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Detection of Skeptical Activities in PTAs Using Real Time Surveillance System

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ABSTRACT— *Detection of skeptical activities in public transport areas using real time video surveillance system has attracted an increasing level of care. A framework that contains video data receives from a fixed color camera installed at a particular location. The noise from video frames is removed by using Gaussian filtering. The foreground blob is extracted from video frames using background subtraction method. The framework obtains 3-D object level information by detecting and tracking persons and luggage in the scene. The actions of public are identified and clustered in a crowd scene by using unsupervised learning k-means clustering and force field model. The features are extracted from the frames using Gabor algorithm, histogram of gradient and SIFT. The different variants of behavior that is relevant to security in public areas such as abandoned luggage, fighting, fainting, and loitering. The experimental results are to demonstrate the outstanding performance, fast object tracking and low computational complexity.*

Keywords— crowd behavior, abnormal events, staged matching, k-means clustering, force field model, objects tracking, occlusion.

1, INTRODUCTION

The analysis of single and crowd behavior using surveillance videos is an important issue for public security, as it allows detection of both abnormal crowd behavior and individual behaviors being important surveillance applications. Behavior recognition and video understanding are core components in video surveillance system. The detection of changes, behaviors and anomalies in imagery and video is a fundamental problem in machine vision. Lately there has been much effort to devise automated real time high accuracy video surveillance systems. This practice is almost witness in large public areas such as metro station and airport. The purpose of this paper is to identify the behaviors, abnormal events and suspicious activities of the individual and crowd people in public areas. The framework that processes raw video data receives from a fixed color camera at a particular location. The noise removes from video frame using Gaussian filtering with color correction and gamma correction to improve the quality of the image. The conventional background subtraction method is to subtract the background in each video frame and extract the foreground objects as blobs. The single or crowd areas in video frames are notified after the extraction of foreground blobs. The blobs are extracted in foreground that as automatically finds crowd or individual areas. The objects are obtained by background segmentation into semantic entities in the scenes [5]. A complete semantic based recognition that depends on object tracking has been innovated and extensively investigated. The object is tracked by using particle filtering with color histogram, spatial histogram and similarity index measure.

These color objects are tracked in 2-D and classified as being either animate (people) or inanimate (object) in individual and crowd scene. These objects are modeled by using spatio spectral algorithm to estimate the pixel color and halt update of occlusion

stage [1].

The objects are matching with blob by comparing of color histogram and histogram intersection with threshold. The matched object and blobs are move to feature calculation.

The unmatched blob and objects are handling the occlusion by using staged matching technique to detect merges and splits. The unmatched blobs are processes into new object and recover the objects. The feature calculation is different from both individual and crowd scenes. The features of individual behavior are calculated by using threshold and velocity to create a historical record.

The features of crowd behavior are calculated by using Gabor algorithm and histogram of gradient. The classification is based on feature record to analyses the behavior in scenes by using histogram of gradient and Gabor algorithm. The detection of semantic behaviors based on object and inter-object motion features. A number of interesting types of behavior have been selected to demonstrate the capabilities. These types of crowd behavior and individual behaviors are relevant to most commonly encountered in public areas. These are related to public areas such issues as merging, splitting, fighting and loitering in crowd scene.

2, RELATED WORKS

The behavior recognition is depends on object tracking in 2-D, segment and classify. The behaviors are defined and detected by continuously check the feature records [1]. The individual recognitions are adaptability and robustness with human operators but varied in crowd density [2]. The visual surveillance in dynamic areas for humans has wide spectrum of application, human identification, crowd statistics and congestion analysis detection of anomalous behaviors and interactive surveillance using multiple cameras.

The framework includes modeling of environments, detection of motion, and classification of moving objects as tracking and recognizing [3]. The video surveillance technique has increase the safety and security in public areas to enable human operators and monitoring activities across large environment. The real time image analysis is used for image

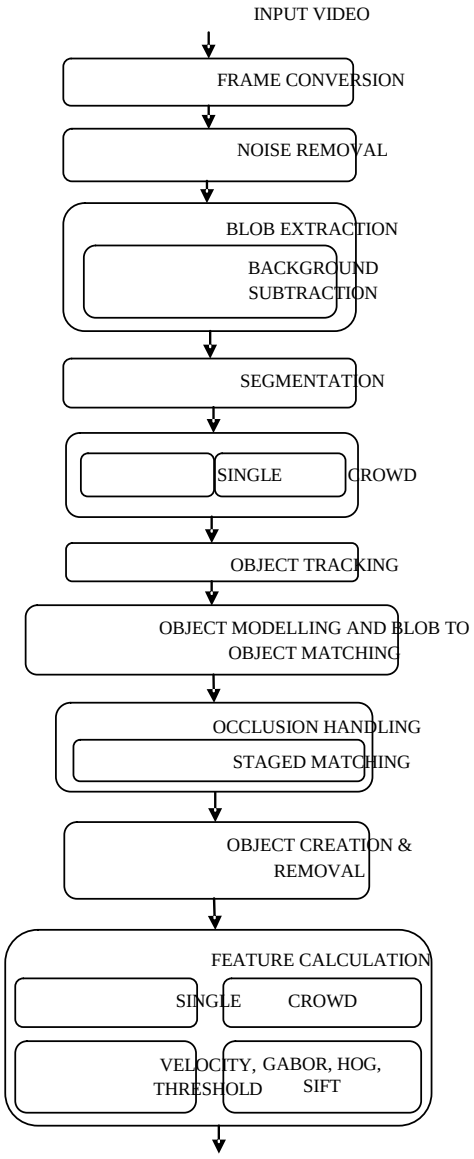
transmission, color image analysis, event focusing and model sequence understanding [2].

