PERFORMANCE IMPROVEMENT OF SMART SURVEILLANCE CAMERA USING MODIFIED CNN TECHNIQUE

[1] G. SIRISHA, [2] K. MOUNIKA, [3] A. LAKSHMAIAH

[1,2, 3] Assistant Professor, Department of Computer Science and Engineering, Sri Indu College of Engineering and Technology, Hyderabad, Telangana-501510

ABSTRACT

Over decades, with the advent of new technologies into the market, connectivity between people and resources is increasing in an unprecedented scale. Applications started collecting data and devices started exchanging data between themselves to provide us with a comfortable life. However, it also brought certain concerns along with it. Some of the prime concerns are security and data storage. The data is being generated at such an exponential scale that shortage of data storage devices may be imminent. There are various applications in real life where data storage has become a problematic issue. This application of smart surveillance system is focused on reducing data redundancy by using smart human recognition. This paper aims to elaborate the various techniques, which are used to enable this application to mitigate data storage issues by reducing data redundancy

INTRODUCTION

Humans have come a long way in terms of development and technological advancements played a major role in it. The technologies that exist today would have been considered as magic a few decades ago. The technological advancements that we have been through have skyrocketed and are increasing in an unprecedented scale. We have got a smart solution for almost everything, today [1]. Technology did not only make things possible for us, it made life a lot easier and even luxurious. We have a dedicated application or a device for almost everything now. Data sharing between humans and computers and different devices has become a lot more convenient and possible these days. Living among the swarm of devices interconnected with each other, either directly or indirectly has its fair share of disadvantages of concerns. With the amount of data being collected by devices, applications and networks, privacy and security are majorly at risk [2][11].

It is imperative that the technology is supposed to facilitate the lives of people, but not at the cost of their privacy and security. Because luxury at the cost of one ‘s safety and security are not worth it. Security is a major concern these days at every place, and one cannot take any chances regarding it. To address this concern and ensure safety, organizations use surveillance cameras [3][12]. There proved to be effective but, there are quite a number of limitations for using these devices practically, in real life. One of the major concerns is the data storage capacities. One should have higher data storage capacities to store the amount of data produced in the form of video by these devices. The data produced increases significantly if multiple surveillance cameras are installed to ensure safety

[13]. So, generally organisations only keep store of data corresponding to a few time periods of the past. They simply delete any data corresponding to the time beyond the time period [4].

However, it is an unsafe practice to do so as this may erase the only evidence of the day after a particular amount of time. If the organisation needs the data beyond the time period for any reason, they can ‘t get it, because it is no more and is deleted. By using the power of modern computing and advanced algorithms, it is possible mitigate this issue to a significant extent. Most of the recorded footage is useless for any purposes and so, instead of recording continuous video, we can enable the device to click pictures only when they are necessary [14]. By the utilisation of modern machine learning techniques, we can enable a camera to detect humans and save a picture on detecting them. This could reduce the data storage issues to a greater extent without having to trade data for duration of recording and the purpose of the device, in the first place [5].

LITERATURE SURVEY

In this proposed technique, Big data applications are taking up the majority of space in industry and research. Video feeds from CCTV cameras are just as important as other kinds of big data, such as medical data and social media data. CCTV cameras are installed in all areas where security is a high priority for security reasons. Security may be characterised in a variety of ways, including theft detection, violence detection, and so on. Security plays a vital part in most highly guarded regions in a real-time setting. Using deep learning ideas, this study explores identifying and distinguishing the face traits of people. The basics of deep learning are covered in this work, which begin with object detection, action detection, and identification [15]. Existing approaches have problems that are highlighted and summarised. Because of its wide range of applications, the available scope for increase in accuracy and process speed due to hardware innovation, and the increasing availability of vast and accessible databases, facial recognition and verification are a hot topic in research [6].

As a result, literature reviews are undertaken on a periodic basis in order to conceal these shifts. However, due to the wide range of facial recognition methods used, most studies focus on a single issue or group of concerns rather than examining the entire range of prevalent methods. Many recent surveys, for example, have particularly addressed a number of approaches that have attempted to achieve rotation. Face recognition algorithms have been examined from a variety of perspectives in other works [16]. However, these surveys don't include all of the current identity verification approaches, and they don't always include the most up-to-date databases and benchmarks, such as the Mega Face Challenge benchmark [7].

