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Human Segmentation Using Haar-Classifier

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ABSTRACT
Segmentation is an important process in many aspects of multimedia applications. Fast and perfect segmentation of moving objects in video sequences is a basic task in many computer visions and video investigation applications. Particularly Human detection is an active research area in computer vision applications. Segmentation is very useful for tracking and recognition the object in a moving clip. The motion segmentation problem is studied and reviewed the most important techniques. We illustrate some common methods for segmenting the moving objects including background subtraction, temporal segmentation and edge detection. Contour and threshold are common methods for segmenting the objects in moving clip. These methods are widely exploited for moving object segmentation in many video surveillance applications, such as traffic monitoring, human motion capture. In this paper, Haar Classifier is used to detect humans in a moving video clip some features like face detection, eye detection, full body, upper body and lower body detection.

Keywords **-** Object Segmentation, background subtraction, temporal, Tracking, Haar Classifier and object detection

I. INTRODUCTION

Key purpose of moving object segmentation is to extract objects from a series of repeated video frames. Mainly, it is required for high-level image accepting and scene explanation such as segmenting and tracking of special events in a surveillance video. For example, person on foot and highway traffic can be regularized using with the help of segmenting people and vehicles separately. By object segmentation, speeding and doubtful moving cars, road obstacles, human movements and strange activities can be detected [2]. Tracking and recognition the object in a video can be done easily with the help some common segmentation methods such us background subtraction, temporal segmentation, edge detection, and frame differencing. Accurate moving object segmentation will greatly improve the performance of object tracking, recognition, classification and activity analysis.

Background subtraction is a commonly used method for segmenting out moving objects of a particular scene for applications such as investigation. In this the foreground and background moving objects are segmented separately it's like subtracting the static image and moving image in a frame sequences. The name "background subtraction" comes from the easy method of subtracting the experimental image from the estimated image and threshold the result to generate the objects of moving images [3]. Temporal video segmentation is the initial step towards automatic explanation of digital image sequences. Its goal is to divide the image stream into a set of significant and manageable segments (shots) that are used as essential fundamentals for indexing. Each shot is `represented by selecting Key frames and indexed by extracting spatial and temporal features [4]. Edges of objects plays a vital role in video based segmentation, we can apply canny edge or sobel edge contours to detect and find edge information of each frame and then keep tracking the edges of the moving object in a video. Contours and threshold are common segmentation methods. For human detection we can use haar classifiers , haar classifier is trained to detect the humans in a particular video sequences. The features used in haar classifier to detect humans are face, eye, nose, human upper body, lower body and full body structures of positive and negative samples should be loaded first and train the haar classifier.

This study paper has been organized as follows. Section II presents the Main Features of Human Motion Segmentation. Section III presents the classification of segmentation. Section IV Related Works for Motion Segmentation. Section V Haar Cascade Classifier. Section VI presents Conclusion

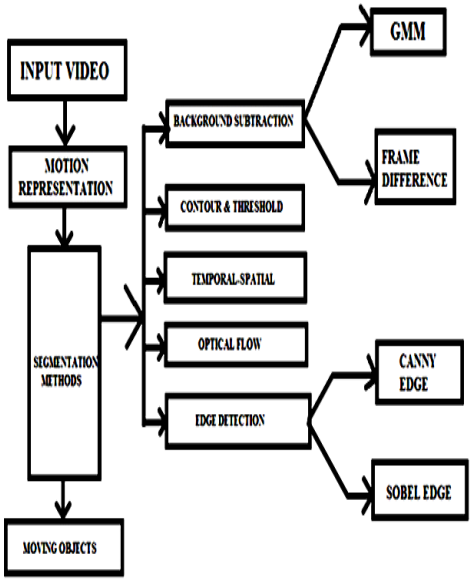
II. Main Features Of Human Motion Segmentation

Segmentation plays a vital role inmultimedia applications such as traffic monitoring, car detection, people detection in crowd area etc. Particularly human segmentation is hard and tough job to segment from a moving clip and an active research area in computer vision field. The features used to segment humans are color, skin, face recognition, eye recognition, nose, upper body structures, lower body structures and full body shape structures. These features are modified as a classifier i.e. Haar

Classifiers. Haar classifier are trained with the help of negative and positive samples of images and saved as .xml files. Some cascades used in opencv to detect human are haarcascade_upperbody, haarcascade_lowerbody, haarcascade_fullbody, haarcascade_frontalface etc. By using these cascades we can easily track and segment the humans separately.

