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# HISTOGRAM PATTERN AND KALMAN FILTER APPROACH BASED REAL TIME OBJECT RECOGNITION AND TRACKING SYSTEM

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**ABSTRACT**

Human tracking is implemented on a video sequence, which involves the analysis of the presence, size, shape and position of human beings. Human tracking is generally used in applications like video surveillance, crowd monitoring. Videos are series of images, called frames, which are displayed in faster frequency, such that human eyes will not be able to percept the continuous contents. Usually, the information of the contents present in two consecutive frames will be closely related. This paper presents a new approach for recognition of human use Histogram Specification with Kalman filtering approach. The main aim of this work is provide accurate recognition of human and view of their location from an unknown scene, Finally Kalman filter approach is apply the different positions of humans are identified based on the computation of Euclidian distance by using correlation matrix method. In this work results are drawn by using MATLAB tool by in view of the input video dataset taken from different sources and extract the frames from the input video for the detection and the efficiency of the proposed techniques will be calculated.

**KEYWORDS:** Histogram pattern, Kalman filter, Morphological operation, Euclidian distance.

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## I. INTRODUCTION

Image Processing is the field where various number of research work has been taken up and implemented successfully. With increasing concerns for public safety and security nowadays, the need for automatic surveillance systems based on real time videos of public places is realized. The highly crowded and sensitive places like markets, shopping space, famous restaurants, railway stations etc. Must be equipped with these surveillance systems, without constraining their application to security under public spaces, they are also most demanded for the purposes of traffic control and examination, activity recognition and tracking, fault detection in industrial applications and semantic video indexing. In order to achieve the high level tasks of classification or tracking a target from video stream, the strategy used is to detect the target of interest in individual frames in the first place.

The technique used in many of the works for surveillance is the background subtraction method. This technique performs extraction of the foreground object i.e. the target under motion by separating the background and foreground pixels in the frame under processing. The advantages of this method namely the performance in the presence of a non-mobile video camera and illumination invariance are well exploited by many researchers. The building of a background model of the captured video frame is a key point to be considered.

## II. HISTOGRAM SPECIFICATION WITH THE KALMAN FILTERING

The histogram specification is mainly applied for multiple human identification, the blob detections carried out using background modelling. The blob detection is mainly used to carry out the filing operation which is mainly

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needed to identify the connected components in the video frames. These connected components are defined as the blobs which are identified by using the adjacency of the neighbour frame pixels that are similar in nature. The present location of the identification stage is predicted by the features of the human being. These types of features are mainly obtained using the centroid of the blobs for the each blob that should be tracked [1-2].

The common plan of background segmentation is to involuntarily produce a binary mask that splits the cluster of pixels into 2 sets, foreground and background pixels. A stationary background frame are often matched to current frame uncomplicated cases. Pixels with high pixels area unit known as foreground. This straightforward technique may add few specialised situations. Each constituent is characterised by its intensity within the RGB house.

Next is Kalman Filtering Kalman filter may be a region primarily based technique to seek out the regions of the article in forthcoming frame. Centre of object is set 1st then Kalman filtering is formed use for predicting position of a similar within the next frame. Kalman filtering is most popular to cipher the state of a linear system. Kalman filtering consists of 2 steps, prediction and correction [3-5].

## III.ALGORITHM FOR HISTOGRAM PATTERN WITH THE KALMAN FILTERING

It provides optimum estimate to come up with the position for the motion model for a moving object though the video contains some quantity of dynamic noise and uproarious observations concerning the position at on every occasion step. For Gaussian noises, Kalman filtering can give an optimum resolution. The filter reduces the mean sq. Errors of the parameters like position, velocity, etc [9].The Kalman filter is essentially an internet method, which implies the new observations are going to be processed as and once they arrive. A distinct time dynamic linear system having AN additive racket that may model surprising disturbances are going to be needed to formulate a Kalman filter is the problem [10].

**Step1:** Firstly, reading the input video data; a continuous signal to extract the individual frames it is comprised of is performed.
**Step2:** The input video is usually color image in RGB color space. It is easy to apply image processing techniques.

