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# Surveillance Robot For Tracking Multiple Moving Targets

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**Abstract --** Object tracking is a challenging task in spite of all sophisticated methods that have been developed. The major challenge is to keep track of the object of a particular choice. In this work, a new video moving object-tracking method is proposed. The segmentation of the video is done by contextual clustering. Clustering is an important method in data analysis because of its ability to 'discover' the inherent features in the data. The fundamental concept in clustering techniques is to group a given set of objects into subsets according to properties associated with each object, so that the members in each individual subset share some similar properly defined features. A multitarget human tracking is attempted.

**Index Terms-**Contextual Segmentation,Clustering,Tracking.

## 1. INTRODUCTION

Surveillance is the monitoring of behavior. Systems surveillance is the process of monitoring the behavior of people, objects or processes within systems for conformity to expected or desired norms in trusted systems for security or social control. Intelligent visual surveillance systems deal with the real time monitoring of persistent and transient objects within a specific environment. The primary aims of these systems are to provide an automatic interpretation of scenes and to understand and predict the actions and interactions of the observed objects based on the information acquired by sensors. The main stages of processing in an intelligent visual surveillance system are: moving object detection and recognition, tracking, behavioral analysis and retrieval. These stages involve the topics of machine vision, pattern analysis, artificial intelligence and data management.

The technological evolution of video-based surveillance systems started with analogue closed circuit television (CCTV) systems. These systems consist of a number of cameras located in a multiple remote location and connected to a set of monitors, usually placed in a single control room, via switches (a video matrix). Conventional CCTV cameras generally use a digital charge coupled device (CCD) to capture images. The digital image is then converted into an analogue composite video signal, which is connected to the CCTV matrix, monitors and recording equipment, generally via coaxial cables. The digital to analogue conversion does cause some picture degradation and the analogue signal is susceptible to noise. It is possible to have CCTV digital systems by taking advantage of the initial digital format of the captured images and by using high performance computers.

The technological improvement provided by these systems has led to the development of semi-automatic systems, known as second generation surveillance systems. Most of the research in second generation surveillance systems is based on the creation of algorithms for automatic real-time detection events aiding the user to recognize the events. The increasing demand for security by society leads to a growing need for surveillance activities in many environments. The demand for remote monitoring for safety and security purposes has received particular attention, especially in the following areas. Transport applications include airports, maritime environments, railways, underground, and motorways to survey traffic. Public places such as banks, supermarkets, homes, department stores and parking lots use such surveillance systems. Remote surveillance of human activities such as attendance at football matches or other activities and surveillance to obtain certain quality control in many industrial processes, surveillance in forensic applications and remote surveillance in military applications are in use.

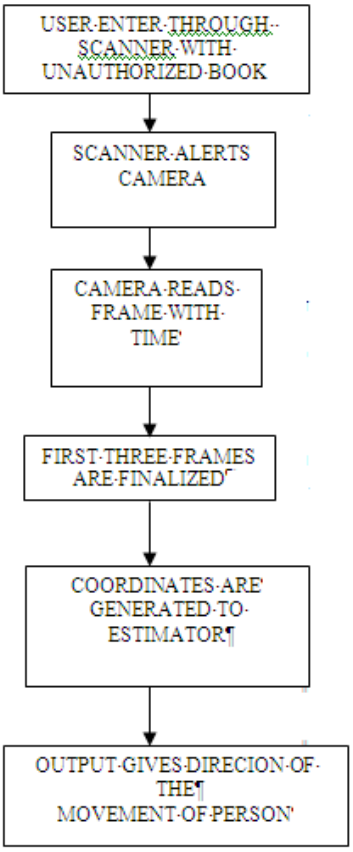
Recent events, including major terrorist attacks, have led to an increased demand for security in society. This in turn has forced governments to make personal and assess security a priority in their policies. This has resulted in the deployment of large CCTV systems.

Surveillance systems created for commercial purposes differ from surveillance systems created in the academic world, where

commercial systems tend to use specific-purpose hardware and an increasing use of networks of digital intelligent cameras. The common processing tasks that these systems perform are intrusion and motion detection and detection of packages. Research in academia tends to improve image processing tasks by generating more accurate and robust algorithms in object detection and recognition, tracking, human activity recognition, database and tracking performance evaluation tools. A review of human body and movement detection, tracking and also human activity recognition is presented. Other research currently carried out is based on the study of new solutions for video communication in distributed surveillance systems. The creation of a distributed automatic surveillance system by developing multi-camera or multi-sensor surveillance systems, and fusion of information obtained across cameras, or by creating an integrated system is also an active area of research.

## 2. Schematic Diagram

An user who is moving in and out of library system




The sequence of implementation of this work starts with initialization of Radio Frequency Identification Technology (RFID) scanner at the library entrance. Whenever a person coming out of the library does not register his/ her books at the books issuing counter, and whenever, he/ she is trying to pass through the RFID scanner, the scanner alerts the video camera which is in focus at the entrance. The video camera covers a range of area at the entrance and records the actions. Inbuilt algorithm passes each frame to software. The software, segments the frame using contextual clustering algorithm. The segmented image contains the human being distinctly visible. As the frame covers certain are of the entrance, the position of the human in the frame is given with respect to the left hand side of the frame. In our calculation, the number of columns away from the left position of the frame are suitably scaled based on the area of the room and the position of the human is recorded based on coordinates. The coordinates of the first two frames are given to an estimator. The estimator estimates the next position the object. This estimation may not be exact as the position of the human in the third video frame. To overcome this drawback, back-propagation algorithm has been used to bring close the estimation accuracy. When more than one human is present, then separate procedure has to be followed. The segmented frame has to be coordinated with the input frame and corresponding color information of the human are noted. Incase , both the human are wearing the dress in same color, then there should be some difference in the height or width of the persons in the image.

