HUMAN RECOGNITION AND SURVEILLANCE

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ABSTRACT

Abstract— All types of information are represented and processed in the forms of multimedia. Particularly in video processing, numerous frames containing similar information are usually processed. The results are unnecessary time consumption, slow processing speed and increased complexity. Summarization of video using key frames can facilitate to speed up video processing. The method is a new optimized "humanly" approach. This approach uses Human Motion Detection based key frame extraction. The key frames extracted then undergo restoration. In video processing, numerous frames containing similar information are usually processed.. Video summarization using key frames can facilitate to speed up video processing. Key frames extraction using wavelet statistics method is a technique that can be used in video summarization.

Video restoration is an important field in image and video processing fields , which aims to estimate the high-quality version from typically noisy and of low resolution input. The restoration involves sharpness enhancement, brightness and contrast enhancement and finally de-blurring. These restored frames will then be recombined into final video. The final output from the proposed system will be a summarized restored and reformed video..

Keywords:*Human Detection, Surveillance,Image Processing.*

1. INTRODUCTION

In the past , faster digital devices which can facilitate more storage space are rapidly being deviced. Hence, instead of representing information using text, still images, audio etc. and the information is recorded and stored in videos.. Also its important for video to be presented in a high resolution format hence video restoration forms an important part of video processing. A video is made of continuous still images called frames. When we want to show complete information of a video rapidly, only key frames come into existence. Each key frame can provide and represent all necessary information of a video shot of the video. This compact display method is usually called video summarization.

Many techniques for key frame detection have been reported in so far. In the DWT wavelet technique, key frame is detected by using wavelet declared coefficients. Complementary to this, we have Key Frame Extraction Based on Block based Histogram Difference and Edge Matching Rate.The next possible technique is using Human Motion Detection for extraction of key frames. This technique can be specifically used in summarization of video surveillance tapes. This technique would be based on the Video Motion Detection module to detect motion.

The purpose of restoration is to "improve the quality of the frames leading to better video output". Sometimes these

videos frames get blurred due to subject movement, improper holding of camera, focal length of the lens, and shakes due to internal vibration, depth of field, dirty lens and focus. Using these restored key frames final video is recorded.

2. PROPOSED SYSTEM

As discussed earlier, this project is to be linked with another project to come up with the final system called Human Motion Detection agenda related project.

This module would do classification of objects where it classify human and non-human object. Thus, this project is to come up with a solution that detects motion effectively and record it down with one or more objects that are moving and causing motions.

The purpose of this project is to help new researchers learn and further research on their topic of interest. The question to be addressed here in this module is, given a sequence of images, how do we detect motion or track a moving object? The project is to mainly answer this particular question addressed by providing a prototype to emulate or prove the algorithms or techniques that are available to perform motion detection by an input of images in a number of frames.

This project would be emphasized on the Video Motion Detection module where we would perform research on the techniques and methodology to detect motion and to develop a module for a technique that we prefer to use in this project.

