

# A Survey on Techniques for Unusual Event Detection using low resolution camera for Enhanced security

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**Abstract -** A certain scenario is considered to be unusual when it is perceived to be out of the ordinary under certain situations. For example, people running around in a football field are considered to be normal whereas it is deemed as unusual if it takes place in a mall. Detection of unusual events are crucial due to the increase in various crimes in our society. If such unusual activity can be detected early on and investigated before the actual crime has been committed, we can avoid the losses and casualties that are generally associated with crime. A technique which is commonly used in recent times to detect unusual activity is known as Convolutional Neural Networks (CNN) which is a deep learning technique that can capture/learn different levels similar to a human brain.

**Keyword:** Convolutional Neural Network, Unusual event, Background Modelling and Subtraction.

## I. INTRODUCTION

There have been significant efforts since the turn of the decade in the field of digital image processing, particularly with regards to object detection and tracking to make applications such as video surveillance to be more efficient. But like always there are hurdles produced around every corner due to the challenges faced in increasing the efficiency of the system. The challenges are mainly to do with the quality of the video background, the shadows, and the resolution. But the benefits of using low resolution cameras are less storage space required, cheaper to operate, minimal processing overhead, fast transmissions. These benefits cannot be overlooked as they are crucial in the operations. Since converting this low resolution to a higher resolution is very expensive and time consuming, this paper presents an algorithm to detect unusual activity with great accuracy even in low resolution videos. A typical application of our algorithm would be in the enhancing the security of ATMs. It uses rolling average background subtraction technique to segment foreground object from scene with dynamic background and preserves object features to an extent by simply applying morphological operations with the suitable structuring element. It also does not need any property standard deviation of the centroids of the blobs to recognize the occurrence of the abnormal events.

## II. LITERATURE SURVEY

Sudhir Goswami, Jyoti Goswami, Nagresh Kumar[1]

So in this paper we are identifying unusual event detection like fight and overcrowding happens in low resolution camera video in particularly in the ATM system. That algorithm classifies the what are different technique are used in the project like rolling background subtraction technique and close Morphological operation for using fill the gap between after obtaining subtraction image contains gray scale pixels in this image block contains small gaps that will be filled up using this technique. and calculating some probability of threshold value used for thresholding and standard deviation and calculating segmentation area, stanadrad deviation and no of blob detection used for pseudo code of approach and so over all result are efficient because low resolution camera there is no need of high computational because low resolution so perform all tasks easily.

Rupesh Ambatwad, Mrs. Jaya Dewan[2]

In this paper mainly focus on Background subtraction perform varoios unusual event detection like mainly identifying head area identification, classification and feature extraction, mask and helmet detection and future extraction so there are used method for detecting head area is used for blob detection technique and Gaussian mixture model in capturing head area under blob technique it mean different color and region object and identification of helmet and masks using viola jones algorithm it mainly focused on identifying facial aspects like eye pair, nose and mouth. To recognizing and

calculating skin color using two techniques one is color space transformer and skin ratio calculation. In color space transformer calculating color ratios so basic model is RGB is hard to separate from chrominance and luminance information and calculating skin ratio is identifying skin pixels of head region. Using formula like number of pixels divided by total number of head region found to obtain skin ratio. In feature extraction means identifying unique feature in the particular image in classification of image are challenging task it used support vector machine for classifying binary images under the images so main algorithm is CNN.

Mandar Shriram Munagekar[3], In this paper we are analyzed the intrusion detection, edge detection and grabbing techniques using canny detection algorithm mainly used for calculating image edge criteria like smoothing, finding gradient and double the thresholding. In grabbing frame phase only, the frames are grabbed from the video recording for second consider pixels span is set to 5 seconds it happens only in live going on. And matching of a frame take place to intrusion. Second phase is edge pixel processing it explain the number of edges in the images is highlighted by whitening the outer edge and other edge are object is black end and third phase is theft detection and alert in this phase white pixels calculation is done to count the pixels and comparing by current pixels and previous one and it take place by raising alarm. so canny detection algorithm maintain the status of edge pixels of captured images will be recognize uncommon circumstances and alert the owner. And entire automatic functions like determining theft, recording the footage, notifying the owner and police itself.

