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A Study on Video Based Face Recognition for Real-Time Surveillance

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ABSTRACT

Now a days it is require to increase real time security because some threats may affect seriously individual life. For enhancing security numerous security techniques have been introduced. We review all of these techniques. Some techniques are unable to address some issues. A video surveillance system overcome most of challenges addressed in existing system with minimum complexity. This study aims primarily to propose a facial recognition system to identify a person using his face. Video Dataset is from an environment in real time. The facial features selected and a common multi-layer feed the neural network for classification. The extracted characteristics are determined and shown to the neural network as a pattern vector. Facial image data collected are compared to facial images in the database. If the data does not match, an alarm or signal is generated that alerts security personnel to action. A security alarm or signal.

Keywords : HOG Features, Face Recognition, Feed forward, Back propagation Neural Network, Principal Component Analysis; Surveillance Video.

I. INTRODUCTION

Face detection is process searching faces from source images or videos and face recognition is the task of automatic detection and verification of individual from digital image or videos. There are numerous techniques present for detecting and recognizing face. Some techniques gives efficient outcome in terms of accuracy and reduced processing time. Here we present survey on these techniques and are examined under recognition accuracy and processing time. According to that we can get best approach.

Existing research present on a 3D face recognition, which is treated as a hybrid approach that is worked on horizontal vertical stripes and cloud conversion estimation method for getting better accuracy while working with facial expression. This result is tested on GAVAB dataset, according to experimental result this approach gives 95.08% accuracy on GAVAB data set. But 3D face recognition method is computationally expensive and not suitable for practical applications. Author Sharif M utilizes spatial domain for improving face detection and recognition. This technique achieves 98% accuracy on CVL dataset, Indian and ORL face datasets and it is also less expensive.

Even the existing classical facial recognition algorithm focuses on the local multiple structure. However, this algorithm might not represent faces when large variations in the expression and other factors of illumination occur. There is also an artificial neural networking method, which is

naturally integrated with factorization of non-negative matrix. Some other methods used to simplify and speed up computation are also used. But this approach calls for a large number of samples of training. This method is designed to learn the most discrimination-based local characteristics, minimize differences between the images of the same human being and optimize differences between the images of the same individual. This makes the improvements in light and language more inclusive and stable. Nevertheless, it takes a high machine time to adverse effects of this process. Video-based face recognition used in video to enhance image processing details. There is huge work on matching images but they are poorly studied.

Also presented some real time surveillance using a histogram of oriented gradients (HOG) and feed forward neural networks. HOG utilized for the retrieving of facial feature followed by the feed forward back propagation neural network classifier. For recognizing image a sliding window approach is used. This approach consist of two phases one is estimation of descriptor value for each sliding window using HOG and next is categorization of descriptor values using an FFNN classifier. FFNN is a NN classification system that makes it much simpler and more reliable to identify your face.

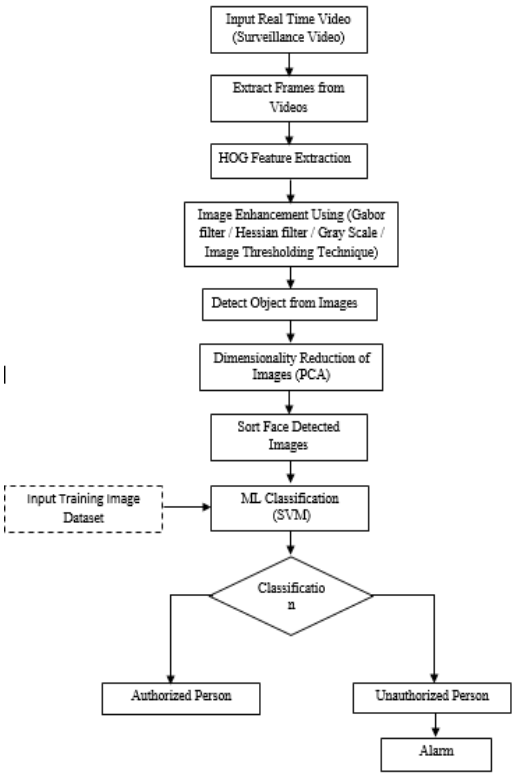

Figure 1. Face recognition

Figure 1 shows face recognition system using HOG feature extraction and PCA. Here Surveillance Video taken as input then extracted images / frames from Videos after that applied HOG Feature Extraction then Image Enhancement performed using some techniques. Next Object from Videos are Detected then PCA applied to reduce dimensionality of images. Here detected images are sorted using classification algorithm here SVM utilized for classification purpose. Training dataset is loaded to classify person as authorized or unauthorized. If provided face match found then that face is termed as authorized and not matched then is termed as unauthorized.

A variety of frames, such as geometrical and prototype matching techniques, can be used to overcome the question of facial detection and recognition. The primary component analysis (PCA) is the method for the reduction of features

and variables that converts large numbers in a smaller number of features or variables.