**Step3:** Thus, next step is to convert each RGB video frame into its gray scale form.

**Step4:** Blob analysis technique can be applied involves Thresholding and morphological operations.
**Step 5:** In the next step sing Kalman filtering technique can be applied to remove noise inherent in the frames so that final output is refined well.
**Step 6:** The task of background subtraction is a challenge as it is subject to variations in the lighting conditions or occlusions in the scene.
**Step 7:** Morphological processing is carried out on the target detected frames where a number of operations perform noise removal.
**Step 8:** As a last step, Fourier transform is applied on the morphologically processed frame to extract the lost frequencies of the target video frame in the noise signal so that no data is compromised.

## IV.FLOWCHART FOR PROPOSED SYSTEM

This diagram presents in theform of bubble graphs can be defined as dfds. Data flow diagram is one of the easiest graphical representations describes in Figure 1 [11].

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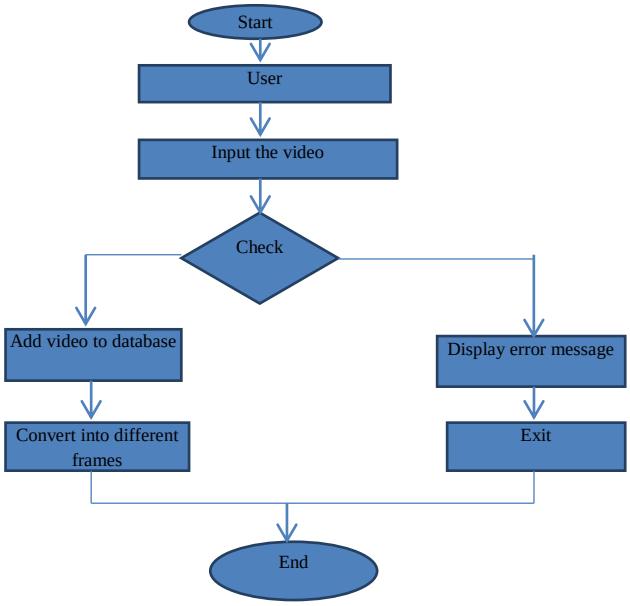