Wafa Lejmi, Mohamed Ali Mahjoub, Anouar Ben Khalifa<sup>[4]</sup> In this paper we are analyze different the event, optic flow, characterization, feature learning classification and spatial-temporal descriptor and extracting of primitive characterizing the movement it uses two approaches first one is classical approach to estimate the optical flow and second one is spatial temporal descriptor for provide a sophisticated modelling of the movement for encoding the variability of the movement. Detecting abnormal images are used two approaches first one is microscopic approach for different types of processing we can list person segmentation in order to determine the paths and posture study. Second one is macroscopic approaches it used for study global aspects of global movement like the flow analysis and detection of event in a crowd, perception of activity in a crowd and analysis of behavior succession and there some learning methods used in order to classifying the rare rather than abnormal that are following approaches like data partitioning approaches, Bayes approaches and hidden markov approaches and markov fields. There are estimating probability density for probabilistic classification are two methods first one non parametric in under non-parametric used for parzen window and KNN algorithm and in parametric there are expectation-maximization algorithm and sequential kernel density approximation algorithm. so we understand the known methods for event detection in scenes observed from a fixed camera. the motion patterns are determined through an unsupervised learning framework which aim to produce the statistical model of events.

Kunal Dahiya, Dinesh Singh, C. Krishna Mohan[5] In this paper we are analyzed for tracking and detecting of without helmet bike riders it uses gaussian mixture model along with strategy to refine foreground blob in order to extract foreground and tracking of vehicles in real time from single camera in order to accelerate the computation used for integrated memory array processor and proposed framework is background subtraction method it is used for separate the object in motion such as bike and humans, cars from static objects such as trees, roads and buildings, In detection bike riders are following two methods first one is feature extraction under perform histogram of oriented gradients, scale invariant feature transformer and local binary patterns. And second methods are classification in this step is to classify them bike rider's vs other object this required a binary classifier and any binary classifier can be used for choose the SVM due to robustness in classification performance even trained from less number of feature vectors. Usual face detection algorithm is not sufficient because reason is low resolution poses great challenge to capture facial details and angle movement of bike may be obtuse angles. And moving bike riders processing full frame becomes computational overhead which does not add any values to detection rate.

Shikha Singhal, Abhishek Singhal[6] In this paper we are analyzed the different behavior of human crowd area and detect the events in the videos. In event recognition will be identify the event in groups and individual. so using the two technique first one is generating video content representation and second one is decision making process for detection. In identifying event because it is a large volume and high dimension for complex internal structure. In reduce the complexity in video so used Modularity mixture framework it is based on geometry preserving the projection and maintain the integrity. To identifying the human behavior based on human posture it can be divided into two parts one is appearance based and another one is shape based. In appearance based approach calculating the intensity and color of the human body and shaped based approach there are two technique. In first technique is contour based for identifying different body parts and employing the external points detected in contour and second method is silhouette based method in this method analyze the human movements. Analysis done in different form such as pre-processing and background

modelling and multiple body detection and object based level including performing trajectory estimation along with the posture classification, level semantics analysis including visualization of camera calibration. so in this all activities are performed in video and image retrieval analysis tool (VIRAT). This tool divides entire human behavior in two parts such as event and activities. In crowd behavior analysis done using a support vector machine (SVM) it classifies the low-level feature in crowd and event classification.

Kande Archana, P Bhaskara Reddy[7] In this paper we are learned about the recognizing of a normal and abnormal behavior of the person and system consists of structure where object are moving with respect to a fixed background and each frame of a video in this technique first foreground extraction technique is used to obtain clear silhouette of people. And fixed size window is used to record the MHI. The MHI is used to generate pattern of a person under the different situation, describing a pattern used Humoments. The dimension is reduced by applying principal component analysis (PCA) to remove the redundancies and make the system computationally. In background subtraction and MHI techniques computing MHI is a binary image where pixel intensity is a function of the recency of motion in video sequence and pixel intensity is linearly ramping value as a function of a time and more location can be brighter. And purpose of the using hu moments it provides seven values as an extracted feature from a given image. out of seven is invariant, six are absolute orthogonal invariant and seventh one is skew orthogonal invariant. In this proposed system actions are classified using support vector machines is the machine learning tool and a widely used for classifier in computer vision, bioinformatics. LibSVM is a library for SVM used.

