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Implementation of Crowd Surveillance Iot System by Using Digital Image Processing Algorithm

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***Abstract* - Determining the size of crowd in real time is a major research area these days. The input regarding the crowd size to the security managements may serve a greater cause of safety. The manual detection of the crowd size from the CCTV by monitoring the video by human is accurate but it requires 24X7 continuous monitoring the video, which is not possible if the guard is observing more than one video. So the automatic detection of the crowd size will beneficial. The contribution of this thesis is in the field of crowd counting. Size of crowd is a important clue of a present scenario, therefore the maximum existing peoples counting methods have utilized the important scenario to count the existing crowd. Great challenge is to obtain an efficient method for crowd density now days. In this thesis, a novel approach is proposed which is based on local image features, which are specific to individuals and groups within a scene, so the total crowd estimate is the sum of all group sizes. An extensive analysis shows that local features consistently outperform holistic features. This thesis proposes a novel visual representation called textures of optical flow which captures the properties of motion patterns in crowded environments by applying traditional textural features directly to an optical flow field. Results demonstrate that the proposed approach outperforms existing algorithms on benchmark anomaly detection sequences. In order to bring an automated solution to this problem, we propose a novel approach.**

***Keywords*- Crowd Estimation, CCTV, VSS, HMM**

I. INTRODUCTION

Crowd size is defined by the total count of people in it, but to count the number of people is a difficult task. Several people are required for the sitting arrangement on watch tower or the entrance gate of the venue where mob is meeting. But again the mob location might be an open room or there may be several entry points. This would require plenty of investment for manual arrangement and would take additional time in assessment. Presently for measuring the number of people in the mob there is no system available and it gets hard as the movement of citizens in different commands is incorporated.

The current system of counting people involves a sequence of pictures obtained from different locations and at a height of 200 to 400 feet, though the images from satellites can also be used but its cost is more, everyone and every association cannot assemble many cameras at dissimilar places or satellite images. So they required a cheap and best system which can count the number citizens accurately i.e. one, two or three camera images which are positioned at different sites. With some earlier section we can have some methods to grip these challenges, there are some strategies given below that need to be followed. This Iot based can dramatically change the environment of crowd counting it also uses the usual and non usual sensors. There can be applied various methods for considering the size of the mob or the room engage by the mob. To consider the instructions of movement of the citizens a series of images acquired in a time gap can be used. Outlook changes can be used to deal with the different dimension of image of citizens closer to the camera and farther ones [4].

- The stages of research preparation are as follows-
- To learn the available text.
- To set up an assessment graph of the new developments.
- To state the problems linked with them.
- Script out difficulty report.
- Learning old text to get answer.
- Scripting exact problem declaration.
- Planning latest and pioneering thoughts.
- Asses these thoughts with testing tools and for this purpose small and larger information sets are gathered.
- The result of the accomplishment is evaluated with the current technologies.
- If required modify the plan and examine the fresh one by repeating the steps from d to i.

II. MOTIVATION AND OBJECTIVE

Crowded area is a large collection of peoples within a public or private space. In public places such as railway stations, airports and shopping centers, it is not likely to monitoring of every individual person for suspicious behavior. Instead, the difficulties posed in crowded surroundings ascend from the crowd's collective

properties: congestion, excitement, fighting, rioting and mass panic. A crowd in computer-vision framework can be labeled as group of targets (not necessarily people) so close together that no single one can be completely segmented, due to numerous constrictions.

This is the reason; most of the techniques used in non-crowd conditions do not work well for crowds. Assuming a standard video- surveillance setup, with numerous overhead-mounted cameras, even an outwardly sparse crowd is difficult for state-of-the-art methods. A crowd itself is one of the main pointers for a potentially hazardous situation. Violence in public places such as schools, public transport, and shopping malls is very frequently related with local crowd. The study of densities and flows in crowds can show probable risks and suggest appropriate activities. Therefore, there is a great attention in crowd analysis by computer-vision approaches.

The crowd density is a serious safety indicator for mass events coordination squad [21]. The occurrence area was covered by number of cameras; therefore, the involuntary system, which would spot cumulative density of crowd, could be able to warn the managers of the event, before the adversity outburst. They would be able to take protections such as divert a flow of people from the crowded area. The Love Parade is not the only occurrence where the crowd analysis could help. the stampede at the Cambodia Water Festival results in more than 340 deaths.

Closed circuit television (CCTV) offers a resource for safety personnel to monitor crowds, in order to avoid or minimize these problems. Crowd monitoring is apprehensive with the general belongings of amblers in a scene. These properties include crowd size, density, growth rate and flow patterns, as well as the discovery of abnormal events. Inappropriately, CCTV delivers an incomplete picture of the world, one which is "separate and fragmented" [8]. Security systems employing CCTV are accomplished from a control room encompassing numerous monitors, which are experiential by a human operative. In public spaces such as railway stations and airports, the operator is searching to specific events, doubtful behavior and objects. Differentiating such events from repetitive activities is not easy, and requires constant, focused attention.

III. DIFFERENT APPROACHES FOR CROWD ESTIMATION

1. Tracking and Behavioral detection

This is main and important features of the crowd analysis that can help in the process and make easy. Firstly the useable sensor sense the data and that type of data should be analyzed for future use. The tracking is not so easy because of moving object in such type of crowd. In visual system having abs tackle like raining, ice, object shadows, side effect and having so much voice of crowd. More work already done and some model gives very good result in this field. Some motion model having a good result in this field. Few authors' works on dense crowd some work on individual some work on single image and some work on multiple cameras [13].

