

SUPPORT VECTOR MACHINE (SVM) BASED ABNORMAL CROWD ACTIVITY DETECTION

¹Savdhariya Sohil .M, ²Prof.Divyang Patel,³Prof.Ravi Patel

¹Student, ^{2,3}Assistant Professor

^{1,2,3}Department of Electronics and Communication

^{1,2,3}Shankersinh Vaghela Bapu Institute of Technology

^{1,2,3}Gandhinagar, Gujrat, India

Abstract: Crowd analysis becomes the most active-oriented research in computer vision, now a days a wide attention has been paid to crowd control and management in the intelligent video surveillance area. In this thesis, Abnormal Crowd Behavior Analysis and Classification System method is used to identify crowd behaviors using machine learning with segmentation concept. We focus on the motion trajectories to observe the crowd behavior of the personnel in the crowd and Optical flow methods are used to acquire the streak lines and path lines of the crowd personnel trajectories. we focus work on segmentation of canny edge detection method with SVM classification concept using histogram of gradient and motion vector for identify feature matrix from image and using feature extraction identify feature value and using machine learning classify different types of crowd activity like fight, normal, crowd misbehavior etc.

IndexTerms – Support Vector Machine, Object Detection, Abnormality, Histogram

I. INTRODUCTION

The terms of group or known as 'mob' or 'disorder' can be characterize as an aggregate trademark, for example, 'an irate group', a tranquil group', and 'a frenzy swarm' are very much acknowledged. Crowd is comprised of the autonomous person's parts, whereby every one of them have their very own destinations and standard of conduct which vary from the normal separately from its members. The swarmed scenes are increasingly regular as the human populace raises dependably. These days wherever we can locate the swarmed scenes in this universe. The wellbeing, security and the board of the people groups in the open spots like air terminal, railroad station and shopping centres have been a major test. The variation from the norm identification in the swarmed scenes benefits criticalness. Gathering of People who are identified with each other. Group is a novel gathering of individual or something includes network or society [7].Some instances of swarmed scenes are appeared in Figure 1. People can remove helpful data of personal conduct standards in the observation territory, screen the scene for irregular circumstances continuously, and give the possibility to quick reaction. In any case, psychophysical look into demonstrates that there are serious restrictions in their capacity to screen synchronous signs. Incredibly swarmed scenes require checking an exorbitant number of people and their exercises, which is a huge test notwithstanding for a human spectator [3].



Figure1: Examples of crowded scene a) Stage of the Tour de France (structured scene)
(b) People gathered in a square (unstructured scene).

II. FRAMEWORK OF CROWD ANALYSIS

The imperative part qualities in a group comprises of thickness, area, speed, shading and so forth. By utilizing the PC dreams, the data can be separated either naturally or physically. Two kinds of sensors are utilized to catch the scene procedure incorporate typology sensor and topology sensor. To get increasingly exact data in a group scene, the procedure of extraction data ought to rely upon the states of condition, for example, brightening changes (progress from day to night, shadow of foundation pictures and non-static foundation like leaves passed up the breeze could be distinguished as moving item), taking care of the impediment, numerous information channel and sum number of cameras, the progressions of movement and recognizing distinctive trademark either human or article. Generally the group show is created base on the separated data that speak to the status either verifiably or unequivocally while the occasion disclosure is cultivated utilizing the computational model. Both of models are refreshed with the new data extraction. Figure 2 shows the system of group examination and its preparing^[7].