**Figure 1:** Data Flow Diagram for Add Database

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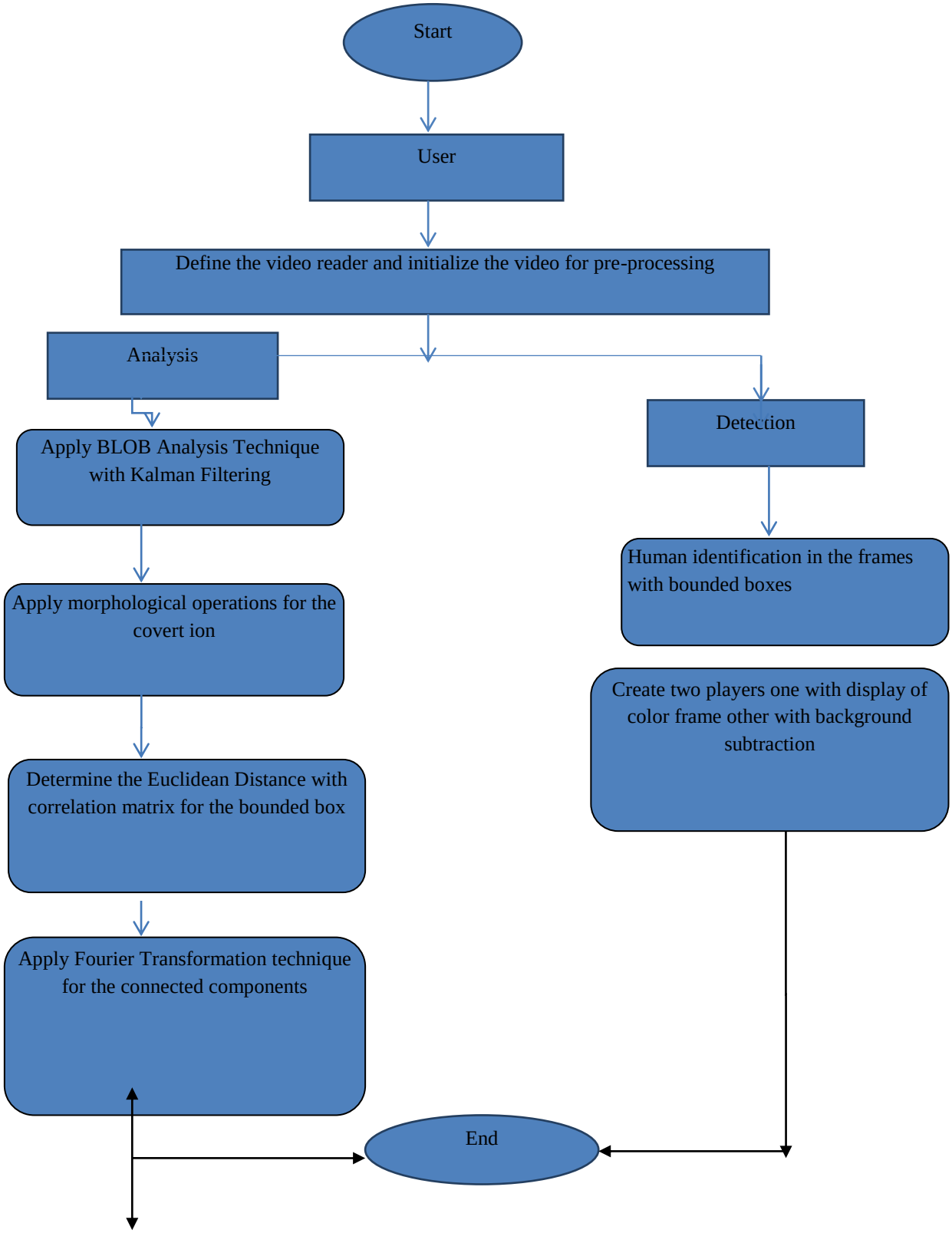


**Figure 2:** Data Flow Diagram for Proposed Technique

**Use Case Diagrams**

The use case diagram depicted in the Figure.3 describes the communication between the end user and the application framework, where each functionality and the communication will be recorded and performed accordingly. The characters who are involved in the process will be referred as on screen characters and who are

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performing outside the framework will be referred as performing artists. The main objective of this design diagram is to describe how the communication between each module is done, that's helps in the implementation of the work [14-15].

