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TRAJECTORY BASED UNUSUAL HUMAN MOVEMENT IDENTIFICATION FOR ATM SYSTEM

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Abstract-*Surveillance technology ordinance and its installation are increasingly being used in public facilities and organizations, as part of common place criminal acts. The environments monitoring has been expanded to protect residents in places, such as elementary schools and other care facilities, city parks and ATM system.*

In proposed system we have mentioned, Smart surveillance technology, which judges the situation and notifies the administrator directly or immediately responds. The most important technique of this smart Surveillance system is to track and analyze objects within the images. Thus, object-tracking technology, which typically targets human subjects, will be implemented.

Key Words: Surveillance technology, **Template Matching, Trajectory Recognition, Motion detection, background subtraction image.**

1. INTRODUCTION

The environments monitoring has been expanded to protect residents in places, such as elementary schools and other care facilities, city parks and ATM system. The installation of the Smart surveillance technology helps prevent crime and may aid in the solution of cases. Its role is also increasing in various forms. In addition, Surveillance system has been used for purposes, such as crime prevention and the detection, influenced by the need for increased security. The core technology of smart surveillance system analysis is used in detecting, analyzing, detect object's and tracking the object's motion. However, the object, which is the target to be traced, can vary, depending on the situation, such as image size, orientation, and location, within consecutive frames. In addition, when the light's color or direction changes, it is difficult to trace the object, as it is perceived as another object, even though it is the same object as in the previous frame. The technology, which can judge the current situation in real-time by analyzing the behavioral patterns of the objects and its association with the surrounding environment, has also been studied actively.

2. RELATED WORK

[1]This paper presents a framework for classification and recognition of human activities in complex motion. We propose a template matching based method to classify the objects and a rule-based approach to recognize human activities. First, moving objects are detected and their silhouettes are generated in each frame. Second, template matching based approach is used to classify the generated silhouette and then a rule based classifier is applied to classify human activities such as running, walking, bending, boxing and jogging etc. The experimental results show that the system can recognize seven types of primitive actions with high accuracy.

[2] This paper present a novel method for judging irregular behaviour based on treading track. Firstly they use the background subtraction method to detect moving body, and then judge whether someone is suspicious or not on the basis of treading track. The experimental result has shown the method present having the superiority of simple algorithm, fast recognition speed and high accuracy rate. Meanwhile, this method has certain robustness.

[3]To perform surveillance, author used a network of cameras at sensitive and strategic locations which provided real time video data. This data was analysed by algorithm Trajectory Extraction. to detect abnormal activity based on trajectory of the subjects. Trajectory extraction was performed on the video clip using optical flow method and it was ascertained whether the target is entering prohibited area. Entry into such an area was immediately classified as abnormal activity. Multiple restricted areas can be defined by the administrator of the system. If the subject's trajectory does not enter the restricted area then we subject it to trajectory classification. Here we determined if the path that the subject followed had "normal trajectory" or "abnormal trajectory". "Normal" and "abnormal" trajectories considered in this paper.

3. PROPOSED SYSTEM

System can start and stop camera in ATM using OpenCV functions also video recording takes place using OpenCV. System contain 2 modes which DAY MODE and NIGHT MODE in which in day mode only video recording takes place and in night mode image capturing and comparing with template image takes place after detecting intrusion video recording takes place. If any suspicious activity happens in the ATM area or any intrusion occurs in the system then system can record the video of the activity. System needs to capture if the user is covering his/her face using scarf. System should deactivate ATM if the user is not showing clear face. When system will start will set or record the targeted area which means we store the particular target area from capture area.

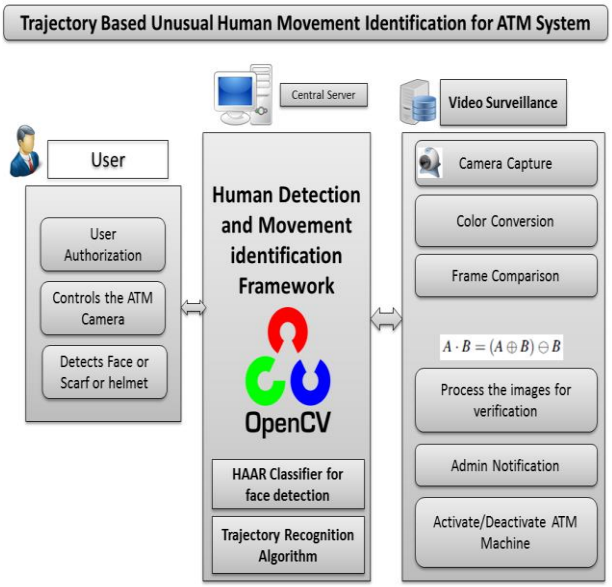


Fig-1: Diagram For Trajectory based unusual human movement identification for ATM system

Selected target area is compare with the current image frame region and analysis on it. If the mismatch found play alarm and send notification. A trajectory is the path that a person moves as a function of time. The trajectory in a scene is recognize using HOG Descriptor is feature extraction algorithm.