III. III.CLASSIFICATION OF SEGMENTATION METHODS

Some common moving object segmentation methods are classified as follows for a video clip.These segmentation algorithms are used to detect the movement of the objects in a image sequences



IV. Related Works for Motion Segmentation:

1. Background Subtraction Method:

Background subtraction is a frequently used method for segmenting out moving objects in a video clip for applications such as investigation or traffic monitoring. The name "background subtraction" comes from the simple technique of subtracting the static image from the estimated image and threshold is applied to generate the result of moving objects in an interest scene [3].

Fig:-1 (a) Original video 1

Fig-1(b) Background Subtraction

Fig:-1(c) Gaussian Mixture Mode in Background subtraction

We can apply Gaussian mixture model for the background image to extract the foreground image. Background modeling is essential for all background subtraction algorithms. Background model is that against sudden changes in the background, but it's enough to classify all moving objects in a sequence of images. The values of a particular pixel are showed as a mixture of Gaussians. At each Iteration Gaussians are evaluated, settle on which one is mostly likely compared to the background pixel. Pixels that don't not match "background Gaussians" are classified as foreground object [5]. We can apply a simple pixel based differencing to detect changes happened in the scene. But, the disadvantage of this approach is that some background objects are often detected as foreground objects because of the changes in illumination, movement of leaves and presence of people movement [6].

2. Frame Difference [1]:

Identifying the moving objects from the current frame and a reference frame, called background image and this method is known as Frame differencing . The projected background image is just the previous frame i.e. "|framen–framesn-1|>Th". It's Very sensitive to the Threshold(TH) [7].

Fig:-2(a)Originalvideo Fig:-2(b)FrameDifferencing

3. Temporal and Spatial:

Image segmentation provides a powerful semantic explanation of video imagery important in image understanding and efficient manipulation of

image data. Spatial-temporal segmentation is to create a layered image representation of the video for image coding applications whereby video data is just described as a set of moving layers [8]. Temporal differencing makes use of the pixel-wise differences between two or three consecutive frames in an image sequence to extract moving regions. Temporal differencing is very adaptive to dynamic environments, but generally does a poor job of extracting all the relevant pixels, e.g., there may be holes left inside moving entities. After the absolute difference between the current and the previous frame is obtained, a threshold function is used to determine changes. By using a connected component analysis, the extracted moving sections are clustered into motion regions. An improved version uses three-frame instead of two-frame differencing [9].

Features used to Segment Humans in a moving clip:

Segmenting Human in moving clip is difficult. The properties used in human segmentation is Human color or Skin color, Human shapes , Height and width of the human, Human pose estimations, Face, Eye, Human upper, lower and Full Body detection. Color property is not that much used because it will detect the color of static images which will have same color so it's not well suitable for human segmentation in a moving clip. Human shapes and human poses are stored in a database and compare it with the estimated image but more human shapes need to store in the database. Height and width property of human can be used to segment the human separately but it will not segment the human accurately because height and width of the humans will not be same for all it will be differ.

V. HAAR CASCADE CLASSIFIERS [10]:

The core origin for Haar classifier moving object detection is the Haar-like features. These features, rather than using the intensity values of a pixel, use the alteration in contrast values between adjacent rectangular groups of pixels. The contrast variances between the pixel groups are used to determine relative light and dark areas. Two or three adjacent groups with a relative contrast variance form a Haar-like feature. Haar-like features, as shown in Figure 3 are used to detect an image in a moving clip. Haar features can simply be scaled by increasing or decreasing the size of the pixel group being examined. This allows features to be used to detect objects of various sizes [10].

