Automatic Face Detection using CCTV Footage

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Abstract— The real-time CCTV face detection has been made possible by using the method of Viola johns, blob Analysis work. The software first taking CCTV Video of all the authorized persons and stores the information into database. Proposed work deals with automated system to detect and classify the Faces using ANN (Artificial Neural Network) algorithm. The methodology comprised of the three phases, first the face Detection from CCTV Video, second apply ANN (Artificial Neural Network) for the purpose of the feature extraction. The most useful and the unique features of the CCTV video are extracted in the feature extraction phase. In the classification the CCTV Video is compared with the images from the database. In our research work, we empirically evaluate the face recognition which considers both shape and texture information to represent face capture based on ANN (Artificial Neural Network) for person independent face recognition. The face area is first divided into small regions from which the ANN (Artificial Neural Network), histograms are extracted and concatenated into a single feature vector. This feature vector forms an efficient representation of a face and is used to measure the similarities between the CCTV Video. In third phase and blob Analysis has been created and trained according to the features extracted from the CCTV Video.

Key words: ANN (Artificial Neural Network), SFCA, Blob Analysis, Viola Jones

I. INTRODUCTION

Checking the CCTV Video based face are recognised with the comparable performance are based on the similarity between features extracted from regions of the gallery images and those from the query image .Recently, one novel approach proposed an new representation of the face image that is an sequence of forehead, eyes, nose, mouth and chin. Face recognition the Sparse Fingerprint Classification Algorithm. SFCA has demonstrated the high accuracy under a large number of different conditions, such as variations in the ambient light, pose, occlusion, size of the face and distance from the camera. SFCA's simplicity and the effectiveness are due to its use of a binary sparse matrix. SFCA does not require sparse reconstruction and is based only on the sparse coefficient vector, which gives it an advantage over the existing methods.

II. LITERATURE SUREVEY

1) Paper name: Dynamic Image-to- Class Warping for Occluded Face Recognition
– Author:X. Wei, C.-T. Li, Z. Lei, D. Yi, and S. Li,

Face recognition (FR) systems in the real-world applications need to deal with an wide range of interferences, such as the occlusions and disguises in the face images. Compared with the other forms of interferences such as non-uniform illumination and the pose changes, face with occlusions has not attracted enough attention yet. A novel approach, coined dynamic image-to-class warping (DICW), is proposed in this work to deal with this challenge in the FR. The face consists of the forehead, eyes, nose, mouth, and chin in a natural order and this order does not change the despite occlusions.

2) Paper name:An Introduction to the Good, the Bad, & the Ugly Face Recognition Challenge Problem
– Author:P. J. Phillips, J. R. Beveridge, B. A. Draper, G. Givens

Most educational institutions' administrators are concerned about a student irregular attendance. The Good, the Bad, & the Ugly Face Challenge Problem was created to encourage the development of the algorithms that are robust to recognition across changes that occur in still frontal faces. The Good, the Bad, & the Ugly consists of the three partitions. The Good partition contains pairs of the images that are considered easy to recognize. On the Good partition, the base verification rate (VR) is 0.98 at an false accept rate (FAR) of 0.001. The Bad partition contains pairs of the images of the average difficulty to recognize.

3) Paper name:DeepFace: Closing the Gap to Human-Level Performance in Face Verification
– Author:Y. Taigman, M. Yang, M. Ranzato, and L. Wolf

In modern face recognition, the conventional pipeline consists of the four stages: detect ⇒ align ⇒ represent ⇒ classify. We revisit both the alignment step and an representation step by employing explicit 3D face modeling in order to apply an piecewise affine transformation, and derive an face representation from a nine-layer deep neural network. This deep network involves more than 120 million parameters using several locally connected layers without the weight sharing, rather than the standard convolutional layers.

4) Paper name:Robust face recognition via sparse representation
– Author:J. Wright, A. Y. Yang, A. Ganesh, S. S. Sastry, and Y. Ma

Our use of the sparsity for classification differs significantly from the various parsimony principles discussed above. Instead of using the sparsity to identify an relevant model or relevant features that can later be used for classifying all the test samples, it uses the sparse representation of each individual test sample directly for an classification, adaptively selecting the training samples that gives the most compact representation.

5) Paper name:Toward a practical face recognition system: Robust alignment and illumination by sparse representation
– Author:A. Wagner, J. Wright, A. Ganesh, Z. Zhou, H. Mobahi, and Y. Ma

Many classic and the contemporary face recognition algorithms work well on the public data sets, but degrade sharply when they are used in an real recognition system. This is mostly due to the difficulty of simultaneously handling the variations in illumination, image misalignment, and

occlusion in the test image. We consider an scenario where the training images are well controlled and the test images are only loosely controlled. We propose a conceptually simple face recognition system that achieves an high degree of robustness and stability to the illumination variation, image misalignment, and the partial occlusion. The system uses tools from the sparse representation to align a test face image to a set of frontal training images.

