International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2019 IJSRCSEIT | Volume 5 | Issue 4 | ISSN : 2456-3307
DOI : https://doi.org/10.32628/CSEIT19545

Simulation of Object Movement Analysis

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ABSTRACT

There are many approaches for motion detection in a continuous video stream. All of them are based on comparing of the current video frame with one from the previous frames or with something that we'll call background. This research project is carried out to determine some of the basic simulation of object motion analysis algorithm that had been founded or developed or even researched and Supports the following types of video sources: AVI files, local capture device .This thesis report would bring a presentation of these algorithms for researchers to get a basic idea of performing an algorithm for simulation of object motion Analysis. One of the most common approaches is to compare the current frame with the previous one. It's useful in video compression when you need to estimate changes and to write only the changes, not the whole frame. But it is not the best one for motion detection applications. If the object is moving smoothly we'll receive small changes from frame to frame. So, it's impossible to get the whole moving object. Things become worse, when the object is moving so slowly, when the algorithms will not give any result at all. I used an image processing library for simplicity, it's not a video processing library. Besides, the library allows me to research different areas more quickly, than to write optimized solutions. I use LDA (**L**inear **D**iscriminant **A**nalysis) Algorithm for face and object detection. LDA maximizing the component axes for class separation. LDA tries to find projection axes, such as classes are best separated. LDA can be used not only for classification, but also for dimensionality reduction.

Keywords : SOMA, Video Tracking, Mixed Reality Webcam Interface, Senses Places, Computer Vision

I. INTRODUCTION

Simulation of Object Movement Analysis dissertation purpose provide an SSE optimized for face detection and non-face detection in uncontrolled scenery with complex backgrounds using Webcam and streaming video. In this dissertation captures images only when the motions exceeded a pre-set value or threshold. Earlier research may be some false detection due to the illumination effects which can be overcome for the better performance. In simulation of Object Movement Analysis is analysis and tracking multiple objects and monitoring their activities in both outdoor and indoor environment are challenging task for the video surveillance system. In presence of a good number of real time problems limits scope for this work since the beginning. An understanding of wavelet-analysis, dimensionality reduction methods (PCA, LDA, ICA), artificial neural networks (ANN), support vector machines (SVM), SSE programming, image processing, morphological operations (erosion, dilation), histogram equalization, image filtering.

Our objective is focused on the Video movement analysis module where we would perform dissertation on the techniques and methodology to detect motion and to develop a module for a motion technique. This module would record down motion

and pass it into the next module that would be on object classification where it classify human and non-human object. Thus, this research 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. in this dissertation, providing a global view of the main algorithms in use. The methods presented are for a single fixed webcam, not a stereo camera, nor any other type of camera. dissertation came up with will be useful for security in a fixed restriction area. Therefore, the background of the targeted area is assumed to be non-moving and considerations of sudden change in lightings are ignored as well. However, the considerations of other factors are taken into consideration. Basically, the initial plan was to use a technique called image segmentation to abstract the foreground image from the source image obtained and later processed to filter out noises or small images disturbance. To perform this, we would use Open Source Computer Vision Libraries from Intel to obtain contours from the foreground image subtracted.

II. METHODS AND MATERIAL

Proposed System for Simulation of Object Movement Analysis: Capturing the live video nourish into the webcam is the initial step in video surveillance.It is impossible to process the video openly, so video cycle is collected in series of frames. By analyzing images, we can evaluate the existing frame captured with earlier frame to identify the motion Movement Behavior of the human is analyzed in front of the system. If the system found any movement in the picture, the system without human intervention takes the snap of the detected image and executes the alarm according to the user settings. Hence, our system provides an accurate methodology for Object Movement Analysis. It is easier than the earlier systems, time saving and eradicates human errors. It can be used in Bank safe, jwellary shop,home night security.

Algorithm: -

Object Movement Analysis Algorithm: -

At the beginning of this process of object tracking, we have to detect the objects in the video frames. Most methods described in this section are motion recognition algorithms, since they are typically the primary source of information and the cheapest, in terms of computational memory. Therefore, in this section we will present the frame difference algorithm, the background subtraction algorithms and the optical flow.

Frame Difference Algorithm

This technique starts from the assumption that the background is static and compares the pixels of the frames captured in very small time intervals (Δt)[14]. If the absolute difference comes to a value above a pre-defined threshold (Γ), it means that the pixel has changed and therefore there was movement.

Background Subtraction Algorithms A common approach to identify the moving objects is background subtraction, where each pixel from the video frame is compared against a reference image of the background. When pixels in the current frame differ significantly from the refere nceimage, it is considered that movement occurred. A very plain approach to this method is to detect the foreground objects as the difference between the current frame and an image of the scene' static background, similar to the technique.

