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RESEARCH ARTICLE

CHANGE DETECTION IN VIDEO USING HADOOP

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ABSTRACT

In the recent years, preventive security measures at public places has gained lot of importance. Visual Surveillance has now got huge attention to ensure safety in public places. These systems generate huge amount of data on a daily basis. This data has enormous Volume, Velocity, Variety. Hence, this is can be termed as Big Data. Handling Big Data is a challenge and thus, in this proposed system, the processing of the video is done on Hadoop. The existing system takes more time to process these live stream video data which is inversely proportional to what we except. The proposed system processes these data in an efficient and a faster manner in a parallel distributed environment. Nowadays, the pure mass of information that has to be handled by the operators of such systems has over- grown their capabilities. Hence, A System capable of identifying objects that tend be vulnerable to the surrounding environment is addressed in the system. This System also implements Machine Learning to overcome the common technical problems present in the existing system which includes lighting changes, occlusions, cluttered backgrounds.

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INTRODUCTION

The Rise of Various kinds of Anti-Social Activities such as theft, bomb attacks, other terrorist attacks has actually led to the need for Video Surveillance systems. These Systems help in monitoring and alerting about the environment upon various threats at any point of time. The Researchers reliable and robust that helps in detecting moving objects, classification, tracking and activity analysis. To be more general, an abandoned object is considered to be an object which is actually left at a particular place under surveillance and left unattended over a certain period of time. It should remain static in all the recently concluded frames for a time. Detecting the abandoned object is considered to be very essential in public places like airports, railway stations, shopping malls etc. where there is actually high security threat. Abandoned Object Detection is one of the most highly challenging task in the video surveillance system. There are a lot of research that is being carried out to enhance the efficiency and to automate the surveillance system for better performance. These data are enormous in size which terms to Big Data. (Kaman *et al.,* 2008) Big data is actually the term applied to various data sets whose size is beyond the actual ability of the traditional relational databases to capture, manage, and process the data with low-latency. It has the following characteristics -high volume, velocity, variety. Big data comes from the various sensors, devices, video/audio, the networks, log files, transactional applications, web, and various other social media of which much of it is generated in real time and in a huge large scale. The Volume refers to a large amount of data that is being generated from a range of sources. Variety refers to using various multiple kinds of data to analyze a situation or an event. The Velocity refers to the rate at which the large data is generated and which is processed into useful information. (Bilik and Tabrikian, 2010; Chan *et al.,* 2011; Comaniciu and Ramesh, 2000) The Visual surveillance system is a system with high level of complexity. The Increasing number of surveillance cameras that actually appear around us has pushed for the demand for automatic methods for video surveillance. These methods actually have broad applications including various surveillance for enhancing the safety in various. Public transportation, public areas like shopping malls, railway stations etc. Automatic surveillance is a must to the fight against terrorism. In recent the past there are lot of research that has being done in field of abandoned object detection system for the video surveillance systems with proper human controlled or CCTV systems. To enhance the quality and the effectiveness of the system various kinds of algorithms and techniques are being suggested and implemented by researchers in various ways. But due to various complexity issues, the implementation was not actually very accurate using languages like Mat lab, Java. The processing speeds of these language are slow. In this work the Opens tool is used

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with Microsoft visual studio 2013.In a survey by NRF's Big Show, actually more than 60% who took the survey recorded that there is no one to monitor and analyze video data. Hence it is the biggest disadvantages of a video surveillance system, which suggests the actual need for an improved and efficient analysis and alerts. (Comaniciu *et al.,* 2003)

System overview

Based on the literature survey done on the various works on Abandoned Object Detection, the common challenges include Overcoming occlusion, Lighting changes and the processing speed. In this paper, a System is proposed to overcome the above said drawbacks. Further, the entire video surveillance system which detects the abandoned objects is implemented in parallel distributed environment by means of Hadoop framework in order to improve the efficiency of professing speed.

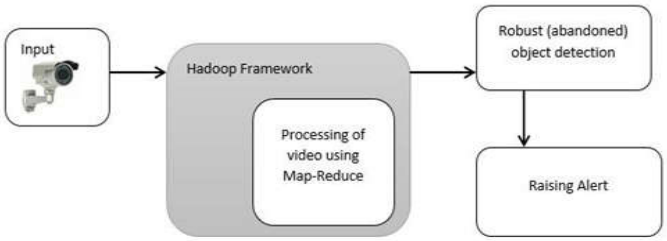

Fig.1. Generalized Block diagram of the proposed system

In this System, the input which is present in form of stream data which is considered to be Big Data as it involves enormous volume, velocity and variety is handled by a map reduce algorithm. Hence, the video stream input is processed by several nodes based on the requirement and generates the output which is to detect the abandoned objects to improve the processing time. In an environment where there is need to identify the threat to its which may be in the form of terrorist activities, the system must be able to do the same in quick time. The proposed system achieves the same by implementing the Visual surveillance system which is to detect abandoned objects in Hadoop.