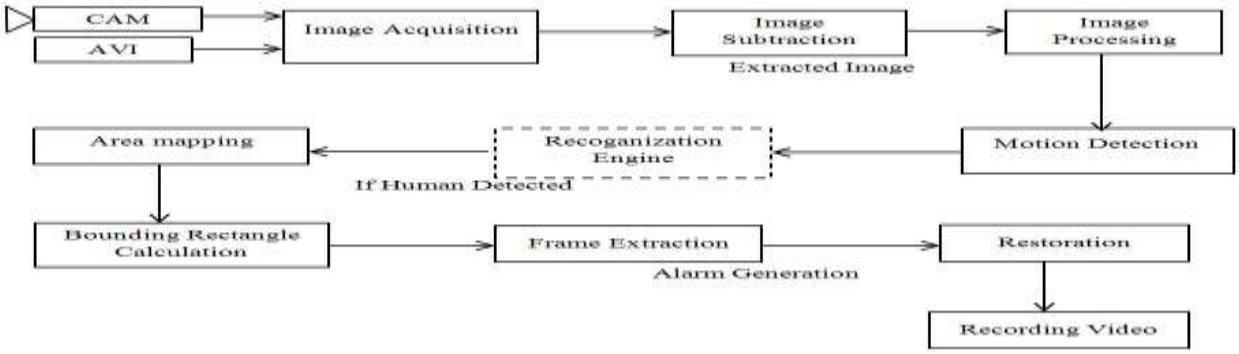

Fig 1: Workflow of Human detection system and surveillance

3. IMPLEMENTATION

Taking input and performing video acquisition. Then will perform motion detection algorithm, which will give key frames as an output. Using HOG engine It will detect if object is human or not. On output of this step will perform restoration and those frames will merge to video to get summarized and restored video.

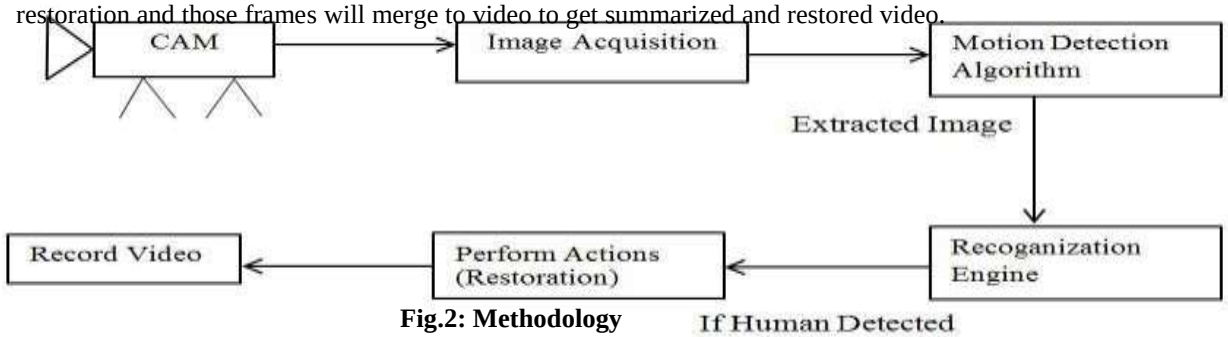

Fig.2: Methodology

3.1 Parameters used are shown in Table 1

Table 1: Parameters used in the project

Integrated Development Environment	Visual Studio and OpenCv library
Programming Language	C# (C sharp)
Operating System	Windows 7,8,10, Server 2008 and 2012 64 bits

3.2 Hardware components

Hardware components include any CPU (Intel i5/ i7/ Xeon recommended), Any GPU that is compatible with OpenGL 3.2. (integrated graphic cards Intel HD 4000 or above, Ram: Minimum 4 GB, Hard disk: Minimum 500GB, Internet Connectivity, Camera.

4. Methodology

4.1 Image Acquisition

The system developed here, can capture sequence of images both from real-time video from a camera or from a recorded sequence in ".avi" format. This is mostly an initial step for most motion detection algorithms . Images of resolution 300x200 have been set to be captured. No matter what settings of cameras property, our prototype system will only use 300x200 resolutions for its calculations. Since we had used a camera capable of displaying more than 300x200 image resolutions then we assume that there should be no problem for other cameras with the same or even better specifications to run our prototype program. Also some performance issues on speed were the cause of us developing this project in such resolution specification .

4.2 Image subtraction

Here two subsequent images are compared and processed using arithmetic operation of subtraction to subtract the pixels' value in the images. We'd implemented an absolute subtraction technique thus there's no difference in choosing which image to subtract with which, since both would result in the same resulting image. Since usually color images are used, the algorithm implemented considers the color data of the images. The technique first separates the images to three planes or channels. Then it performs the arithmetic subtraction to each planes or channels. After that, the results are combined back again to form a color image. Thus, the result of subtraction is in an invert color format. The reason for the inversion is simply because a subtraction of the pixels values was performed.

