Change Detection in Multi-Temporal Video Streams Using Multi-Objective Evolutionary Algorithm

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Abstract- *Protecting our facility with security cameras plays a critical role in improving operations and preventing criminal acts. Nowadays CCTV's are available to monitor the environment and able to see clear detail with it. But, the problem is a human should manually do all the detection and if any mistake happens it leads to detection errors. The proposed method solves this issue by implementing an unsupervised change detection strategy using MOEA (multi objective evolutionary algorithm). In this, the system will automatically detect all the changes and foreign objects throughout the session and can give alert messages if required to the concerning authority according to the sensitivity requirements. This can be implement for military purposes, bank locker rooms and other highly confidential areas.*

I. INTRODUCTION

Video is a sequence of frames.it has different scenes as a chain of continuous action. Scene changes can be broadly categorized into three:

- Abrupt scene change was hard to define the boundaries
- Gradual scene change is a process of transition between two scenesmoving slowly
- Wipe scene changes just wipes the frame

Nowadays, criminal acts around our facilities increasing on daily basis. So, a system which automatically detect the changes and give notifications to the authority is need. This paper proposes a method which unsupervisingly do change detection in video streams dynamically. MOEA (multi-objective evolutionary algorithm) is used for optimization among frames and give optimum results. As described above we found a technique or desktop

application which dynamically process the video streams coming from either a local device such as camera or URL of a video.

II. PROPOSED APPROACH

The change detection in video streams can be done by, let the video will be played at real time with the help of camera viewer of the system.
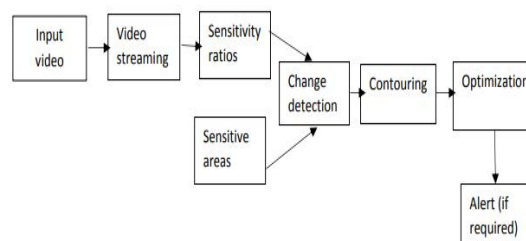

Fig 1: Proposed approach

Then stream the videos dynamically to detect the changes in the particular area. Were we can set sensitivity values to avoid getting notifications for minute changes. The proposed methodology is shown in figure 1.

III. VIDEO STREAMING

Video streaming has very important in the scientific community in the last few years. Streaming video is the process of sending content in compressed form over the internet and displayed in dynamic manner. With streaming viewerscan download file directly without wait to play it. And it can have sent in a continuous stream of frames and is played as it arrives. Several video streaming solutions handle all the steps of the process, namely video capturing, encoding, streaming and video playback. If we use input source as local devices alike web cameras there is no compression is needed. But for other devices such as CCTV's and other camera devices the system should match with the format of input otherwise should use any compression technique.

IV. SENSITIVITY OPTIONS

Sensitivity is set for neglecting minute movements in the selected area. For that purposes we used a technique in visual studio software application. By selecting sensitive areas and non-sensitive areas we can avoid detecting changes for unnecessary areas. There are two methods for this are the following:

1. Intensity of sensitivity

This method belongs to the "Pixel intensity" track bar that can be seen on the graphical user interface. It is a new component as well and the method has been implemented in order to react properly to the scroll events of the new track bar. It can be used to give the new value of the camera's "PixelIntensitySensitivity" property. The minimum value for the position of the track bar's slider is 0 and the maximum value is 255. The lower the value the more sensitive the motion detector will be because it will react to a lower amount of pixel color changes.

2. Amount of sensitivity

This method belongs to the "Pixel amount" track bar that can be seen on the graphical user interface that is a new component as well and the method has been implemented in order to react properly to the scroll events of the new track bar. It can be used to give the new value of the camera's "PixelAmountSensitivity" property. The minimum value for the position of track bar's slider is 0 and the maximum value is 10. The "PixelAmountSensitivy" property's value can fall between 0 and 1 (because 0 is equal to 0% and 1 is equal to 100%), so we have to divide the track bar's value by 100. The lower the value the more sensitive the motion detector will be because it will react to a lower number of pixel changes as well.

V. OPTIMIZATION

For the purpose of change detection and optimization Multi objective evolutionary algorithms (MOEA) are used. And it is an extended version of genetic algorithm were they consider multiple optimization problem as a single optimization function and find result. But MOEA consider the multiple optimization problem as it is and among those multiple functions they find optimum results. Using MOEA multiple objects can simultaneously detected by the system. Using contouring technique, the changed objects can be outlined. According to the area of application and concerning authority we can set alarm to get notifications. In order to

install MOEAs with .NET we should have to install this package Install-Package cs-moea -Version 1.0.2.

VI. CONCLUSION

This paper has proposed a new MOEA based change detection technique for multi-temporal video streams. The proposed method uses .NET framework for performing video streaming and processing. MOEA used for change detection and optimization.

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