Region of interest

Region of interest is a selected subset of within a dataset identified for a particular purpose. Region of interest differs from one environment to another. Here, the region of interest is the subset containing the background objects detected for the first time in the environment and to be considered as a static object pertained to the environment. In this proposed system, the first frame of the environment detected by the camera is taken as the sample to detect the region of interest. The first frame detected is considered asa background subsystem from which individual static objects are detected and stored in the subsystem as region of interest. So region of interest follows two different phases. First, the system will detect the region of interest from the background system and then store it in a separatesubsystem following LIFO model for further processing.

Background subtraction and fore ground extraction

Background Subtraction involves comparing the sample frame with the already stored subset of background objects from the region of interest. The common background objects are extracted by detecting the object boundaries using edge detection scheme. Edge detection scheme refers differentiating the scales of an object based on the pixel configurations such as color, sharpness of the color. The background objects detected by comparing them, is masked from the frame of interest. Then it is subtracted from the frame by eliminating it from the sample frame. Following these steps, the Foreground objects are extracted from the sample frame. Foreground objects are extracted by detecting its object boundary and separated from the sample and stored in the separate stack following LIFO model. These are the foreground objects detected in the new frame are considered to be objects unclassified. These steps are followed for all the frames in the shot and each foreground object is stored. All these objects in the stack are used for building a foreground model.

Implemetation in Hadoop

Each shot in the video is considered to be independent of each other and they are distributed parallel to the systemusing Map

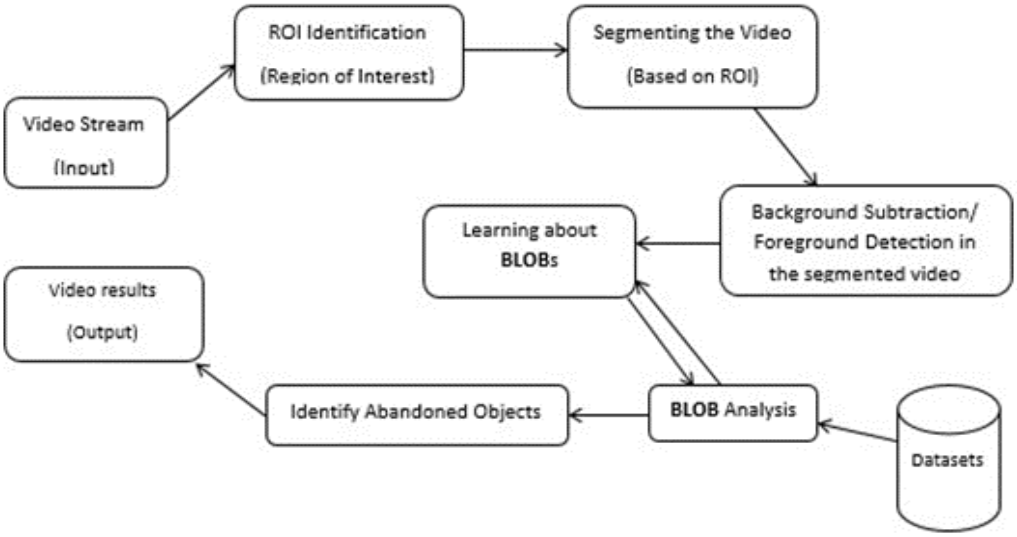

Fig.2. Block diagram illustrating the process of identifying the Abandoned Objects

