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VIDEO MANAGEMENT SYSTEM

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ABSTRACT

Video footage from many cameras can be managed, recorded, stored, and retrieved in real-time with the use of software solutions known as video management systems (VMS). They are extensively utilized for security and monitoring purposes in a variety of industries, including retail, transportation, healthcare, and education. Users of the system can record video, watch live feeds, and examine previously recorded video for analytical or security reasons. Commercial "security systems" are frequently created as a careless monitoring system to recording quality. In such a system, locating and Exporting pertinent video can be difficult and frequently requires extensive human intervention. VMS was intended to deliver the highest level of record quality while allowing easy searching, filtering and exporting of security footage.

Keywords : security system, video

1. INTRODUCTION

The goal of the VMS video management system project is to make this procedure simpler by offering a complete and user-friendly solution for organizing and keeping an eye on your video surveillance requirements. With the use of our platform's sophisticated capabilities, which include motion detection, face recognition, person detection, and attendance based on face, you can keep an keeping an eye on your company or assets from any location in the globe. Furthermore, our program offers a great degree of customization, which makes it simple to adapt the system to your unique requirements. You can customize the functionality of VMS to meet your needs and combine it with other systems thanks to its open-source code and vibrant developer community. VMS's broad, user-friendly PHP web interface and speedy video interface core make it possible. It is also pleasant and, most all, practical. From

2. METHODOLOGY

The algorithms used for the development of the thesis are CNN along with transfer learning.

What is CNN?

A Convolutional Neural Network (CNN) is a deep learning model used to process data with a grid-like structure, such as images. It is inspired by organization of the animal visual cortex and is designed to autonomously learn spatial hierarchies of features, from basic to complex patterns. A CNN comprises three primary types of layers: convolutional, pooling, and fully connected layers. The convolutional and pooling layers are in charge of extracting features, whereas the completely connected layer translates these features into a final output, such as classification. The convolutional layer, a crucial component of CNNs, consists of stacked mathematical operations, including convolution—a specialized linear operation. In digital images, pixel values are organized in a two-dimensional grid (array of numbers), and a small grid of parameters known as a kernel (an optimizable feature extractor) is applied at each position in the image. This design makes CNNs highly efficient for image processing, as features can be detected anywhere in the image. As each layer passes its output to the next layer, the extracted features become progressively more complex in a hierarchical manner.
The process of refining parameters like kernels is termed training, where adjustments are made to minimize the difference between outputs and actual labels through an optimization process. algorithm called backpropagation and gradient descent, among others.

IMAGE PROCESSING:

Image processing, as used in imaging science, is the mathematical processing of images through any kind of signal processing, where the input can be an image, a sequence of images, or a video, such as a picture or a video frame. After image processing, the result can be another image, or it can produce a set of parameters or characteristics associated with the image.[1] The majority of image processing methods handle the image as a two dimensional signal and process it using conventional

signal processing methods. Time, or the z- axis, is thethird dimension of images that are processed as three-dimensional signals.[2] While digital image processingis the most common type, optical and analog image processing are also feasible[3]. The general methods discussed in this article are relevant to all of them.

3. AIMS AND OBJECTIVE

In order to protect the security and privacy of the company and its stakeholders' data, a video managementsystem (VMS) must offer a stable, dependable, and adaptable platform for organizing video footage from security cameras or other video sources. The user can comprehend the algorithm's operation more intuitively byseeing it in action. For educators, software engineers, andstudents in particular, algorithm visualizations can be quite helpful. Teachers can use them to teach algorithms more successfully, and students can use them to better grasp how algorithms function. They can be used by software developers to investigate several algorithmic approaches to an issue, as well as to troubleshoot and optimize their code

Hardware Specification

- Intel processor i3 and above
- 4 GB RAM
- 256 GB hard disk
- Web camera

SOFTWARE

REQUIREMENTS:

1. Version: Python IDLE (3.8.0)
2. Code Editors: PyCharm
3. Framework and Dependencies: time, Pandas,Open CV
- 5.Operating System: Windows 11

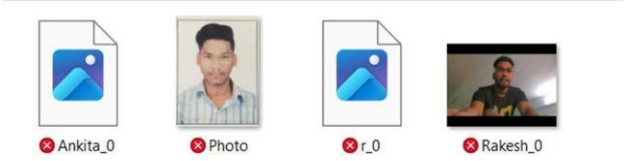
4.PROPOSED SYSTEM

One of the issues that many security systems have is their inability to carry out specific tasks without a driver monitoring the system's progress automatically. Humans are not meant towork for twenty-four hours a day. There is a limit to how long mortal drivers can drive whilethey are awake. People cannot stay awake for extended periods of time without being distracted,and they will always have to sleep. Because of this, the Plagiarised Unique Total Words: 577 Total Characters: 3614Plagiarized Sentences: 0 Unique Sentences: 28 (100%) 0% 100% Page 1 of 2 multi-camera videotape system has special features that might have a bigimpact on security assiduity. The technology is really specialized, and it can assist a lot of people in overcoming security issues that they encounter on a daily basis. It's crucial to take these factors into account while choosing.