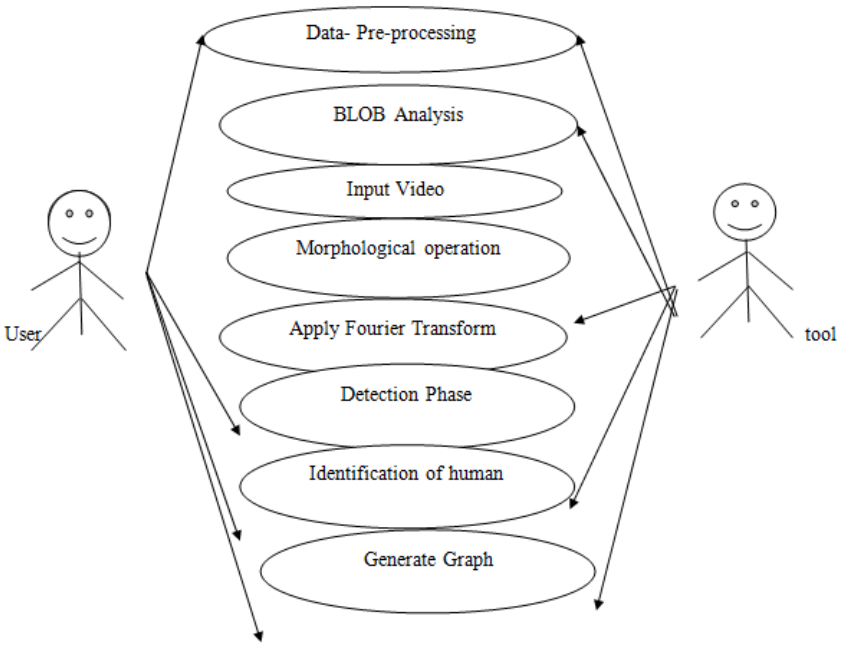


**Figure 3:** The Use Case Diagram for Proposed Technique

## V. SIMULATION RESULTS AND DISCUSSION

The results of the proposed approach are drawn in the MATLAB tool which provides us the effective solution for Multiple Human detection in the video. Even though there are various works has been carried out so far the proposed research work strands unique with its desire to provide an excellent results for the different kinds of the videos considered [6-8]. In this research work first the BLOB analysis is applied then applied the Kalman filtering along with Euclidean distance provides more effective results with minute number of false detections. The main advantages of this proposed work is provide an efficient algorithm which is easy to implement and contains less complexity in detecting the human presents in the video [12-13].

The first input video under the consideration is a good quality video of the duration 15 seconds and the memory size is 25MB. The video taken is from jewelry shop which consists of 3 persons with sitting in the shop watching the jewels. The identification of human result its grey scale image representation of a video frame is as shown in below Figure.4 with the background subtraction. The figure.4 describes the identification of persons based on the hand movements. Figure.5 describes the human identification based on the face and the leg movements of the person [16-18].

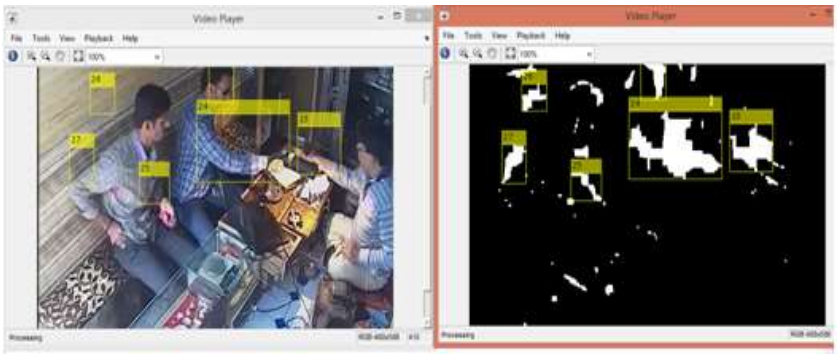

**Figure 4:** Human identification based on Hand Movements

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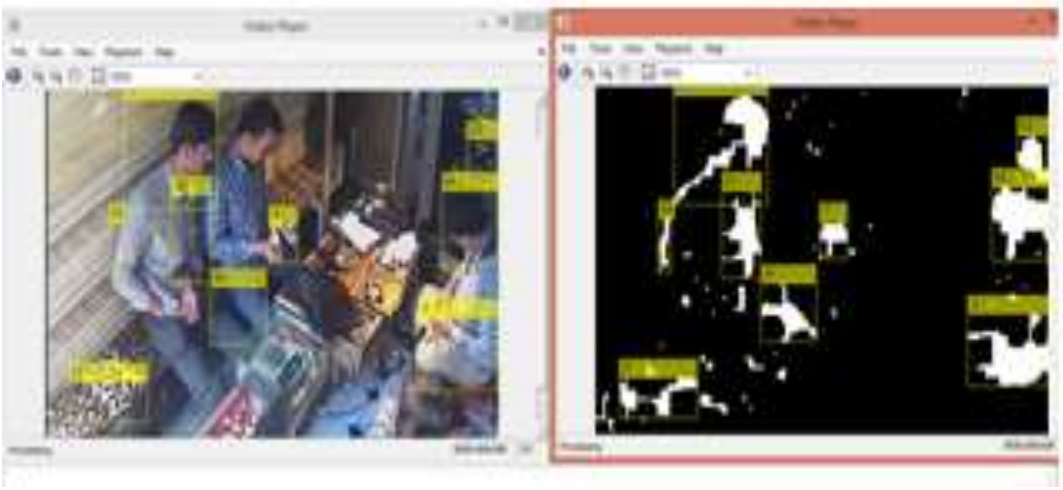

**Figure 5:** Human Identification based on Face and the Legs of the Human

The accuracy of the proposed technique described in Figure.6. This accuracy of this proposed work is represented in the output graph which is plotted against number of frames identified with human and total number of frames and drawn with the help of five different input video from different sources by varying the size of the video along with different background. An average accuracy of 90.5% has been achieved, where each of the video frames varies from 150 to 1500 and for each of the video accuracy varies from 82% to 95% in identifying the human [19-21].