If any mismatch found at the time of image comparison system will notify the admin by sending SMS that suspectful person is there in ATM area & plays alarm. If the person is suspectful then Admin can stop him from using ATM machine. The system keeps track/log of all the activities. Hence detailed record of messages received is maintained. Also a detailed track of all the activities (intrusion detection, etc.) is also maintained.

4. PROPOSED ALGORITHM

4.1 Motion detection using block based background subtraction image.

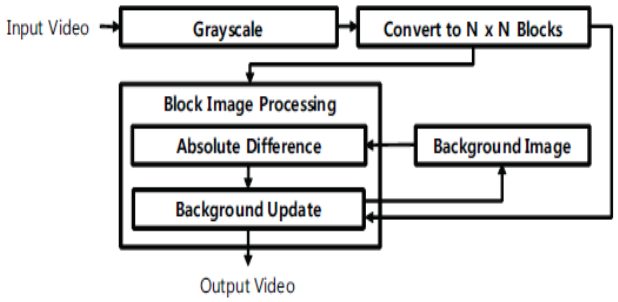
A. Motional Region Detection Structure:

The new motion detection method we proposed uses a technique like BSM. That is, it uses the subtraction between the current frame image and the background image. The background image used at this time is not a background image prepared in advance. However, it creates the background screen in real-time when video shooting. The motion detection method proposed in this study can divided into three steps:

a. blocking the input image and pre-processing the image by block zoning

b. Obtaining the difference image between the background image and block zoning.

c. Updating the background image.



In Figure, the initial input image is a TV input method proposed in the NTSC standard. This is the YIQ method. It is converted to greyscale using following formula. Herein, F represents the frame image, and r, g, b indicates Red, Green, Blue value, respectively, to the pixel corresponding to the position of x and y.

$$G(x,y) = 0.299 \times F_r(x,y) + 0.587 \times F_g(x,y) + 0.114 \times F_b(x,y)$$

The images obtained subsequent to converting to greyscale are fragmented into the square block with the complete number of pixels, N. consequently; the complete different image of the block is divided in the front using formula.

$$D_n(x,y) = \begin{cases} 1, & |W_n(x,y) - B_n(x,y)| > t_T \\ 0, & otherwise \end{cases}$$

$(x, y=0,1,2,\ldots\ldots,N-1 \qquad N$: window block size)

In above formula, n represents the number of blocks, W the block corresponding to the existing image, B the block keep in touch with the background image, and D the value of the complete difference between W and B.

B. Background Image Update:

Step 1: One-dimensional array is declared to store each difference image luminance change rate by block R(n), and initialized to 0. This step is performed only once during the first run.

Step 2: Integer variable C to compute the degree of transform for the entire block is confirmed and initialized into 0. Here in, C represents the number of blocks with a change. For the block difference image (Dn). Steps 3 and 4 are performed repeatedly.

Step 3: The number of pixels that have 1 as a value within the block difference image (Dn) is put together. At this time, the sum of pixels represents the change in the luminance

within the block. If it is equal to or greater than $\triangle$ t, it is considered to have a change in the movement in the block, and the value of R(n) increases by 1. In addition, the value of C increases by 1. Conversely, if the sum of the pixels is less than t. we consider there is no change, the value of R(n) reduces by 1,and all the values of Dn are initialized to 0. The image with no change in the luminance value in the block is initialized into0 to eliminate noise. Herein, $\triangle$t uses an arbitrary threshold value i.e. block size N.

$$R(n) = \begin{cases} R(n)+1, & C = C+1, \quad \sum_{k=0}^{N^2} D_n(k) > \Delta t \\ R(n)-1, & D_n = 0,\ldots,0., \quad otherwise \end{cases}$$

Step 4: In above formula, if the value of R(n) is less than '-1',the background image of the block is updated.

Otherwise, it is not updated and remains as the previous background image.

5. CONCLUSIONS

In this paper we propose a method for trajectory recognition based on obtaining the Motion History Image of the moving person . This method produces accurate results even when tracking is not very robust. The system used in public facilities and organizations, as part of an effort to achieve security.

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