## 3. Contextual Segmentation

Segmentation refers to the process of partitioning a digital image into multiple regions (sets of pixels). The goal of segmentation is to simplify and /or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images.

The result of image segmentation is a set of regions that collectively cover the entire image, or a set of contours extracted from the image (see edge detection). Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly

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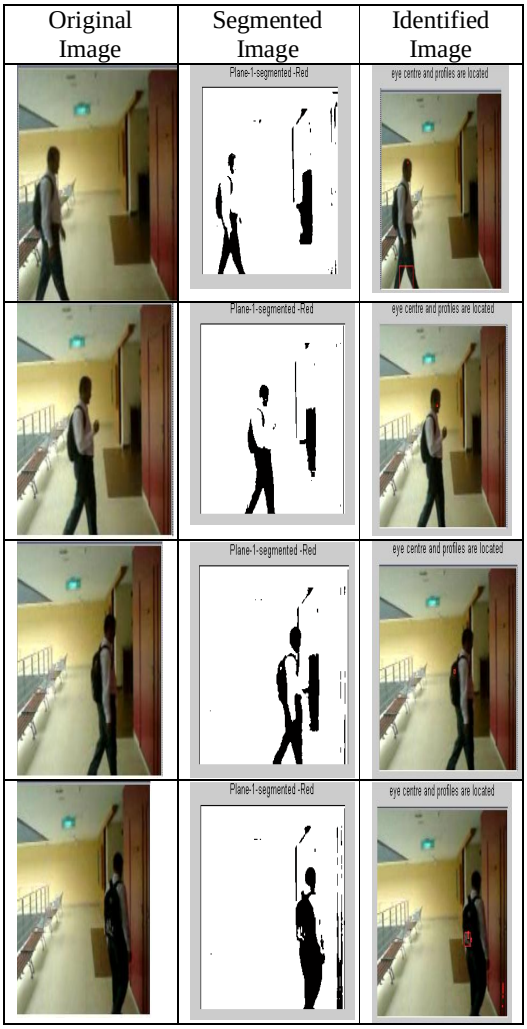
different with respect to the same characteristics. Several general-purpose algorithms and techniques have been developed for image segmentation.

## 4. Experimental Setup

Hardware Requirements are any Processor above 500 MHz., Ram 128Mb, Hard Disk 10 Gb., Compact Disk 650 Mb, Input device Standard Keyboard and Mouse./ Yashika Camera, Output device VGA and High Resolution Monitor are used Software Requirements namely operating system Windows Xp, Image Processing, Front / Back End and Matlab 7 is used for implementing the work.

## 5. Results And Discussion



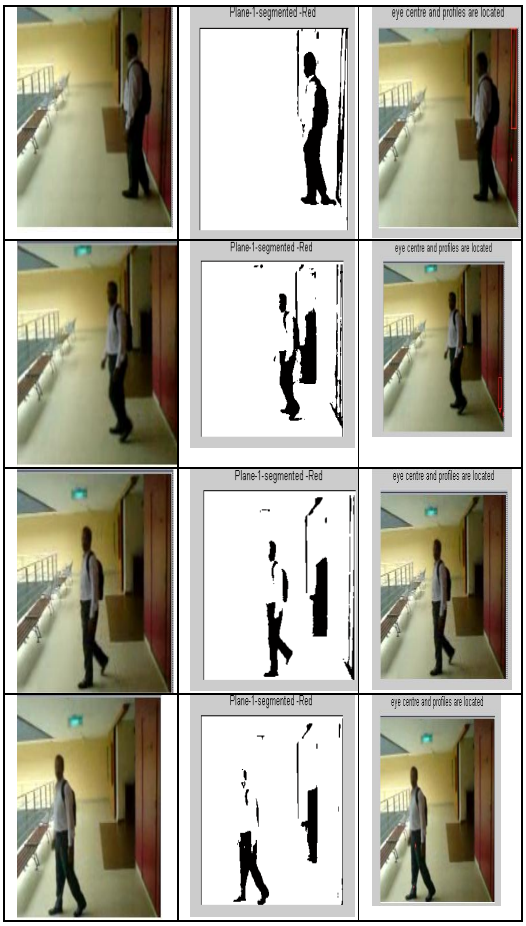




**Figure 1 original segmented and identified images**

## 6. Conclusion

Video tracking is an important process in tracking objects. It involves various image processing concepts. In this work, the acquired video has been separated into frames and segmented by using contextual clustering method. The features of the segmented image is further processed by the imfeature properties of the matlab. The imfeature provides 24 properties. In this work, two important properties are used to process the features of the segmented image for highlighting the presence of the human .

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