III. SYSTEM ARCHITECTURE

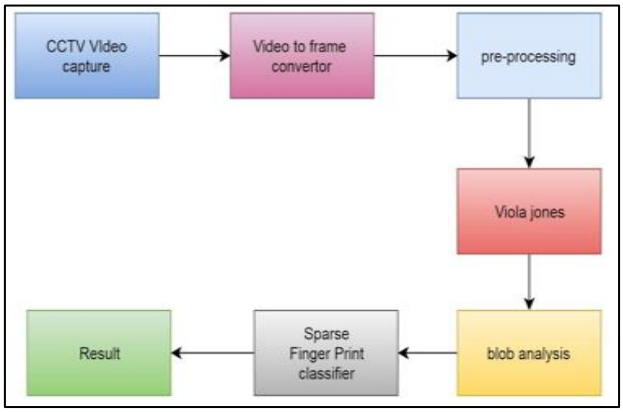

Fig. 1: System Architecture

Traditional way of the CCTV Video involves a typical situation of the user sitting anywhere and tracks the object and detects the object. After detection we will recognize weather the object is normal or criminal.

A. *Disadvantage of Existing System*

- It is cumbersome to maintain a huge set of records.
- It is time Consuming
- Error-prone
- Its leads to wastage of Resources.

IV. PROPOSE SYSTEM

This paper is presenting an proposed work of an automated CCTV video Capture system using) Mat lab. This work is experimented on the user face we have to use classification methods, ANN (Artificial Neural Network) algorithms, etc. But improvements are expected to increase its efficiency of the classification. This system automatically detects the user face and detect the by recognizing their face. This system is developed by capturing the real time human faces. The detected faces are matched against the reference faces in the dataset and detect an user in CCTV Video camera.

A. *Advantages of Proposed System*

- We perform a detailed security analysis and performance evaluation of the proposed data
- Required less time
- Increase Efficiency
- Improve the accuracy

V. SYSTEM SPECIFICATION

A. *Software Resources*

There has to be required packages, software's etc to interact with system.

- Operatingsystem: WindowsXPProfessional/7.
- Coding language: MATLAB+Java

B. *Hardware Resources*

There should be required devices to interact with software.

- System: Pentium IV 2.4 GHz.
- Hard Disk: 40 GB.
- Monitor: 15 VGA Colour.
- Mouse: Logitech.
- Ram: 256 Mb.
- Camera: Webcam

VI. MATHEMATICAL MODEL

Let S be the Whole system which consists:
S= {IP, Pro, OP}.
Where,

1) IP is the input of the system.
2) Pro is the procedure applied to the system to process the given input.
3) OP is the output of the system.

A. *Input:*

IP = {I}.
Where,
I is set of images, provided as an input.

B. *Procedure*

1) Step1: CCTV Video capture the user face.
2) Step 2: verify the information into database.
3) Step 3: Proposed work deals with automated system to detect and classify the Faces using Artificial Neural Network algorithm.
4) Step 4: The comprised of three phases, first face Detection from CCTV camera, second apply Artificial Neural Network algorithm for the purpose of feature extraction.
5) Step 5: The most useful and unique features of the face image are extracted in the feature extraction phase.
6) Step 6: The face image is compared with the images from the database.
7) Step 7: we empirically evaluate face recognition which considers both shape and texture information to represent face images based on Artificial Neural Network for person independent face recognition.
8) Step 8: As per comparison show Result.

C. *Output*

Getting CCTV video detects the face named and show the result.

D. *Algorithm*

1) Viola Jones

The Viola–Jones object detection framework is the first object detection framework to provide the competitive object detection rates in the real-time proposed in 2001 by Paul Viola and Michael Jones. Although it can be trained to detect an variety of the object classes, it was motivated primarily by the problem of face detection.

2) Blob Analysis

Blob detection methods are aimed at detecting the regions in a digital image that differ in properties, such as brightness or color, compared to surrounding regions. Informally, an blob

is a region of an image in which some properties are constant or approximately constant; all the points in a blob can be considered in some sense to be similar to each other. The most common method for the blob detection is convolution.

3) Artificial Neural Networks (ANNs)

Connectionist systems are computing systems inspired by the biological neural networks that constitute of animal brains. Such systems learn (progressively improve performance) to do tasks by considering the examples, generally without task-specific programming. For example, in image recognition, they might learn to identify the images that contain cats by analyzing an example images that have been manually labeled as the "cat" or a "no cat" and using an analytic results to identify the cats in the other images. They have found most use in the applications difficult to express in an traditional computer algorithm using a rule-based programming.

VII. CONCLUSION

This paper focuses on developing an automated face recognized system. It saves the time and effort, especially if it is a lecture with huge number of students. This attendance system shows the use of facial recognition technique for the purpose of student attendance and for the further process this record of student can be used in exam related issues. It is not possible to identify the faces having similar facial features. The system can be extended to respond the presence of newcomers in the classrooms. Also, means to mark attendance without the intervention of teachers in a classroom i.e. automatically marking attendance at the beginning of every hour can be implemented. It can be extended to video surveillance to detect frauds at crowded areas such as bus stands, theatres, railway stations where in by face recognition techniques, the identity of the culprits can be found.

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