

Segmenting Videos with Absolute Frame Differencing Method and Cropping News Reader's Portion from the Frame

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Abstract: Segmentation is to partition an image into meaningful regions for the purpose of clear identification of the objects in the picture. Algorithm for segmenting the videos of all format are proposed. The video is converted into frames. Each and every frame is segmented individually by using absolute differencing method and the segmented video is obtained. The frame is cropped such that it takes the news readers portion of the frame from the video. The Scope of the work is to identify the News reader with hands from the segmented videos.

Keywords: Absolute Frame Difference, Video Segmentation, Frame Cropping.

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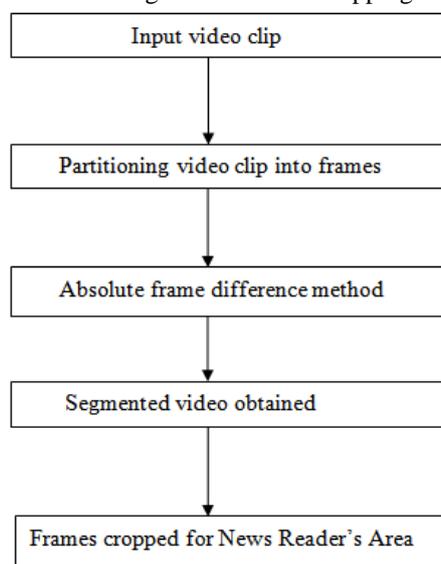
I. Introduction

To identify an object in an image we do image segmentation. Segmentation is the process of segregating a digital image into its constituent parts or objects or regions. These regions share common characteristics based on color, intensity, texture. The first step in image analysis is to segment an image based on discontinuities [1]. Video segmentation is a way of dividing a movie into meaningful segments. Today's world has many applications of gesture recognition systems such as human computer interface (HCI), robotic arm control, gaming consoles and television control mechanisms, sign language [2]. Segmentation is the basic process leading to face and hand segmentation.

II. Implemented Research Methods

In this work the implementation methods are described. Input video clip of type AVI or MP4 are partitioned into frames. First Background subtraction is done for all frames using absolute difference method. The segmented video obtained is cropped to get the news readers picture with hands from all the frames of a video. A combination of both background subtraction and crop algorithm makes the process more advantageous. The flow chart of proposed method is shown in the Figure 1.

Figure.1 Flow chart of video segmentation and cropping of news reader's area



2.1. ABSOLUTE DIFFERENCE METHOD

Absolute difference is a technique for detecting the motion area by making the difference mask between the current frame and the background frame [4]. An image is divided into foreground and background in this method. $Z = \text{imabsdiff}(X, Y)$ subtracts each element of an array from the corresponding element in array X and returns the absolute difference in the corresponding elements of the output array Z.

$Z = \text{imabsdiff}(X, Y)$

Absolute values prevent negative values from being rounded to zero in the result as with `imsubtract`.

A. Algorithm for frame difference using Absolute frame difference method

Step1: Index =1

Step2: Call the Reader object of video to read the video

Step3: nframes= gets the total number of frames in a video

Step4: Frames are read starting with index of 1

Step5: Let K= 1 to nFrames

Step6: Reader object K reads each frame from 1 to nframes

Step7: The function `imabsdiff (frame, bg)`, finds the difference separating the frame from background.

Step8: $Z = \text{imabsdiff}(X, Y)$ subtracts each element of in an array from the corresponding element in array X and returns the absolute difference in the corresponding elements of the output array Z.

2.2. Extracting segmented video from color video

Extract algorithm for video segmentation using subscripts as column index and cropping the frame

Step1: Video of type AVI, MP4 is considered.

Step2: Convert the video into frames by using Absolute Frame differencing method.

Step3: Convert the pixels of color frames to black and white pixels using binary mask.

Step4: Pixels that define the ROI set to 1 and the rest to 0.

Step5: Frame differences between the subsequent frames are identified until the last frame of the video is reached.

Step 6: Condition is set that the frame should not be an empty frame.

Step 7: The white pixels are identified and the dominating white pixels are counted to capture the newsreaders face and hands.

Step 8: Extract the frame with `rx(index),rx1(index), ry(index),rx(index)` by leaving the index where the index values are zero .The count starts with the index values of 1 to crop the frame.

Step 9: Read the image by counting the entire column index until the end of the frame to extract.

Step 10: Segmented video is extracted.

Step 11: The video writer writes the video in the segmented form.

Step 12: Frames are picked and tested for the crop function to identify the corner points to get the news readers image and hand.

Step 13: The cropped image of the newsreaders portion with hands are identified.

Region-based tracking algorithms track objects according to variations of the image regions corresponding to the moving objects. For these algorithms, the background image is maintained dynamically and motion regions are usually detected by subtracting the background from the current image. [3]

III. Implementation And Experimental Results

The implementation is stated with sample videos of type AVI and MP4. Each and every sample videos are converted to frames using absolute frame differencing method .Column index is chosen for segmenting the videos in black and white. The segmented videos obtained are converted to frames. The frames of the video are cropped to get the picture of the news reader's portion along with hands for further processing. In Matlab the proposed algorithm acts as a tool to extract any format of videos in the segmented form.

Table- 1: Extracting the News reader's portion from the videos

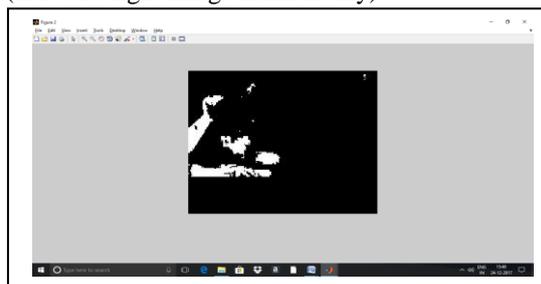
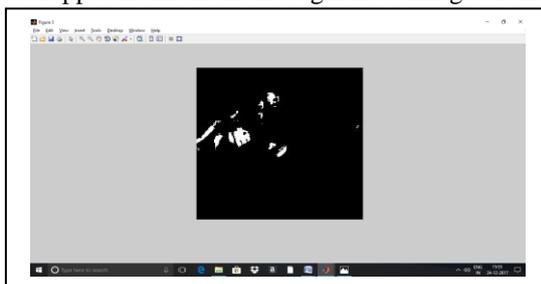
a. Original sample image extracted from the video (Left) segmented frame from the extracted video (right) horizontally.



b. Other sample image extracted from the video (Left) segmented frame from the extracted video (right) horizontally.



c. Cropped frame from the segmented image of the video (Left and right image horizontally)



IV. Conclusion

This paper proposes a segmentation method for detecting the news reader's portion with hands from a dynamic video. The proposed method shows accurate, robust, reliable and efficient computations to extract the news reader's portion of the frame. Each frame is cropped to get the news readers portion along with hands. Cropped image identifies the news reader's portion with dynamic changes in hand movement. The algorithm works well with MP4 and AVI videos as well as with other types of videos. An extract tool is created in Matlab to segment any type of videos. For further work, this extraction algorithm can be implemented to various types of upcoming video formats with higher resolution.

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