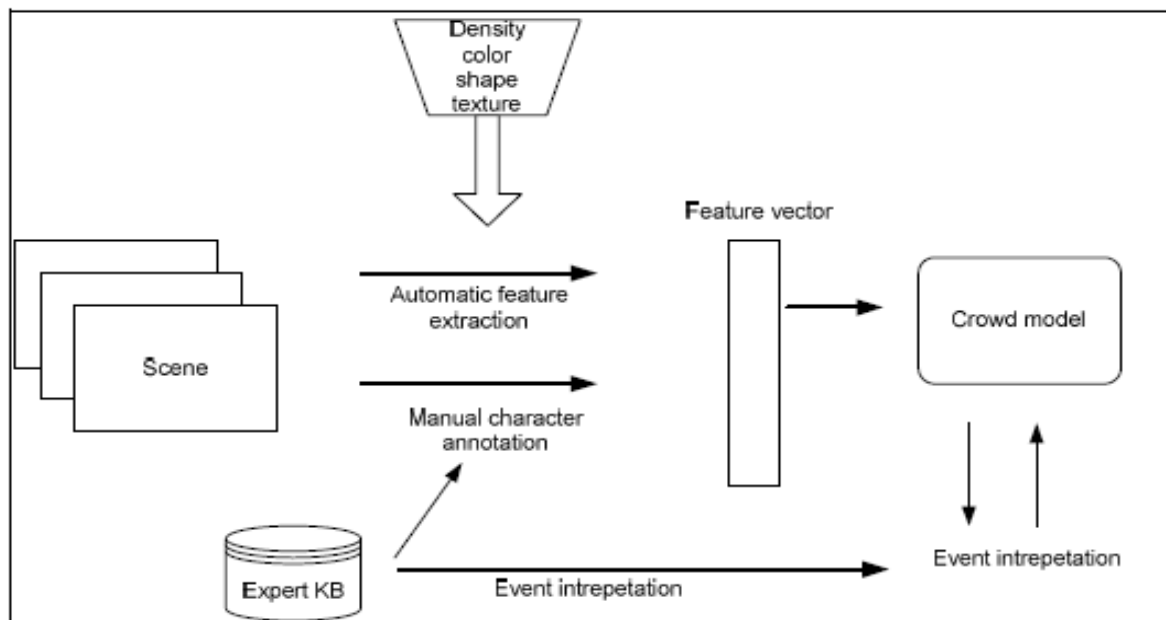


Figure 2: A framework of crowd analysis ^[7]

The capability of group examination fit another application space, for example, programmed recognition of uproars or disorganized acts in groups and restriction of the anomalous locales in scenes for high goals. The regular procedure for investigation in video arrangement of group data extraction created the accompanying fundamental three stages include: I) Pre-Processing, ii) Object Tracking, iii) Event/Behavior Recognition ^[7]. Group Density Estimation: - To gauge a group status. Discover the dimension of the group in a space or to distinguish anomalous changes of the group additional time. Group Motion Detection: - To portray the normal for a group. Recognize example of conduct in group. Group Tracking: - To gain the directions of development. Decide if irregularities happen. Group Behavior Recognition: - To break down the conduct of the group. Concentrate movement data and Model unusual group. Pre-Processing: - Responsibility: Detect and characterize, Category: Rigid article or Non-Rigid Object, Analysis/Features/Approach: Pixel Based Analysis, Texture Based Analysis, Region Based Analysis, Frame Based Analysis. Precedent: Feature extraction (forefront location, optical stream), object identification, arrangement (shading, edge, shape, head, body) Item Tracking: - Responsibility: Analyze target development, Category: Tracking singular articles and following the gathering of items. Examination/Features/Approach: Region-based, dynamic shape based, highlight based, display based following, Example: Tracking pace and course. Occasion/Behavior Recognition: - Responsibility: Analyze example or conduct of the article, Category: Individual or group conduct acknowledgment, Analysis/Features/Approach: Object approach, Holistic methodology, Example: Occlusion, moving item (running, strolling, hopping). Minuscule: - Defines the article development and treats swarm practices because of a self-association process. Naturally visible: - Focus on objective arranged groups which decided a lot of gathering propensities dependent on the objectives and goal of the scene. Mesoscopic/Hybrid: - Inherit from Microscopic and Macroscopic^[7].

III. APPLICATION OF CROWD ANALYSIS

Below describes the application of crowd analysis:

1) Visual Surveillance: Many spots of security interests, for example, railroad station and shopping center are exceptionally swarmed. Traditional reconnaissance framework may fizzle for high thickness of items, with respect to both precision and calculation. We can use the aftereffects of group conduct examination to swarm transition measurements and clog investigation inconsistency discovery and disturbing, etc. Virtual reconnaissance is generally examined by PC vision ^[3].

2) Crowd Management: In mass social affairs, for example, music celebrations and games, the swarmed scene investigation can be utilized to create swarm the executives procedures and help the development of the group or people, to stay away from the group catastrophes and guarantee the open wellbeing ^[3]. Comprise of creating swarm the board systems particularly for progressively increasingly visit and well known occasions like game matches, show exhibitions, open exhibitions and so forth so as to keep away from group calamities and guarantee the open security. Group the executives generally examined by the humanist, analyst and structural specialists ^[7].

3) Public Space Design: The analysis of crowd dynamics and it can provide some guidelines for public space design, and therefore The examination of group elements and it can give a few rules to open space structure, and consequently increment the effectiveness and wellbeing of train stations, air terminal terminals, theaters, open structures, and mass occasions later on^[3].

4) Entertainment: With the inside and out comprehension of group wonders, the foundation of numerical models can give increasingly exact reenactment, which can be utilized in PC diversions, film, and media businesses. Some ongoing works have been proposed to integrate swarm recordings with sensible miniaturized scale conduct^[3].

5) Virtual environments

Comprise of numerical models of groups can be utilized in virtual condition so as to improve the recreations of group marvels, to enhance the human beneficial experience. Virtual condition is ordinarily examined by the PC realistic scientists ^[7].

6) Intelligent environment

Include a pre-essential for helping the group or a person in the group. For instance, how to redirect a group dependent on the example of group in an outside domain like parking area ^[7].