Mixture of Gaussians (MoG) One of the most used models of background subtraction is the pixel wise mixture of Gaussians (MoG), proposed by Stauffer and Grimson, because it presents a good compromise between robustness versus computation time and memory requirements. In this technique the background is not considereda frame of values. Instead, the background model is parametric and the model parameters can be adaptively updated without keeping a large buffer of frames. MoG keeps a

probability density function for each pixel, in a way that each pixel is characterized by a mixture of n Gaussians given by the following formula:

$$P(Xt) = \sum_{I=1}^{n} \omega_{i,t} \cdot \eta(Xt, \mu_{i,t}, \sigma_{i,t}) \quad (1)$$

where ωi,t is a weight associated to the ith Gaussian distribution at time t with mean μ i,t and standard deviation σi,t. A background pixel has a high weight and a weak variance, since the background is usually more present than the moving objects and it is practically constant.

$$\eta(Xt, \mu, \sigma) = \frac{1}{(2\pi)^{n/2}|\sigma|} e^{-\frac{1}{2}(Xt-\mu)^T \sigma^{-2}(Xt-\mu)}. \quad (2)$$

There are normally three to five Gaussian distributions for each pixel, depending on memory limitations.

III. RESULTS AND DISCUSSION

Optical Flow Optical flow is the pattern of apparent motion of objects ,surfaces and edges in a visual scene, generated by the relative motion between an observer and the scene. The optical flow method calculates the optical flow field and groups different types of movements, according to the optical flow distribution characteristics of the image. This technique seize sallthe movement information and detects the moving object easily, however, it is demanding in terms of computation time and memory requirements. In the definition of the optica lflow problem, we consider that in the frame obtained at the instant t1 we get a certain point (x1,y1) that corresponds to the point (x2,y2) in the frame of instant t2. It is assumed that the distance between both points (or pixels) is small. Considering a linear local deformation in a sequence of images, we are able to translate the optical flow problem into the following formula: $I_{x(t),y(t),t} = I_{x(t)+\Delta x, y(t)+\Delta y, t+\Delta t}$. (2.13)

Working:-

There are many approaches for motion detection in a continuous video stream. All of them are based on comparing of the current video frame with one from the previous frames or with something that we'll call background.

- AVI files (using Video for Windows, interop library is included);
- Updating JPEG from internet cameras;
- MJPEG (motion JPEG) streams from different internet cameras;
- Local capture device (USB cameras or other capture devices, DirectShow interop library is included).

In Motion Detection1 approach is one disadvantages. If the object is moving smoothly we'll receive small changes from frame to frame.

There is another approach Motion Detection2. It's possible to compare the current frame not with the previous one but with the first frame in the video sequence. So, if there were no objects in the initial frame, comparison of the current frame with the first one will give us the whole moving object independently of its motion speed.

The most efficient algorithms Motion Detection 3 Technique are based on building the so called background of the scene and comparing each current frame.

The Motion Detection application is based on the framework, which provides all the filters and image processing routines used in this application

Last Technology use Detection Technique 4 objects are highlighted with a curve, which represents the

moving object's boundary. But sometimes it's more likely to get a rectangle of the object. Not only this, what to do if we want not just highlight the objects, but get their count, position, width and height?
with the background. There are many approaches to build the scene, but most of them are too complex.

IV.CONCLUSION

This dissertation of the present work was to create a web cam interface for a motion object to help establishing a deeper connection between the virtual and physical worlds.

This dissertation is carried out to determine some of the basic simulation of object motion analysis algorithm that had been founded following types of video sources: AVI files, local capture device The purpose of Simulation of Object Movement Analysis is to detected the motion of an object in any scenario. In past years this process is carried out by humans. This process gives the exact image movement and comparing of the current video frame with one from the previous frames or with something that we'll call background

This dissertation can be extended to adjust the gaps between the clips after construction of the image to be a perfect photograph using Image processing Techniques. We mentioned three strategies: the frame difference, the background subtraction and the optical flow. The frame difference is the easiest to implement and is the one that consumes less computer memory, since it considers the background static. In the future, the user can be provided a remote access to this software from some remote PC through internet. Include an option to take snaps periodically, manually or automatically.

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Cite this article as :

Ambika Sharma, Mrs. Mamta, "Simulation of Object Movement Analysis", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 5 Issue 4, pp. 60-64, July-August 2019.

Available at doi :
https://doi.org/10.32628/CSEIT19545

Journal URL : http://ijsrcseit.com/CSEIT19545