2. Head Count and density estimation of the crowd

The head count and measurement of density are combined used by researcher to easily identification. In any panic situation is very important to identified head count in crowd so that the unwanted person identified. In the report presented by yogamina [12] having the error rates only 2.05% used the concept of video sequencing and detection flows. A very different approach was applied to counting the peoples those are waiting the bus at bus stops according to that they can assign the ticket to the person in a particular buses and also shows that waiting time period that also can solve the problem of face counting in crowd. Considering the above all method we reach the conclusion that mobile system is better option in all available option for counting and density estimation. Video based system having some improvement for giving better result.

IV. PROPOSED ALGORITHM

Proposed Algorithm's Steps:-

Step 1: Create or Read a video or moving object%obj.reader = vision.VideoFileReader ('d.avi');
Step 2: Initialize Tracks or state of moving object
Step 3: Detect moving objects from the video,and track them across video frames
Step 4: Create a Kalman filter object
Step 5: Display Count Results in Video Frame

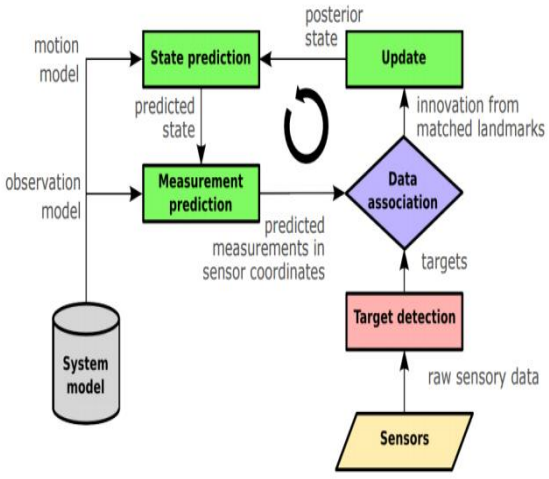


Fig. 1 Shows Filter Proposed Model.

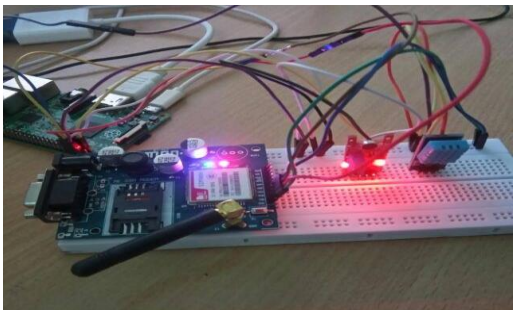
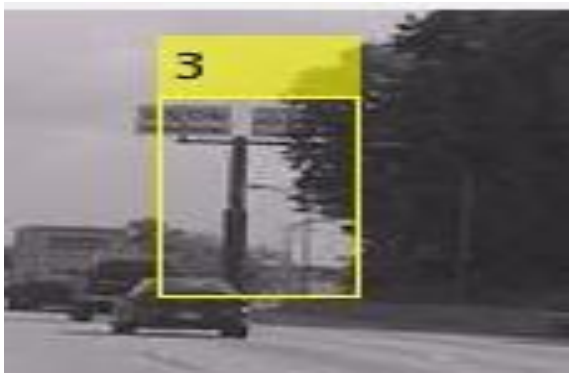


Fig. 2 Proposed Working Model

V. EXPERIMENTAL RESULTS

The following section shows the tracking of objects in the video and with their count using our model.



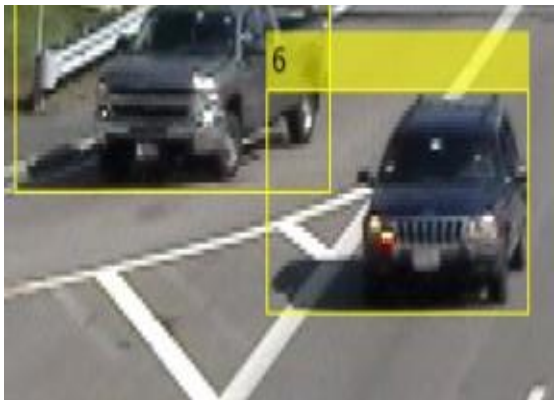


Figure 6 a,b,c and d contains detected objects and showing counts in the video

Table 1 Outcome with Constant Velocity on above Video

Video Name	Exact Position of Object	Estimated position of Object
a	4	3
b	10	7
c	7	6
d.	15	17

VI. CONCLUSION AND FUTURE SCOPE

We have presented the general outline to count objects in images. While our definitive aim is the counting accurateness over the entire image, during the learning our approach is improving the result based on motion model. In this thesis two motion model have been discussed and implemented in MATLAB, in result section both motion model (Constant Velocity and Constant Acceleration) results are shown in tabular and results are good and more accurate for Constant Acceleration motion model. In coming future proposed a new index parameter for measurement of accuracy for crowd density estimation.

A Great challenge is to obtain an efficient method for crowd density now days. Avenues for additional future research are listed below:

- The use of bidirectional segmentation methods, such as the mixture of dynamic textures could be used to extend the current virtual gate into bidirectional system.
- In addition to anomaly detection, textures of optical how may be considered for event modeling and event recognition purposes. Exploration of additional textural features, which may be applied to optical flow field, is also warranted.

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