IV. PROPOSED SYSTEM

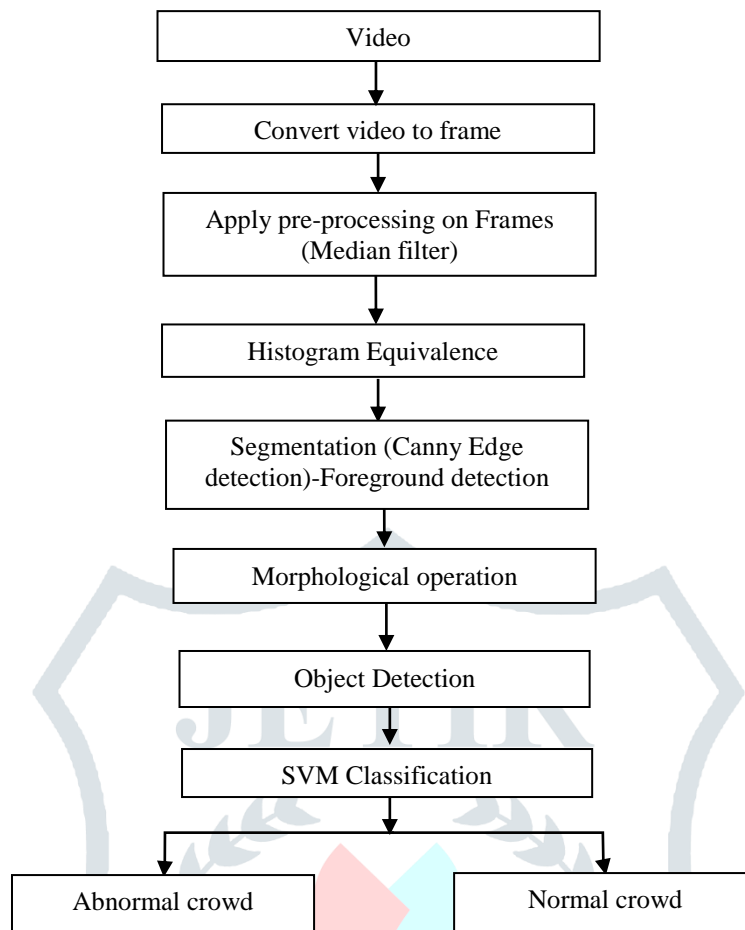


Figure 3: Proposed system Algorithm

ALGORITHM STEPS:

Step 1: Take a Input video

Step2: Video Convert to frames

Step3:Pre-processing is a typical name for tasks with pictures at the most reduced dimension of deliberation - both info and yield are power pictures the point of pre-preparing is an improvement of the picture information that stifles undesirable contortions or upgrades some picture highlights critical for further preparing. I have utilizing the middle channel is a nonlinear advanced separating method, regularly used to expel clamor from a picture or flag. Such clamor decrease is a run of the mill pre-handling venture to improve the consequences of later preparing.

Step 4:Histogram equalization the basic idea is to change the original image pixel gray value of the number of pixels in the image gray value to widen, while the number of pixels in a small gray level reduction, the image is converted into the form of a histogram.

Step5: Image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as super-pixels). I have using edge detection technique for finding the boundaries of objects within images and in this research, work have using Canny edge detector is a multi-step algorithm that can detect edges with noise concealed at the same time.

Step6:Morphological strategies confirm the picture with a little layout called organizing component. This organizing component is connected to every single imaginable area of the information picture and creates a similar size yield. In this method the yield picture pixel esteems depend on comparative pixels of info picture with its neighbors. This activity delivers another double picture in which if test is fruitful it will have non-zero-pixel esteem at that area in the information picture. There is different organizing component like jewel molded, square formed, cross molded and so on.

Step7:Object recognition is the way toward discovering examples of certifiable items, for example, human, bikes, and structures in pictures or recordings. Item location calculations commonly use extricated highlights and learning calculations to perceive occasions of an article like human movement examination. It is generally utilized in human movement in group region.

Step8:Classification can apply to pixels or to images. When classifying pixels, we try to decide whether a given pixel belongs to a class. Detection is all about searching for objects or features within images and determining their locations. For example, finding the faces, signs or license plates in an image. When classifying images, you are trying to identify the type of image you have, such as what the main subject of the picture is (person, dog, bus, and building). I have using support vector machine is a powerful tool for binary classification, capable of generating very fast classifier functions following a training period. SVM can be considered as a linear method in a high-dimensional feature space nonlinearly related to the input space. Using kernels, all input data are mapped nonlinearly into a high-dimensional features space. It is possible to compute the separating hyper planes without explicitly carrying out the map into the feature space and classify to abnormal and normal images.

V. RESULTS AND DISCUSSION

We have examine several videos to find abnormality in the crowded places. Our proposed system gives better result as compare to other methods available to detect abnormality. Table 5.1 shows extracted frame from videos which have some abnormality.

Table 5.1: Abnormality Detection

Original Image From Video	Abnormality Detected Image
	
	

VI. CONCLUSION AND FUTURE WORK

In this paper work on crowd detection technique has been described. Since the specific goal was to identify gatherings of people like abnormal activity rather than flows or walking individuals. We implemented use of a features descriptor that overcomes the performance of well-assessed Histogram of Oriented Gradients. The use of One Class SVM allows the system to learn automatically the needed thresholds making it easily generalizable to settings that shares similar viewing angle. Future work in this system including pre-processing technique, segmentation methods using will improve the performance.

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