# Crowd Steering Using Motion Vector Analysis

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**Abstract:**

For a prolonged period, video monitoring has been used as an aid to beat protection and other problems. Historically, the area unit of video outputs controlled by human operators and the area unit was often saved to tapes for future use. Sensitive areas such as shopping centers, banks, huddled public places want a thorough police investigation that could require automated control of individual flows. For the world of today equipped with machine learning algorithms, a smart, closed-circuit video television is required to do such automation. A sensible, closed-circuit visual television with person detection and following capabilities is granted in this project. It can be used to control the movement of people into sensitive spaces, and is mostly done by counting the people who enter and move through these spaces, because knowing the cumulative capacity of a sensitive space is hollowing up for some particular purpose of your time. Analysis of motion vectors is that the key construct used here to realize the persons following. This tends to count the persons entering and leaving fixed points stationary cameras, the ability is obtained as a distinction between the number of persons entered and the number of persons leaving the sensitive space. Every reasonable space will have to fit a restricted building. Therefore, it is important to prevent people from accessing sensitive space until they have exceeded the capacity at the price threshold.

**Keywords**Video surveillance. Sensitive areas. Motion vector analysis. Moving person detection and tracking. Background subtraction .Person counting

## 1 Introduction

Efficient and accurate automated individual monitoring and counting is also very helpful for many industrial applications used for protection and management of other people. It can be used to ensure folks' protection inside vulnerable areas. Areas such as town parks, shopping malls, and banks are often secured from overcrowding. One includes the variety of techniques in traditional police investigation schemes involving cameras to track these locations. It often needs additional human operators, and hence the storage devices with large data volumes are produced. Confirming accurate control of sensitive areas over long periods of time is unworkable. Large numbers of individuals are on the road in vulnerable regions, and the rate within a specific region of those folks may mean the number of people entering this region within a particular period of time. It is arduous to count the individuals at a particular position after they join or exit during a cluster. The use of rapidly growing PC vision technology and high-speed PC as a processor to count these people often solves this downside. Many people are counted by continuous video camera footage and unceasingly spending this real-time footage on PC through USB connectivity for image processing. This image method consists of segmentation, background removal, and identification of blobs,

etc., which can be achieved using advanced image processing techniques; background subtraction techniques primarily track movement in several real-time vision police work applications. To track foreground objects, these methods think about differences between the incoming and background images. Background subtraction offers the foremost complete awareness of the feature; but, due to shifts in lighting and extraneous occurrences, it is very prone to complex scene alterations. Researchers are currently engaged in creating a context model for the analysis to prevent falseness in motion detection triggered by changes in the scene. The context model is revised sporadically, using a mix of pixel and object oriented techniques. Speed and accuracy of background subtraction depend on the performance of the algorithmic data extraction programme. When within the image sequences there is a scene (frame) with none moving object, it is always a background frame with a pure background image. There is, however, hardly anything to induce a pure background image within the globe. In these systems, as in several alternative implementations, it is important to extract a pure background image from videos embodying moving objects [1,2].

The traditional method of enumeration of persons is the manual enumeration. The difficulty lies in counting the quantity by victimization counter of persons passing a space. Even to count few individuals, it is not certain that in a brief amount of time it will be correctly counted at intervals. Manual enumeration is painfully laborious and highly costly. Human labours have limited span and reliability if large quantities of information have to be evaluated over a prolonged period of time, particularly under jam-panicked conditions. Delivering physical leads in real time for electronic police investigation is mutually arduous. Therefore, the automated enumeration method needs to be built and this is always not an easy job, there are some things that can be difficult to unravel even with today's technology[3].

Individual enumeration may be a challenging scientific downside and linked to many sensitive applications such as railway platform, enumeration of people inside the elevator, trains, enumeration of the number of people going through security doors in search centres, The number of persons present in the chain store, the number of persons visiting the recreation park and the number of persons working in the laboratory. Another in each of the enumeration persons' automated ways is the tiny enumeration device dependent on controller. Small controller-based system unremarkably used for small scale enumeration, except for massive scale and business use, and this method has certain limitations such as lack of precision. Together, intolerable sensors will be used to count people; intolerable receivers will count the number of people until the detection zone detects the echo bouncing away from the people[4].