The Linear Discriminant Analysis (LDA) is also the linear method of combination. The LDA Framework examines several types of things in various classes. There is a different LDA system. LDA's main aim is to increase class inequality while reducing class division. The use of class data leads to higher grade inequities than PCA, so LDA is better than PCA.

The introduction is discussed in the section I. The literature review of current systems was presented in Section II and the proposed system was completed in section iii. The reference paper is presented in the final list.

II. LITERATURE REVIEW

The linear approach is also the linear discrimination analysis (LDA). The LDA paradigm discusses many types of objects distinctly, and they are grouped into various categories of objects or classes. The LDA's main goal is to increase inequality between different classes while reducing the disparity between classes. It gives better class discrimination than PCA by using class data. LDA is better than PCA.

M. A. Abuzneid and A. Mahmood et al [2] presents improved technique to enhance face recognition by using the neural backbone propagation network (BPNN) and extraction of features depends on the correlation between the training images. One important thing is to create new T-Datasets from the first BPNN data set. Here a T-dataset was created, using the image correlation without using a common image density approach. The correlated T-Dataset provides a highly distinctive layer in training which enables BPNN to converge more quickly and more accurately. Information and features must be reduced for the facial recognition process, and other researchers will now concentrate for one day on the modern neural network. The writer therefore used a binary pattern descriptor for a local histogram to show that even traditional methods can be improved. Therefore, by using reduced picture features, the author achieved a higher accuracy of face recognition with less computational cost than the current approach.

Here N. A. A. Rahman, B. S. Satari, and Z. M. Z. Abidin et al [3] resented system assessment that manages and monitors company visitors using Face Recognition as a method of authentication. Once you have authenticated and checked your visitor, a visitor card will be printed that prints the visitor 's image, the date and the time of your visit as well as your contact person and visitor's name. The visitor recognition system (FRVMS) proposes to increase the protection of a organization from non-authenticated populations. For certain uses, such as stealing assets, illegal entry is forbidden. A web camera already integrated with a computer is used to recognize the face.

N. Jamil, S. Lqbal, and N. Iqbal et al [4] proposed Face Recognition technique using neural networks. The author conducted research on facial recognition by integrating his own faces with the neural network. Eigenfaces [18] are generally used for extracting information essential in a facial image that is very important for facial identification. With the use of

Eigenfaces, face images with various coefficients can be provided. Neural networks are used by using an independent algorithm to recognize the face via the correct classification of the coefficients. The network is initially formed with face data and then used to recognize the image provided.

K. Bong, S. Choi, C. Kim, D. Han, and H. Yoo et al [5] proposed a Low-power convolutional neural network (CNN)-based face recognition system for authenticating users in smart devices. This system contain two chips i.e an always-on CMOS image sensor (CIS)-based face detector (FD) and a low-power CNN processor. analog-digital Hybrid Haar-like FD is proposed to improve the energy efficiency For always-on FD.

Y. Kim, H. Kim, S. Kim, H. Kim, and S. Ko et al [6] proposed A novel illumination normalization method by utilizing a convolutional neural network (CNN). It consist of the local pattern extraction (LPE) layer and illumination elimination (IE) layer. The LPE layers model the correlation among the pixels in every local region for handling numerous kinds of local shadow and shading in the face pictures. And the IE layers create illumination in sensitive ratio images by estimating the ratio among the output pairs produced in LPE layers. The final feature map generated by combining the ratio images consist an enhanced discriminative ability for face recognition (FR).

D. Malik and S. Bansal et al [7] present face recognition based on primary component analysis and linear discrimination analysis. Face recognition now plays an important part in many applications such as computer communication, video monitoring, facial tracking and face recognition. It is not possible to retrieve password by hackers because of face recognition. FR systems are now replacing the security requirement to survive today's crime. It's important now a few days to secure information, but it's difficult.

Suman Kumar Bhattacharyya , Kumar Rahul et al [9][11] presented face recognition using Linear Discriminant Analysis (LDA). LDA is depends on a linear projection from the image space to a low dimensional space. LDA provides set of features that consist of important information for doing classification. By utilizing LDA method the problem in Principle Component Analysis method is mitigated by applying the linear discriminant criterion. Here ORL face dataset used to perform experiment.

Divya Malik, Shaloo Bansal et al [14] principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) are present face recognition. Javed, Ali et al,[10] argue that PCA is a dimension reduction tool used to minimize image size through data compression, and it demonstrates the most effective low-dimensional facial pattern configuration. This reduction in dimensions eliminates information that is not essential and s breaks down the faces in orthogonal ways, known as Eigen faces. LDA is an information separation process, according to the author.

III. CONCLUSION

Here we presented a survey on face recognition and detection methods. Different researchers have different objectives in the face detection

and recognition domain, as some of the researchers have focuses on recognition accuracy and some of them focusing on improving processing time of face detection and recognition. Some methods as follows 3D face recognition, face classical recognition algorithm, Artificial neural networks method, Face descriptor-based methods, Video based face recognition, and real time surveillance using histogram of oriented gradients (HOG) and feed forward neural networks.

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