Advisor is an automated visual surveillance system for metro stations and developed as a

part of project advisor. This system is used for tracking people and crowd monitoring [4].

An abandoned object detection system is presented and evaluated using benchmark dataset.

3, PROPOSED SYSTEM ARCHITECTURE



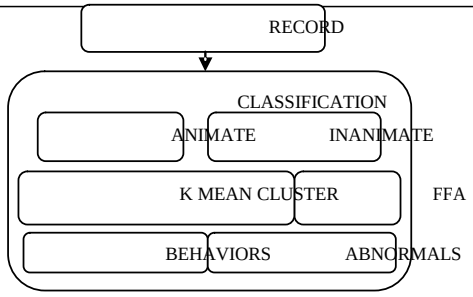


Figure.1 System Architecture

The proposed system is processing a video in camera which as located at particular scene

in public areas and after calibration, the video as convert into video frames. The framework contains the object as 2-D level in video. The video frame is attending the preprocessing stage for removing the noise from video to clear understand of objects. The foreground blob as extracted as using conventional background subtraction. The objects are segment as semantic entities, tracking and classify in both individual and crowd behavior in scene of public areas. The objects are detecting and tracking in 2-D level information.

The object is modeled to update the list of objects using blob matching and spatio spectral algorithm. The blob to object matching is comparing with threshold and unmatched are occlusion occur. The functions are merges and splits using staged matching technique to relax and recover. The unmatched blob and objects are processed into object creation and removal. The features are extracted in 3-D level to classify the activities in single and crowd scene.

4, NOISE REMOVAL FROM VIDEO

The noise is removed from video frame using Gaussian filter technique with gamma and color correction. The quality of the frame is improved for object processing or further processing.

4.1 Gaussian Filter

The Gaussian filtering is used to remove noise form video and minimizing the rise and fall
time. The behavior is closely connected to minimum possible group delay and it is consider
as ideal time domain filter. These properties are important in public areas such as metro
station, oscilloscopes and digital telecommunication systems.

4.2 Gamma and Color Correction

The gamma correction is required to compensate for the properties of human vision and to
maximize the use of the bits or bandwidth relative to how human perceive light and color.
The images are not gamma encoded and allocate too many bits or bandwidth. The
highlights are humans cannot differentiate to shadow values and to maintain the same
visual quality. The pixel intensity values are represents gamma values to get a clear and
improved quality visual.

5, BLOB EXTRACTION

The blob is a region of the image and extract from video frame using conventional
background subtraction and threshold. The background of the video frame is totally
subtracted to focus the goal object. The background subtraction method is used for
detecting moving objects in videos from static camera. The background subtraction
algorithm should be able to perform lighting changes and clutter changes. This is more
efficient and simple to implement for further process.

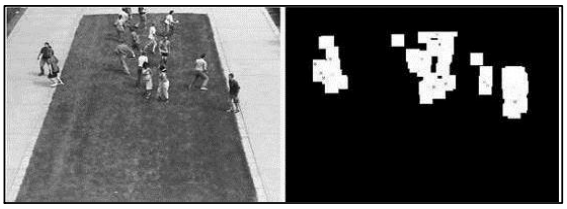


Figure.2 Crowd scene and blob extraction

Figure.3 Single Scene and Blob Extraction

The foreground blob is extracted and segmented as semantic entities using high level motion feature. An image foreground is extracted for object recognition by using background subtraction.

6, OBJECT TRACKING AND MODELLING

The segmented semantic objects are tracked using particle filter and also used as color histogram, color spatiogram and similarity index measure. The each frame contain list of objects to update current frame object from previous one. The object is tracking in both single and crowd scene.

6.1 Particle Filter

The particle filter is used for tracking the problem of single and multiple objects. The set of weighted particles are filtered to get posterior distribution of objects. The weighted particles are based on a likelihood score and then propagate these particles to a motion model. The particle filter is used to estimate the posterior distribution and system state objects in video frames. The color histogram is used to track the color object in video frames. The histogram is graphical representation for fast and easy to compute. The color histogram is to construct as histograms of each individual object. The size of object is easily normalized and different image histograms are compared. The color histogram of object is matched for classification. The normalize histogram is to hold the frequency of color objects. The histograms are matching for color object tracking. The cluster of crowd scene is used color value and pixel location for track crowd density to find regions. The color spatiogram of objects are identical to histogram and stores spatial information to calculate the mean and covariance of spatial position of all pixels of object in single and

crowd scene.