The enumeration accuracy degraded once several objects walked across the detection area , particularly the individual before the sensors blocked the detection of various persons. Together, microwave sensors and weight-sensitive sensors are one in each unit that will be used to count individuals. Owing to the rapid advancement of the desktop and laptop vision program, it is possible to count computer vision victimization persons even though the process is extremely costly in terms of computer operations and money. In general, enumeration persons are essential to projects, marketing analysis, and people management, often focused on police investigation. The identification of individuals by indicates that of

artificial vision algorithms which an energetic analysis field is. A detailed analysis of the method conferred in the paper can show that individuals will be effectively counted by this method[5].

## 2 RelatedWork

Because of its generality in a variety of contexts, background subtraction was the main aim of a lot of analysis. Others use a context subtraction model built from order statistics of background values within a coaching number to enforce an applicable mathematical background rule using color chrominance and distortion of brightness. The different ways of subtraction of the context are also categorized according to the model used in the illustration stage.Basic background modelling is performed over time by an analysis of the common, median or bar chart. Modelling statistical background: the only Gaussian, Gaussian Mixture or Kernel Density Estimate. History estimates are made by the filters Wiener, Kalman or Hebychev[6].

R. Jain, H. Nagles, 1979, despite the earliest approach to subtraction of the context in the late 1970s, mistreatment frame differentiates moving objects to be observed. Ulterior approaches in the background look projected a development of probabilistic models to provide uncertainty.Recently, researchers have provided some classical algorithms for background extraction, as well as the algorithms of mean, median, stable interval determination, change detection, and mode. Researchers have also used extremely advanced methods in algorithms for background extraction, including textural and statistical features and genetic algorithms.

Researchers have proposed edge-based foreground segmentations which use colour information or information on both colour and gradient.The Wallflower algorithm aims to solve many problems in background maintenance, including varying lighting conditions, by creating a three-level system: pixel-, area- and frame-level. Recently, researchers have investigated the scale-invariant feature transformation (SIFT), as it can generate tracking features that are stable across frames with a certain amount of camera / object perspective variance.This becomes critical when considering a combination of several functions in the identification and tracking technique and when deciding on the best features to be used in various circumstances [3,6].

It remains unclear if area based methods are better than edge based methods. However, it is widely recognized that the edge-based approaches also have greater localisation of boundaries.A flow field is created using magneto-static interactions between the active contours and the boundaries of objects. Canny has shown a Gaussian's first derivative will approximate the optimal detector.The edge detection is equivalent to finding the gradient magnitude maxima of a Gaussian-smoothed image in the right direction by converting the image with this filter.

## 3 Person CountingSystem

The architecture that the device implements is shown in Fig. 1 Automatic enumeration system of the person. The images are taken from the video camera, which is supposed to be at a stationary spot, the image is felt as a preprocessing procedure before movement vector analysis is performed on it.After performing arts motion vector analysis, the data is felt to be a option making activity to follow and enumerate the individuals.

### 3.1 Description

In detail, the person investigating system 's method is shown in the diagram below, the image acquisition is that the system 's initial demand is finished by the video camera so that it is transformed into a gray image for analysis and resizes to a smaller resolution.

