# Multiobject Detection & Classification In Video Surveillance Application

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*Abstract*—**From last ten decades video surveillance become one of the most active research topic in computer vision application. Three important steps in video surveillance are Detection, Tracking & Classification. We have implemented detection of moving objects with the help of back ground subtraction algorithm & frame differencing technique. Further classification of moving object in incoming frames are classified with help of RMI (recurrent motion image) classification. Then tracking of objects are tracked using centroid based tracking. The performance of the system is carried out on various databases downloaded from internet.**

*Keywords*—*Video camera, RMT classification,Background subtraction.*

## I. Introduction

The detection tracking and classification of moving object are required and more important in application such as human computer interaction, vision surveillance. In this paper, detection and tracking of moving objects such as car people & animal is done. For detection of object there are various methods such as frame differencing &background subtraction, as frame differencing is easy &simple method for detection of objects. Background subtraction [3] method uses the difference of current image and background image for detection. The disadvantage of this method that it is sensitive to change in external environment. After that, for classification of object RMI classification [1] method is implemented. In classification there are two methods a) shape based classification b) motion based classification. In shape based classification points, boxes, & blobs are used for classifying moving objects. And motion based classification is totally depend on periodic motion of object.

In tracking there are four methods as a) Region based tracking b) Active contour based tracking c) Feature based tracking d) Centroid based tracking. Centroid based tracking is the easiest way to track any object. In video surveillance detect, recognize and classify certain object from image sequences and more importantly to understand and describe object behavior.

## II. Discription

### A. Detection

In object detection segmentation of region to moving object from rest of an image. In that we attempt to locate connected regions of pixels that represent the moving object achieved by following technique.

In Frame differencing :

In this the difference between two consecutive images are taken. Moving object is determined by taking the difference between two consecutive images. Its calculation is simple and easy to implement.

For detection first considering threshold value for comparison of whether it is foreground or background object by converting colored frame into binary frames. After that subtracting the foreground frame from background frame the difference between frames is considered for detection. After detection to remove impulse noise effect to fill up the gap between two connected foreground region morphological operations are required. Erosion and Dilation are two methods of morphological operations. Dilation is used to join the broken segments. Erosion is used to reduce the components of image.

### B. Classification

Classification of object is based on shape based and motion based. We classified different moving objects using periodic motion of those object from input video. Motion based classification is done with the help of RMI (Recurrent motion based) classification [1].

In RMI classification:

In RMI classification divided every incoming frame in boxes and to those boxes compared with particular threshold. So that as periodic motion occurred those boxes are created and according to threshold boxes become white. We counted the no of white boxes and from no of white boxes we classified whether it is man, animal or car.
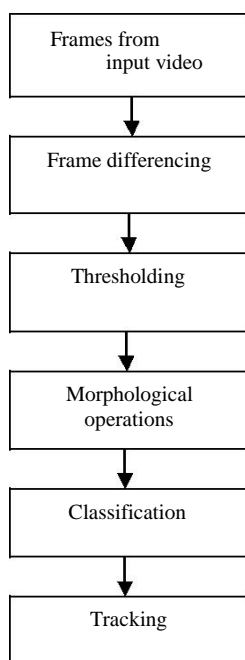
*International Journal of Research in Advent Technology (E-ISSN: 2321-9637) Special Issue*
*National Conference "NCSEEE-2016", 19 March 2016*
*Available online at www.ijrat.org*

*C. Ttracking*

In tracking every new object entering ,must follow a particular path in a limited subset of all possible paths .As now we have detected , we will get the window associated with that moving object to find the position in next frame .for that we have used blob analysis technique . For tracking we have used method.

In Active Contour –Based tracking :

Objects are tracked with outlines as bounding contours. It helps to directly extract shapes of the objects. So we will be able to extract multiple moving objects. But disadvantage of this method is to start automatic tracking

## III. ALGORITHM

```
Frames from
  input video
      ↓
Frame differencing
      ↓
  Thresholding
      ↓
 Morphological
   operations
      ↓
  Classification
      ↓
    Tracking
```

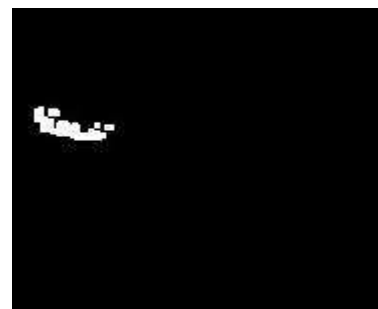## IV. SIMULATION

a) Detection Output

Fig.1.Object detection (man)

Fig.2.Object detection (car)

b) Classification Output

Fig.3.Object classification (man)
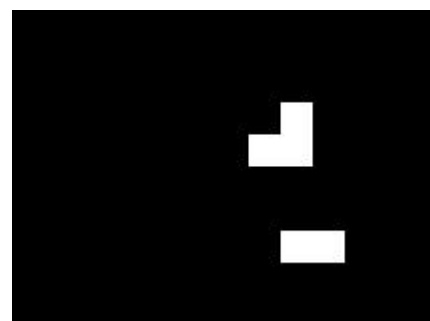
Fig.4.Object classification (car)

c) Tracking Output

Fig.5.Object tracking (man)

*International Journal of Research in Advent Technology (E-ISSN: 2321-9637) Special Issue*
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Fig.6.Object tracking (car)

V.    CONCLUSION

The detection and tracking of multiple moving objects, which can be applied in home and business surveillance. Centroid based technique used for tracking help to avoid occlusion successfully. Objects are classified using RMI classification. All of the moving objects tested were correctly classified into the predefined categories.

VI.    REFERENCES

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