6.2 Spatio Spectral Algorithm

The spatio spectral algorithm introduces two techniques for modeling the objects such as
photometric appearance mechanism and occlusion resolution stage. The photometric
appearance mechanism is used to degree estimation of pixel colors. The occlusion
resolution stage is processed to halt the update in two or multiple occlude each other. The
collisions are not occur in the scene, spectral data is used and collisions are occur in the
scene, multi hypothesis data is used to find occluding objects in single and crowd scene.

7, BLOB TO OBJECT MATCHING

The blobs and objects are matched with using color histogram and histogram intersection.
The histograms are used to match the blobs and objects. The value of color histogram and
intersection are compared with threshold value as (0.45 to 0.6) to identify matched and
unmatched. The matched blobs and objects are processed to feature extraction. The
unmatched blobs and objects are processed to occlusion stage.

8, OCCLUSION HANDLING

The blobs and objects are not matched then it occur occlusion. The occlusion is handled by
potential occlusion and to prevent the contamination of the objects. The occluded objects
are merged and spitted using staged matching technique. The staged matching technique is
used for merging and splitting the objects. The objects are matched with using kalman
filtering to find not matching and mismatching. The not matching get relax with old frames
and mismatching get recover from old frames.

9, OBJECT CREATION AND REMOVAL

The remaining all blobs are considered as new blob to process and grace period also
increase with each other. The some objects are wrongly classified as blob that objects also
recovery from frames.

10, FEATURE EXTRACTION

The 3-D feature extraction is calculated by using threshold and velocity to find single and two object features. The feature extraction for crowd density is calculated by using Gabor algorithm and histogram of gradient. The Gabor algorithm is a number of salient visual which includes spatial frequency, orientation and spatial localization. The Gabor features are robust to illumination variations and detect amplitude invariant spatial frequencies of pixel gray values. The Gabor filters are directly related to Gabor wavelets. The histogram of gradient (HOG) is captured the edge and gradient structures that are indicated as local shape. The histogram of gradients is used in computer vision and image processing for object detection. This technique is used to create the feature record in the historical sequence for detecting the behavior of 3D moving object.

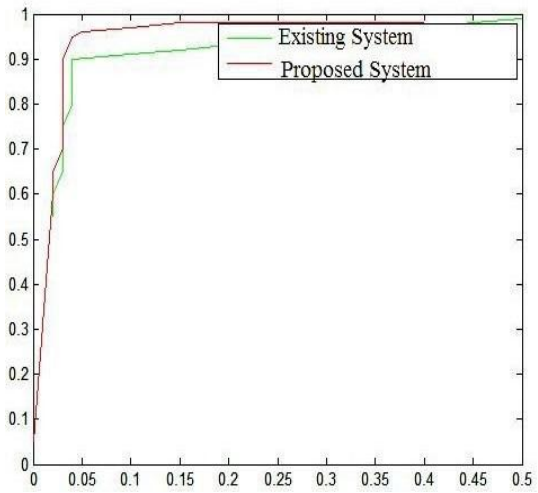


Figure.4 Comparision of Proposed and Existing

The feature calculation based on gradient values and cell histograms. The feature calculation is extracted to create historical for crowd scene in public areas.

11, CLASSIFICATION AND RECOGNITION

The classification is compared with records and threshold of both single and crowd scenes.

The animate or inanimate in public areas are identified by using records. The classification of crowd scenes is identified by using k-means clustering and force field analysis. The unsupervised learning k-means clustering is used to identify the behavior of crowd scene in public. The activities of people behavior are recognized by using k-means. The people in crowd scenes are partitioned into cluster. The element of cluster is isolated to segment and recognize the behaviors in the crowd scene. The force field analysis is used to identify the abnormal events in crowd scene and force that drive or restrain planned. The force is identified to support change and denser of clusters. The finally action of people [7] has to be changed and analysis of abnormal activities in crowd scene. The skeptical activities are recognized such as abandoned luggage, fighting, and loitering in single and crowd scene.

The types of activities are used in investigation, metro station, urban areas, and airport. The complexity is less and easy to implement in crowd. The FFM is to eliminate or minimize barriers to goal attainment. The behavior recognition gives high accuracy and faster objects tracking. The more than two types of behaviors are identified and classified. All aspect of problem may not be identified.

XII. CONCLUSION AND FUTURE WORK

The skeptical activities of both single and crowd scenes are detected by using unsupervised learning algorithm in public areas. The behaviors and abnormal events are identified by using k-means clustering and force field analysis. The future enhancement is to enhance the task of object track, improve all aspect of behavior identification.

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BIOGRAPHY

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