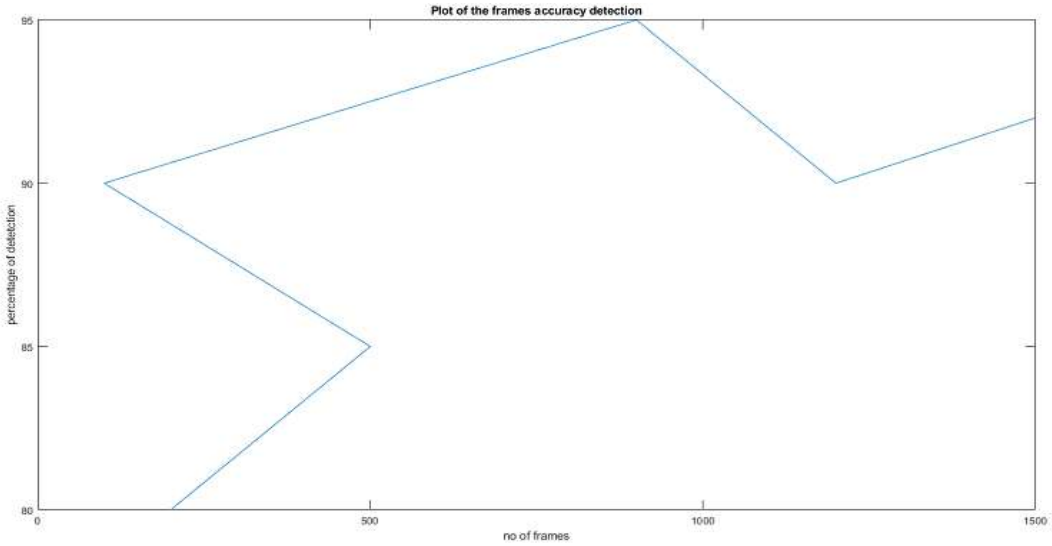


**Figure 6:** Accuracy of the Proposed Number of Frames vs. Percentage of Detection

The graph is plotted by considering the axis (X, Y) generates a 2-Dimentional plot for the line for the data obtained from Y vs. The values presents in X.

- If both the considered variables are vectors, then the length between both the variables will be equal. Then plot the graph againstY versus X.
- If both the considered variables are matrices, then the size between both the variables will be equal. Then plot the graph against function of variable Y versus function of variable X.
- If anyone the considered variables are defined as vector and the other is defined as matrix, then the defined matrix must contain all the dimensions in such way that they should be in equal length. If the row of a matrix contains equal length then graph must be plotted for each of the matrix against each of the vector.
- The total number of identified in the matrix considered for blob analysis and the filtering processing provides the number of frames percentage against the blob detected.

## VI. CONCLUSION

This section concludes the human identification with Histogram Specification and Kalman filtering with Euclidian distance techniques can be presented. During this human identification process the input video frame pixels are applied with various pre-processing methods. The subtraction of background method is applied to remove background unmatched objects. All the moving objects will be detected in background subtraction method by keeping the background of the video frame stable and constant. Then the Histogram Specification with the kalman filtering approach is applied, where Blob Analysis technique for modelling then followed by kalman-filter technique is applied where different positions of humans are identified based on the Calculation of Euclidian distance calculation using the correlation matrix. In the future the scope is to implement the Human identification based of his theft actions using multiple cameras, when the person's activities found doubtful the he is identified as the theft and alarm must be generated to identify the theft, this provides accuracy in tracking results in an efficient manner by considering the videos captured with different position and fields using the Raspberry Pi hardware.

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