In this proposed technique, this study examines the use of Python in a smart surveillance monitoring system. In today's world, video surveillance is crucial in terms of security [17]. High-end cameras are required in commercial locations, schools and hospitals, warehouses, and other demanding indoor and outdoor situations. Current technologies necessitate RFIDs, which are pricey, and therefore the security domain [8].

SYSTEM ANALYSIS AND PROPOSED SYSTEM

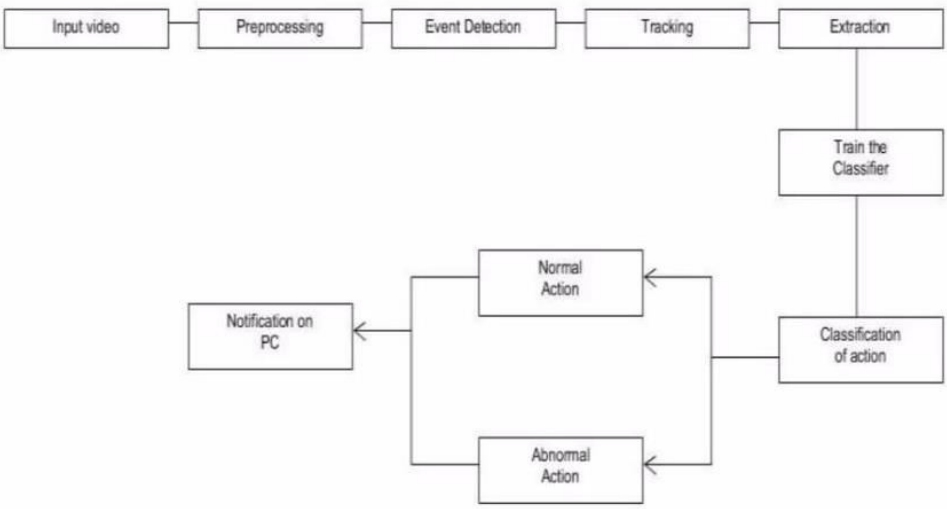
System Analysis

Existing System:

- In the existing system, the video surveillance system is designed for human operators to observe protected.
- Space or to record video data for further detection.
- But watching surveillance video is a laborintensive need to be controlled.
- It is also a very tedious and time-consuming job and human observers can easily lose attention.
- Continuous monitoring of videos is difficult and tiresome for humans.
- Intelligent surveillance video analysis is a solution to laborious human task.
- Intelligence should be visible in all real-world scenarios.
- Maximum accuracy is needed in object identification and action recognition.
- Tasks like crowd analysis are still needs lot of improvement.
- Time taken for response generation is highly important in real world situation.
- Prediction of certain movement or action or violence is highly useful in emergency situation like stampede.
- Availability of huge data in video forms.

Proposed System:

In this paper, detection of humans using complex machine learning processes is achieved to optimise data storage requirements and reduce the requirement for multiple data storage facilities. Humans possess some distinctive visible features that differentiate them from everything or everyone else [18]. Some of those features are as follows: an upright body in standing position with two limbs on the sides and two limbs supporting the frame, a head on top of the body attached by neck, no tail or fur on body, forehead-to-chin distance to ear-to-ear distance ratio etc. Various such unique features are utilised by data scientists to uniquely identify humans electronically. Several such features are identified and embedded into proto text files for elastic usage. These features are utilised for use with Convolutional Neural Networks [9].



System Architecture

IMPLEMENTATION

Modules:

1. Upload CIFARIO Dataset
2. Run modified CNN with global color histogram
3. Run modified CNN local binary patterns
4. Run modified CNN HOG
5. Run modified CNN SVM
6. Upload Video and detect Object

Modules Description:

1. Upload CIFARIO Dataset: Firstly, user need to upload the CIFARIO Dataset into the project using this module.

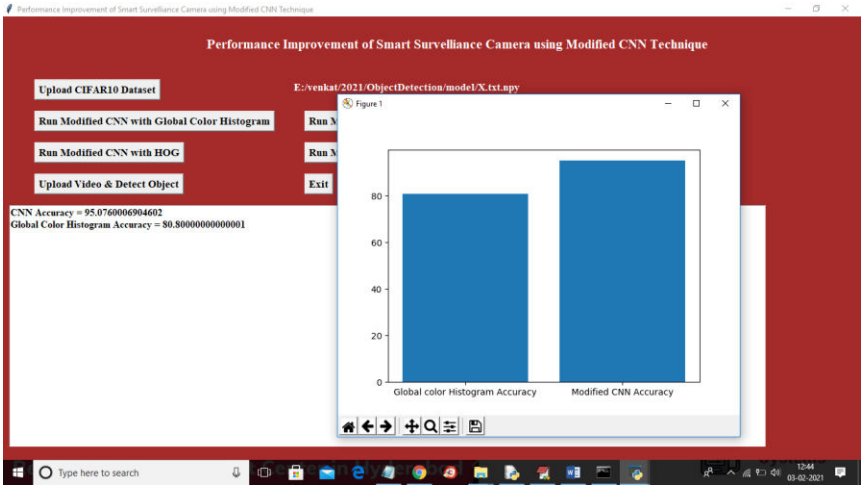
2. Run modified CNN with global color histogram: after uploading the video dataset in the first module, through this module Run modified CNN with global colout histogram it will provide you the graph showing Global colour histogram Accuracy and modified CNN Accuracy [10].

3. Run modified CNN local binary patterns: next, with this module user can get idea of the graph between local binary patterns accuracy and mofied CNN.

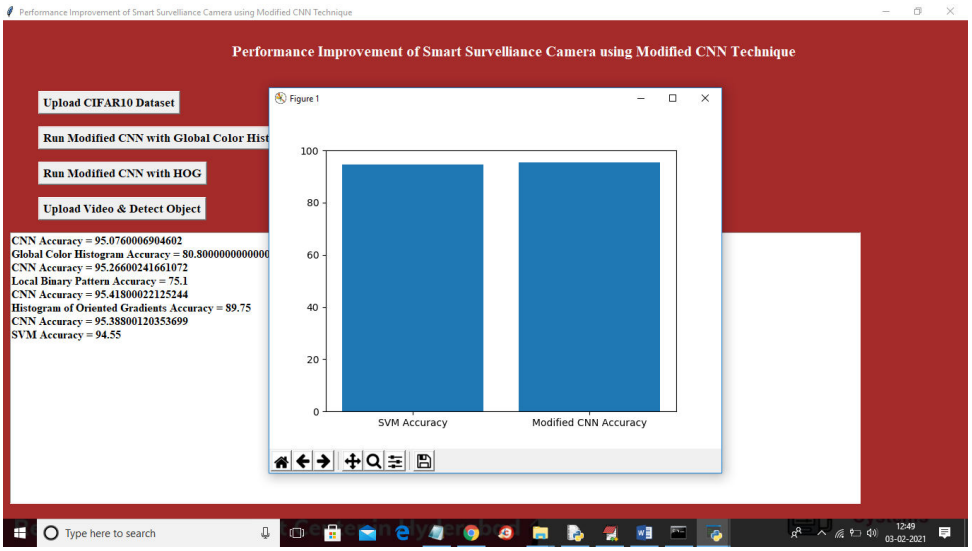
4. Run modified CNN HOG: with this module user can get idea of the graph between Histogram of Oriented Gradients accuracy and mofied CNN.

5. Run modified CNN SVM: with this module user can get idea of the graph between SVM accuracy and CNN accuracy.

6. Upload Video and detect Object: Finally, Upload the video through this module and it will detect the object accurately using different algorithms



CNN accuracy as 95% and Global Color accuracy as 80% and in above graph we can see accuracy comparison between both algorithm and now click on 'Run Modified CNN with Local Binary Pattern' button to calculate CNN and LBP accuracy



CNN with SVM got 95.38 and alone SVM got 94.55% accuracy and now all algorithms models are ready and now upload video and detect and identify object from video by clicking on 'Upload Video & Detect Object'

CONCLUSION AND FUTURE WORK

The technologies utilized in this paper, mentioned above, are easy to avail and to learn, yet, they are highly effective. The underlying concepts in this report are harder to master and implement to provide a solution for a real-

life scenario, but the utilization of python has made significantly easier. This proposed concept has greater scope for future projects and can bring revolutionary changes in terms of data storage, in the field of surveillance. This paper is devised and developed with effective implementation of efficiency, in mind. It could potentially save a lot of money and resources for the people who could replace the traditional methods with this. This technology can be further developed for specific scenarios, in scope and could effectively provide a solution for one of the burning issues of today‘s era, the data storage. Because, with so many devices communicating and sharing data with each other endlessly, the infrastructure necessary to store the data is getting exhausted at a higher rate. So, a smart solution is necessary to this issue and this project proposes a smart solution that works with higher efficiency.

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