEEE Robotics and Automation (2005) 29-36
2. Hsu, W.L., Liao, H.Y.M., Jeng, B.S., Fan, K.C.: Real-time traffic parameter extraction using entropy. IEE Proceedings of Vision, Image and Signal Process (2004) 194-202
3. Efficient Small Face Detection in Surveillance Images Using Major Color Component and LDA Scheme by Kyunghwan Baek, Heejun Jang, Youngjun Han, and Hernsoo Hahn School of Electronic Engineering, Soongsil University, Dongjak-ku, Seoul, Korea {khniki, sweetga}@visionlab.ssu.ac.kr,{young, hahn}@ssu.ac.kr
4. Boosting Image Orientation Detection with Indoor vs. Outdoor Classification by Lei Zhang, Mingjing Li, Hong-Jiang Zhang, Microsoft Research Asia, 49 Zhichun Road, Beijing 100080, China. {i-lzhang, mjli, hjzhang}@microsoft.com
5. Www.Mathwork.Com
6. A Practical Introduction To *Matlab* (Chapter 1) By Mark S. Gockenbach
7. Recognizing Objects By Detecting Multiple Moving Parts, The Journal Of American Science, 4(4), 2008, Issn 1545-1003, Http://Www.Americanscience.Org
8. Http://Blogs.Mathworks.Com/
9. Study Of Robust And Intelligent Surveillance In Visible And Multimodal Framework
10. Radial Basis Function Network for Traffic Scene Classification in Single Image Mode Qiao Huang, Jianming Hu, Jingyan Song, and Tianliang Gao

Department of Automation, Tsinghua University, Beijing, 100084, China

11. Fatih, P., Li, X.K.: Traffic Congestion Estimation Using HMM Models Without Vehicle Tracking. IEEE Intelligent Vehicles Symposium (2004) 188-193

12. Yang, F., Michel, P.: Implementation of an RBF Neural Network on Embedded Systems: Real-Time Face Tracking and Identity Verification. IEEE Transactions on Neural Networks14(5) (2003) 1162-1175

13. Yang G., and Huang, T.S.: Human Face Detection in Complex Background. Pattern Recognition, Vol. 27. no.1. (1994) 53–63

14. Dai, Y., Nakano, Y.: Face-texture model based on SGLD and its application in face detection in a color scene. Pattern Recognition, Vol. 29. (1996) 1007–1017

15. Chai, D., Bouzerdoum, A.: A Bayesian approach to skin color classification in Ycbcr color space. IEEE region Ten onference. Kuala Lampur Malaysia, Vol 2. (2000) 421–424

16. Lanitis, A., Taylor, C.J. and cootes, T.F.: An automatic face identification System Using Flexible Appearance Models. Image nd Vision Computing, Vol. 13. no.5. (1995) 393–401