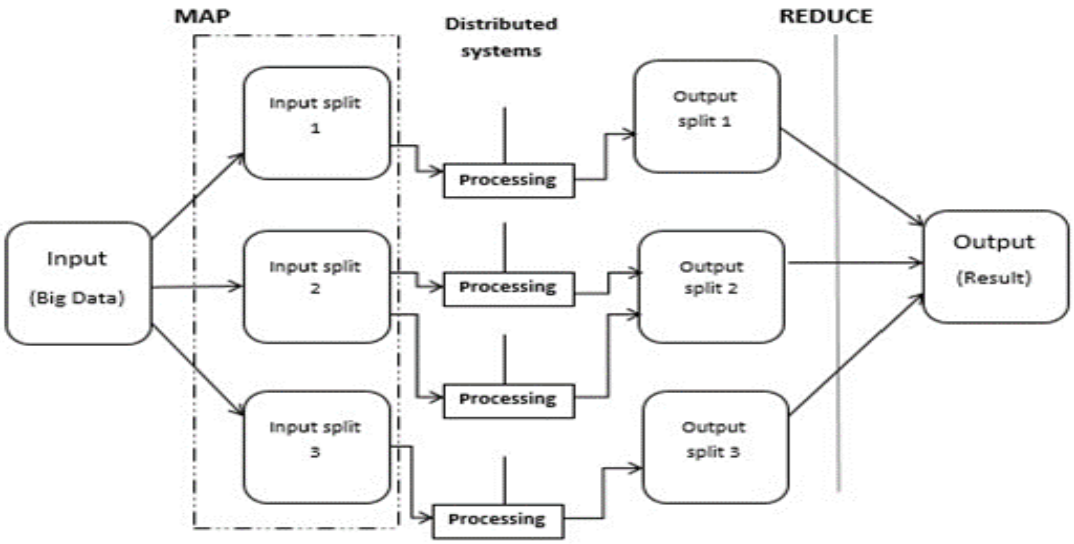

Fig.3. Map Reduce for processing the input

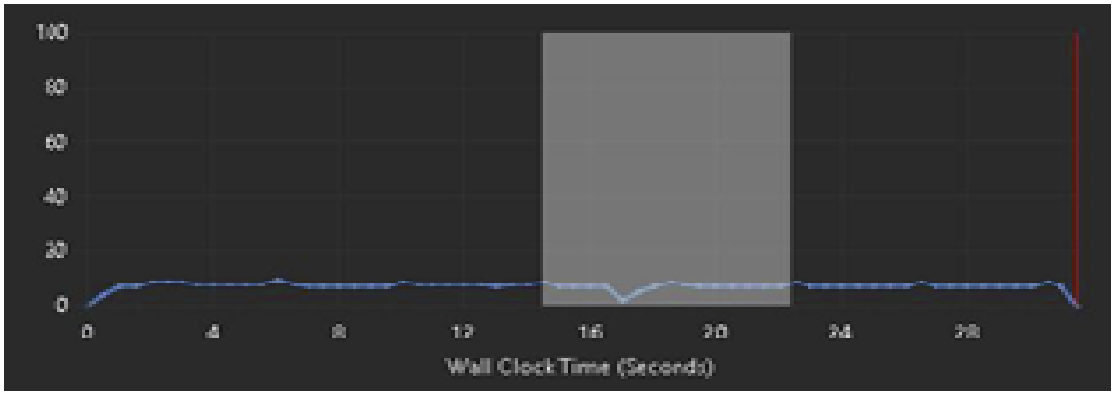

Fig.7. The processing speed of the proposed system without HDP 2.0

Fig.8. The processing speed of the proposed system using HDP 2.0

Reduce algorithm in Hadoop Framework. Each separate shot is distributed to each individual processing system and parallel processed in order to increase the time efficiency in detecting the abandoned object. The result set of parallel processing is again grouped into single output using Map Reduce algorithm. Fig 3 explains the working of map reduce in a video surveillance system. The Live Video Stream is given as input the system which then splits the video into several inputs. This function is performed by the map algorithm. Each split input is given to each node in the distributed system which process them simultaneously. Here, the Video is split into several frames which is executed simultaneously. The output which is generated by each node in the system is then reduced to a single output. The processed frames reduced and combined to form a single output which is the result.

Here, in the proposed system, the result refers to the detection of abandoned object. The proposed system uses Horton works Data platforms 2.0 Hadoop. The Number of nodes required in the system varies from one environment to another which is governed by various factors including complexity, behavior of the surroundings.

Processing Speed and Efficiency

The figure 6 shows the efficiency and performance which is measured by processing speed without the proposed system being implemented using HDP 2.0 while the figure 7 shows the performance metrics of the system, when the system is implemented using a HDP 2.0 Hadoop framework. The issue in the above system is the false or unwanted distribution of objects and the false alarm rates.

Conclusion

This paper proposed a system for video surveillance system which can increase the performance and the efficiency in terms of processing speed by using Hadoop Horton works Data platform 2.0. Further, based on the literature survey, the system has tried to overcome the come issues in the existing system and achieved results considerable results if not commendable. The system was able to classify and detect the abandoned objects and update the same. Overcoming occlusion was a part the proposed objective, but the experimental results were not commendable to prove that the system overcomes occlusion and hence it continues to be a hindrance to the efficiency. The system achieved excellent processing time when implemented using Hadoop and the same has been compared above to the existing systems. The system will try to overcome the problem of occlusions in the future.

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