4.3 Image processing

The next step would be to perform some image processing operations on the result obtained from the previous step. The two branch coming out from this module as shown in figure 6 is because of two images were produced from different image processing techniques for different purposes from this stage of the process. The first is the result obtained from a threshold function. This result is further used for recognition purposes as it filters the human body shapes better than the other output. An adaptive threshold function is implemented here. The method is known as Otsu threshold. The other output from this stage is the eroded and dilated image. This function simply removes small piece of noises that maybe caused by camera signal noise or small pixel changes. The function increases the filled section of an image and then decreases it leading small portions being removed. The reason for using this instead of threshold for

contour is because to draw the bounding box we want a bigger region so that we do not lose out any body parts on the rectangle drawn. This is only implemented for the 2nd algorithm; the temporal update + edge detection background update algorithm . The reason is simply because the 2nd algorithm doesn't return enough information to be threshold by otsu threshold function thus, instead of using otsu threshold, dilate and erode is being implemented.

4.4 Motion Detection

Here we've implemented two algorithms to update the background image which is to be used in the image subtraction stage of the motion detection algorithm:

a. Spatial Update

b. Temporal Update + Edge Detection

4.5 Recognization Engine

In this stage, a temporal differencing detection algorithm is used to extract moving region. There are many variants on the motion detection method, but the simplest is to take consecutive video frames and determine the absolute difference. A threshold value is used to determine the results. If n I is the intensity of the nth frame image from real-time video, 1 -nI is the previous one.

4.6 Area Mapping

After the bounding rectangles are identified, the position is then mapped to the source image and the rectangle being drawn there. Mapping is done for the area of the bounding boxes drawn in the source and also the corresponding area in the binary processed image. The area from this processed binary images are the ones to be used for the recognition engines . This project does not cover the recognition engine and the output component. The recognition engine is implemented from the work of the partner in this project.

4.7 Bounding Rectangle Calculations

Some operations are done in order to remove overlaying boxes or rectangles when drawn to the source image. Basically rectangles or boxes that are near and almost crosses one another's edges would be joined up to form a larger rectangle or box . This would help eliminate the problem of only portion of human being returned to be recognized.

4.8 Image Restoration

Image Restoration is the operation of taking a corrupt or noisy image and estimating the clean, original image. Corruption may come in many forms such as motion blur, noise and camera mis-focus. Image restoration is performed by reversing the process that blurred the image and such is performed by imaging a point source and use the point source image, which is called the Point Spread Function (PSF) to restore the image information lost to the blurring process.

4.9 Video Summarization

After reading the image from the current folder, convert the image to movie frame using 'addframe' function.Write the frame to the file and read next image and repeat the process of converting and writing to the file till the last image is processed and written. After loading the first image convert it to bitmap (.bmp) and next create a new AVI file and add a new video stream and one frame to the new file and dispose of the bitmap frame continue for all the frames.

5. RESULT

We have completed developing the software.This had led to a successful system where objects are detected and their movements has been captured faster.

6. CONCLUSION

Designed system performs video summarization and restoration. Video summarization implements key frame extraction which extracts the key frame from input video. We have presented key frame extraction algorithms earlier along with its workflow. **Human Motion Detection technique** would focus on mainly motion-related problems whereby not only detecting motion is sufficient, additionally further steps are taken to obtain the object that causes the motion and using an recognition engine instead of just image-matching to classify the object to check whether if it is a human or not which is the main and headlined method of our agenda. With this, therefore, this technique is not fixed to only the first application area discussed but it can also be applied to applications in control areas or analysis areas where human motion is to be classified to distinguish them from other objects that cause motion.

Once we get key frames, final steps would be to restore them by performing sharpening, de-blurring and adding contrast and then will merge them to get summarized video.

7. FUTURE SCOPE

Motion Detection System can be used in surveillance and security systems in a fixed restriction area. Human or object detection is necessary for surveillance applications, for guidance of autonomous vehicles, for efficient video compression. In all application the proposed technique can provide greater and faster results. Only some enhancement or addition needs to be added if the algorithm discussed were to be ported into other applications such as those in control application areas.

The technique is limited to human object identification and can be extended to include object recognition or even face detection. For a computer vision system, the ability to cope with moving and changing objects, changing illumination, and changing viewpoints is essential to perform several tasks. Hence the technique should be able to handle situations with low contrast videos taken in low lighting conditions.

8. ACKNOWLEDGMENT

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