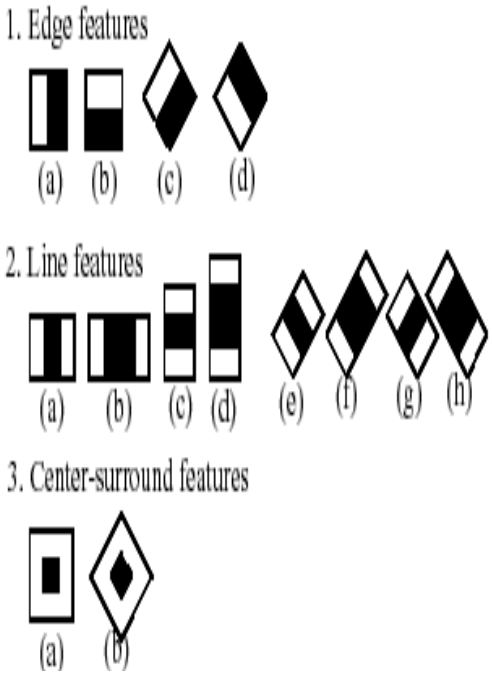


Fig:- (3) Common Haar Features

To train classifiers for their face detection system or some other human parts detection, called HaarTraining, so that we can create our own object classifiers using these functions. Haar classifier needs all positive and negative samples of images that should be stored in a database. The database should contain the object of interest i.e. to crop the frontal faces for face detection system. Similarly we have to do for upper body, full body and lower body detection. In Positive samples we need to collect positive images that contain only objects of interest, e.g., faces and these samples should be stored in database. In Negative samples we need to collect negative images that do not contain objects of interest, e.g., faces to train haarcascade classifier [11].

Human Segmentation Flow Chart:

Haar classifiers are used to detect the humans, with the help of Region of Interest (ROI) we can crop the haar detection from the original video then apply the Frame Differencing algorithm to extract the foreground image to eliminate the static image. The Flow Chart for human segmentation using haar Cascades

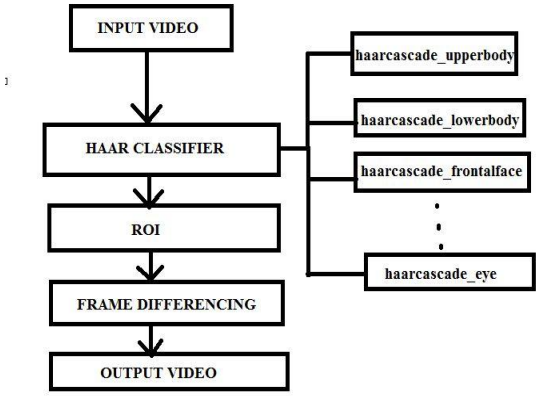


Fig: - (4) Human Segmentation Using HaarClassifier

Region of interest (ROI) is used to draw a bounding box on an interest scene in a moving clip. After drawing the bounding box we can able to crop the ROI image and shown in separate window. Then we can apply frame differencing algorithm to the crop ROI image so the foreground image will be clear.

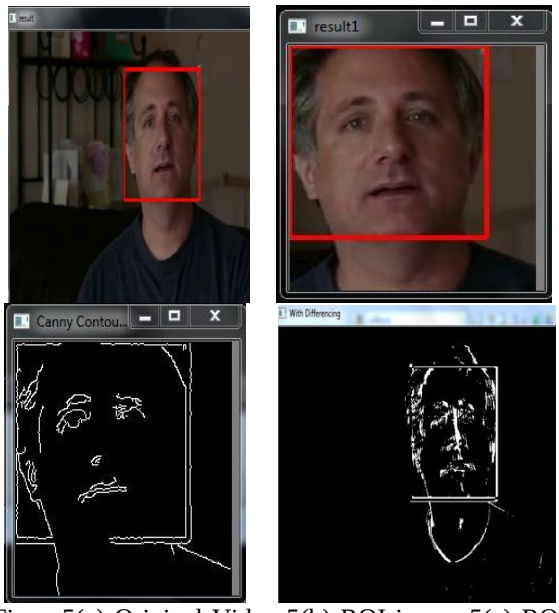


Fig :- 5(a) Original Video 5(b) ROI image 5(c) ROI Contour Image 5(d) Frame Difference Image

VI. CONCLUSION:

In this paper we present, Human segmentation using Haar cascade Classifiers like Human Frontal face, Upper body, Lower body and Full body detection. Haar classifer will detect the humans using bounding boxes .Bounding box can be drawn by taking the interest scene in a moving clip with the help of ROI. Some movement detection algorithms are implemented to detect the motion in image sequences. Frame differencing algorithm is used in ROI image to eliminate the background images. Object recognition and tracking are mainly on the bases of object segmentation, and decisions about activities

VII. ACKNOWLEDGEMENTS

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