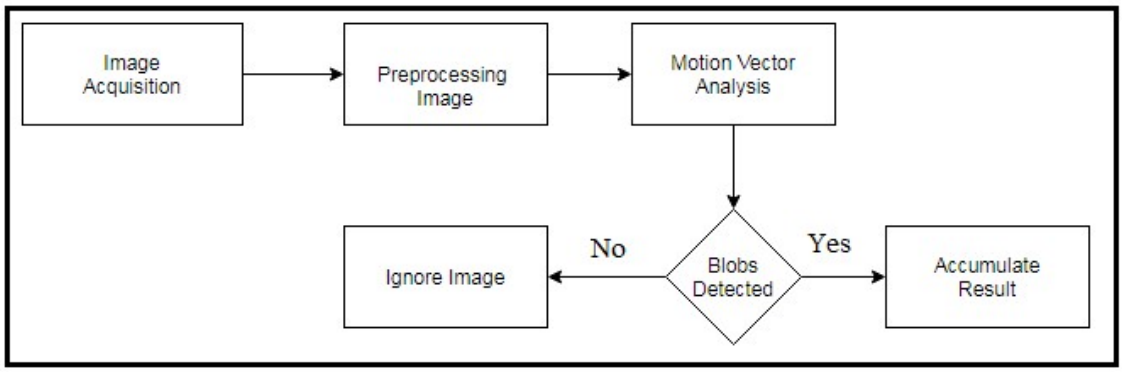


**Fig.1 Architecture of person counting system**

Then it's professional filtered noise reduction process so that the noise reduced picture is regenerated to binary picture which is in terms of 0's and 1's, for this image the vector motion analysis is performed supporting the previous image and this is always done until the last image of the video has reached. And an oblong mask is created to point the persons inside the image, and blob analysis is performed on the image to detect the person, and this is also mapped to the motion vector, and the detected persons count in each image is kept and accumulated within the program to a dynamic variable and written in the image at the left corner when accumulated.

## 4 Results

In the following estimates, the individuals are shown in the image at the side of the quantity in the left corner of the image showing the United Nations agency's cumulative count.The overall persons who detected within the video, and thus the rectangular frames that bind the persons, are accustomed to indicate that the detected object may be a individual within the image. Figure 2 indicates the background of a nonperson picture (Fig.3).Figure 4 shows a background with a single person image accompanied by Fig. 5 Indicating the number

of persons that crossed the specified boundary.