FACE DETECTION BY HAAR CASCADED CLASSIFIER

To train the classifier, the method first requires alarge number of positive images, or images withfaces, and negative images, or images without faces. After that, we must extract its features.
Haar characteristics, as seen in the image below,are used for this. They resemble our convolutional kernel exactly. The sum of the pixels under the white rectangle and the sum of the pixels under the black rectangle are subtracted to get a single value for each feature.Numerous features are now calculated using all potential kernel locations and sizes. (Can you fathom how much computing that requires? In a24x24 window, more than 160000 features are displayed. We must determine the total number of pixels beneath the white and black rectanglesfor every feature computation. They introduced the integral pictures as a solution. It reduces the computation of the sum of pixels—which determines how many pixels there are—to a process requiring only four pixels. Isn't that nice? It produces results quite quickly. However,the majority of these features—of all the ones we calculated—are unimportant. For illustration, look at the picture below. There are two nice features on the top row. The initial feature chosen appears to concentrate on the characteristic that the ocular area is We do this by applying every feature to every training image. It establishes the ideal cutoff pointor

every characteristic to classify the faces as positive or negative. . Of course, there will be mistakes or incorrect classifications. The features that best classify faces and non-face images are those with the lowest error rate, which is why we choose them. (This is not how the procedure works. At first, the weight of each image is the same. The weights of photos that are incorrectly classified are raised after each categorization. Again, the same procedure is followed. We compute new error rates. fresh weights as well. The procedure is carried out repeatedly until the desired accuracy, error rate, or feature count is reached. OpenCV includes a trainer. in addition to detector. You may use OpenCV to build your own classifier and train it for any object, such as cars, planes, etc. The complete details are provided here: Training of Cascade Classifiers. We'll talk about detection here. Many pre-trained classifiers for faces, eyes, smiles, and other features are already included in OpenCV. The subdirectory opencv/data/haarcascades/ contains those XML files. Let's use OpenCV to construct a face and eye detector.



FACE RECOGNITION :

Preparing Student Photos In order to train the neural network and identify students based just on their faces, this stage involves preparing a dataset. Three students, each with thirty images, had their photos taken for this test. The dimension of the used photographs is 152 pixels by 152 pixels. B. Recognising Face Based on the face recognition diagram, The steps to recognise face are face detection, feature extraction, and face recognition. This student attendance system is likewise taken those three steps, with the specific method used for those three steps. The steps used are as follows: 1) Detecting face in an image Plagiarised Unique Total Words: 466 Total Characters: 2999 Plagiarized Sentences: 0 Unique Sentences: 26 (100%) 0% 100% Page 1 of 2 2) Highlighting the distinctive facial feature and modifying the image's placement 3) Embedding face (transform the image into numerical array) 4) Classify the result using CNN algorithm Face recognition operations

5. SCOPE

A video management system (VMS) may see a number of future improvements that could increase both its usefulness and efficiency. Among these improvements are: Integration of machine learning (ML) and artificial intelligence (AI): Advanced video analytics, including object detection, behavior analysis, and facial recognition, can be carried out by a VMS through the integration of AI and ML algorithms. Organizations may be able to more effectively detect suspicious activity or possible threats with the aid of this integration.

Deployment in the cloud: A cloud-based VMS implementation can provide a number of advantages, including improved scalability, cost-effectiveness, and accessibility. Superior choices for backup and disaster recovery can also be found with a cloud-based VMS. Integration of virtual and augmented reality (VR/AR) technology: A VMS that incorporates VR/AR technology can offer immersive monitoring and instruction-related experiences. Security staff, for instance, can see 360-degree video feeds from various cameras by donning VR headsets.

6. CONCLUSION

In conclusion, the OpenCV-based motion detection project showcases the remarkable potential of computer vision in discerning and evaluating motion within real- time video streams. Through harnessing the capabilities of OpenCV, the system achieves precise and effective motion detection, offering promising applications in fields like automation, security, and surveillance. Moreover, the successful execution of this project establishes a solid foundation for future advancements. By integrating machine learning techniques, multi- camera setups, and semantic understanding, the potential for enhancing the

7. REFERENCES

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