NorSurayahaniSurianiAiniHussainandMohdAsyrafZulkifley[8] In this paper we are learned about the concept of sudden event recognition, motion pattern, video surveillance and foreground detection and object recognition. The importance of sudden event over a general anomalous event for resulting dynamic state of the object like direction and speed of motion are caused by a change in the force applied for particular object during the activity. In sudden event detection are explained in 3 ways. First one is human centered it consists of single and multiple person second one is Multiple person it consist of multiple groups like fight and disperse suddenly, muggers and a snatch theft. Third one is in this vehicle centered in this method sudden event occur when there is an unexpected behavior suddenly happens the road such vehicle that deviates from the normal event. And last one is small area centered it represents by a space volume properties and size of the object and it correlated with sudden event.

S. Sakthi Sowmya, Dr. D. Jeyakumari[9] In this paper software are used LabVIEW which is used for real time usage and LabVIEW is processing of a digital image in IOT. And used for Sending mail if any unusual event detected. And sensors and webcam for capturing real time video in ATM system. In this project if unusual event happen door will be locked and theft can be easily catch and door will be made in electroMagnetization it complex to unlock the door. And there is no need of manual security. and mainly used weapon detector sensor it is used for detecting a power cells and other commonly used weapon profiles and metals. Relay device also used for opening and closing contacts circuits purpose in this project using for triggers for the opening and closing of the electromagnetic door.

Ramesh babu d r, amandeep rathee, Krishnan Gini kalita, mahima Singh deo[10] In this paper mainly focused on detection helmet using various machine learning algorithm, supervise learning, feature extraction and background subtraction and MATLAB function. In this project there are five machine learning classifiers are random forest for based on decision trees and second one is gradient boosted trees it constructing trees in parallel comparing to random forest tree and third one is SVM. Fourth one is deep neural network using deep learning improvement over convolutional neural networks. In this model suitable for large training data set are to be needed. If you are giving small data set it becomes a bottleneck for such network. so deep learning network expected to perform better than random forest in image recognition but lack odd data issues does not perform well this is the drawback of the project.

Mamata s. kalas[11] In this paper we have learned about the facedetection, adaboost and haarlike and computer vision and OpenCV. In face detection contain the four method that are knowledge-based methods in this method encode our knowledge of human faces and algorithm finds different faces indifferent angles. Second one is template matching methods in this method algorithm compare input images with the pattern of faces or features and third one is appearance-based method in this method template will be matching with those pattern databases and learn from a set of training images. Fourth one is face detection in computer vision it briefly explain about the given an arbitrary image, the goal of face detection is to determine whether or not there are any faces in images and if present, return the image location and extent of image And last one is face localization in this phase identifying various facial aspects like eye pair, nose, mouth. To represent the image in 2d ways so used for haar like feature in this section haar like feature detecting human faces and show the age, gender, color. Next feature in this project Adaboost is linear classifier and is adaptive boosting in a machine learning algorithm and it contains low substantial error rate, So mainly used in this

project biometrics in various aspects like face,thumb,iris and palmprint authentication in any security System.

### III. PROPOSED SYSTEM

So, we are collecting data from different sources like handycam, mobile camera, USB camera, CCTV camera etc. And we are capturing video in ATM System for tracking unusual event and recognizing of faces and object detection we are used openCV for tracking real time computer vision and it supports several hundred of computer vision algorithm and it support some several shared or statistic libraries and it also provide core functionality like image processing, video analysis, camera calibration and 3D reconstructions, object detection and high level GUI. And we used buzzer for if unusual event detection happen it will be on and if any person damage to ATM machine we are used Force sensor it any force found it detected unusual and again raised buzzer and if any man handling inside a ATM system so we are used Accelerometer to find displacement and it treated as Unusual event .and we are used Stepper motors for door locking purpose then and enabling SMS and Calling purpose used GSM module if unusual event detected send message for a particular ATM belonging to the Bank and Nearest police station and over all hardware integrating with Arduino Uno perform all operations. In we have to write code in python 3.X Because python is popular programming language and it supporting more machine learning algorithm so we are used CNN algorithm and support it also openCV.

### IV. CONCLUSION

The system aims to identifying and tracking unusual event happening in inside a ATM for tracking different events like if any robbery happens it bank loss more amount and there is no proper security for ATM system and Identifying crimes like Man holding some sharp material and snatch withdrawal money for customer. Inside like over crowding if two persons coming and wearing helmet those are the activities happens so avoid those problem for using algorithm to make decision is fast and easily track that person in inside a ATM for using smart door locking system and alert the perspective Bank person come and after that take actions.so our goal is creating a user friendly environment in the ATM System and avoid the crimes in ATM system.

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