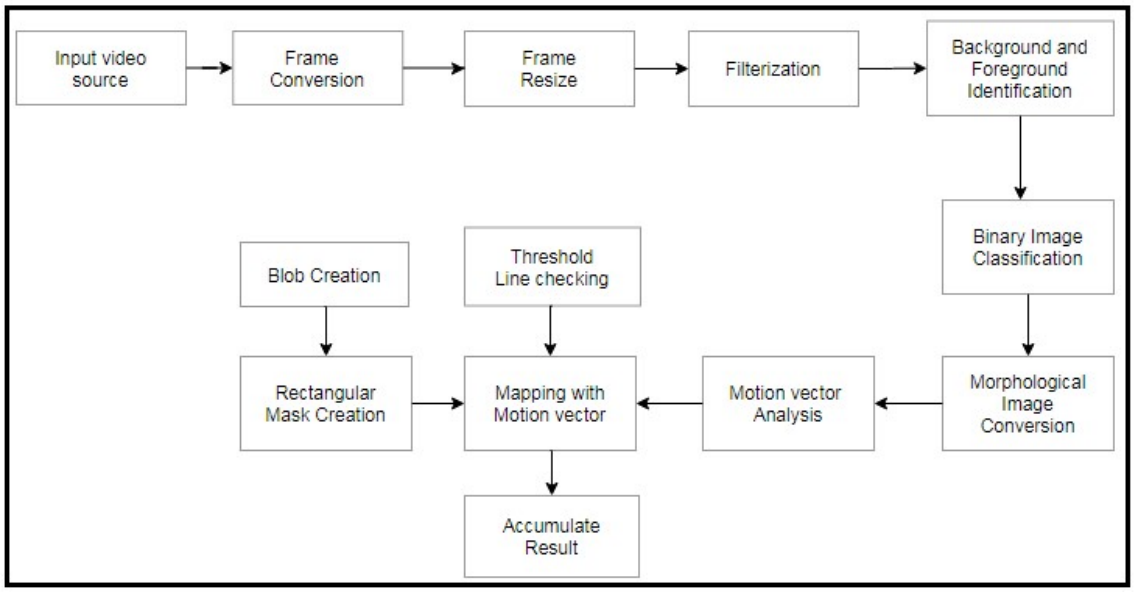


**Fig.2 Person counting system working principle**

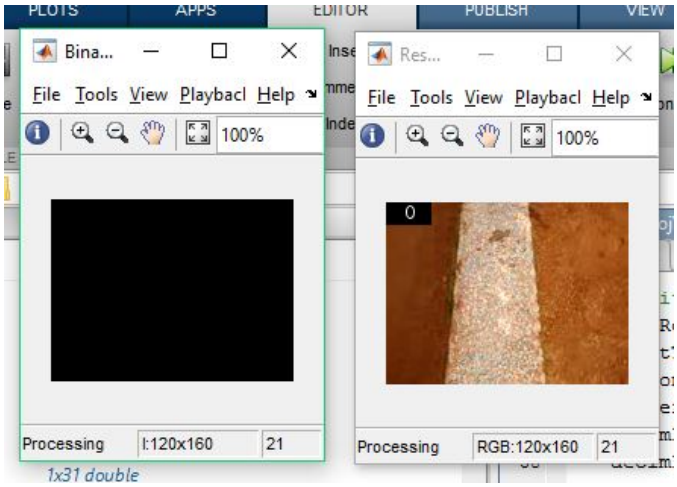


**Fig. 3 Image with no person**

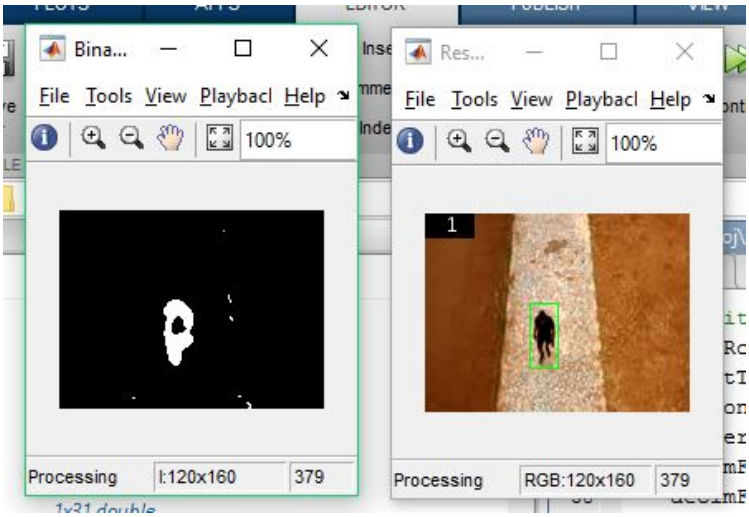


**Fig.4 Image with single person crossed and the indicated count**

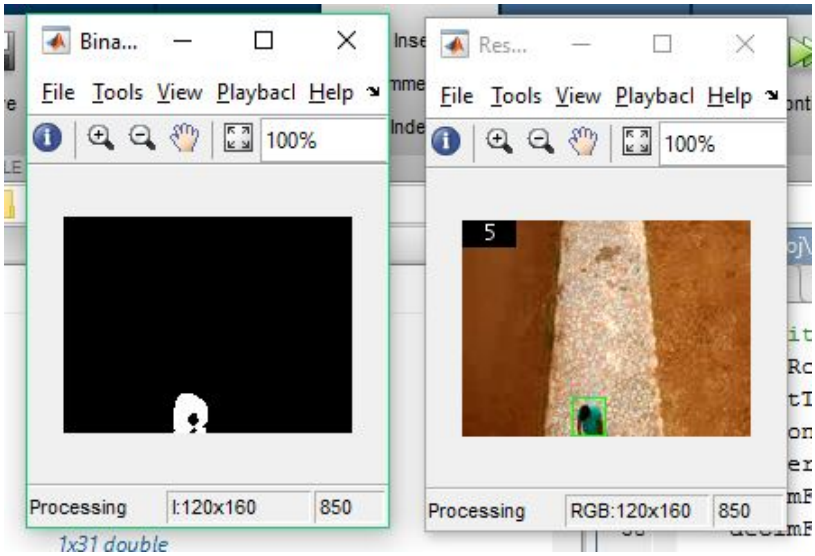


**Fig.5 Image with persons so far crossed and the indicated count of the persons**

## 5 Conclusion

The system of person count can be a combination of the method of background subtraction, chase objects, and analysis of the motion vectors. This paper shows an approach by using a video recorded from a video camera to count people entering through a selected place.In MAT- LAB programming, this individual counting method can be simply implemented with a decent laptop setup and can be ready to count the people in real time. This approach gives

the bequest device's predominantly dependent individual count scheme a strong rate of potency comparison.This person counts sys- tem can be used in several sensitive places such as banks, jewellery store, supermarket, recreational park, railway platforms so numerous places for count persons and realize the gift of the individual in a very particular location. For consumer analysis this technique is extremely imported to examine the efficacy of company policy.

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