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HUMAN SURVEILLANCE WITH FACE RECOGNITION

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Abstract: Automatic attendance system is required in large organizations. The biometric attendance have its own benefits for controlling mal practices. Face detection is one of the popular biometric attendance system in which human face detection and recognition is performed. The face detection can be done with the help of conventional haar cascade classifiers. The detected faces are then recognized using trained models from face database. The first step in recognition system is to develop recognition database of each person and then using this model for identifying the person by comparison and matching process. This paper presents face recognition based attendance system which records the attendance of person standing in front of web camera.

Index Terms - Face Recognition, Attendance System, Biometric, MySQL, Recording.

I. INTRODUCTION

Face recognition is a technique for determining a person's identity based on their unique facial features. Photos, films, and real-time machines can all benefit from such systems. The purpose of this essay is to present a more straightforward and straightforward approach to machine technology. With the use of such technology [1], a person's face can be simply detected using a dataset with a similar matching appearance [2]. The approach of detecting a person's face with the help of python and OpenCV in deep learning is the most efficient. This strategy can be used in a variety of settings, including the military, security, schools, colleges and universities, aero planes, banking, online web applications, gaming, and so on. This system employs a strong Python algorithm that makes face detection and recognition simple and efficient.

The Viola-Jones technique (also known as Haar cascades) is the most widely used face detection algorithm in the computer vision area. The Viola-Jones algorithm [3] is used to recognize faces in photos, but it may also be trained to detect other items such as automobiles, buildings, culinary utensils, fruits, and so on.

For Face detection from the input image is separated into various sub-windows, with multiple Haar-like characteristics computed at various scales and positions for each sub-window. The Adaboost algorithm [4] is used to select the primary features. The existence or absence of face is then examined in each sub-window using a cascade of classifiers.

II. RELATED WORK

Consider if facial recognition algorithms are based on models or exemplars as one way to categories them. Models are utilized to calculate the Quotient Image in [5] and to construct their Active Appearance Model in [6]. When dealing with appearance variance, these models capture class information (the class face) and give significant constraints. Exemplars, on the other hand, can be utilised for recognition. The ARENA approach in [7] simply saves all of the training and compares it to the task image. As far as we can determine, present models-based procedures do not utilise exemplars, and vice versa. This is due to the fact that these two techniques are not mutually exclusive.

Recently developed method in [8] for facial recognition that combines models and exemplars. In this case, models are employed to create extra training photos, which can subsequently be used as exemplars in the face recognition system's learning stage. Face recognition approaches can be classified into two types based on posture invariance: I global approach and (ii) component-based approach. A single feature vector that describes the entire facial image is utilised as input to a classifier in the global approach. Minimum distance classification in Eigen space [9,10], Fisher's discriminant analysis [11], and neural networks [12] are some of the classifiers proposed in the literature.

III. PROPOSED WORK

The proposed system will be consist of stages as shown in block diagram in figure 1.

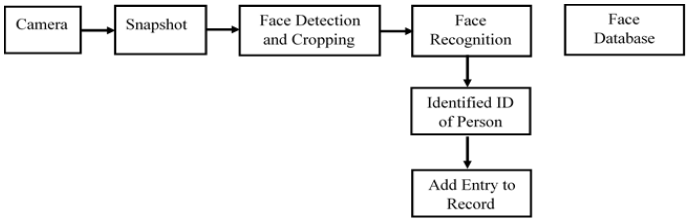

figure 1: proposed face recognition and attendance system

The web camera interface is used to capture the image of the person. The image is captured with snapshot mechanism which is automated with respect face detection process. The detected face is cropped for face recognition. Feature extraction from face image and comparing with the features of faces from database with the likelihood estimation mechanism is used for recognizing the identification (ID) number of the person. The respective record of identification along with system time and date is added to the record. The record entry database is maintained with the use of applications such MYSQL server.

The face region detection is done with the use of haar cascade filters as shown in figure 2.

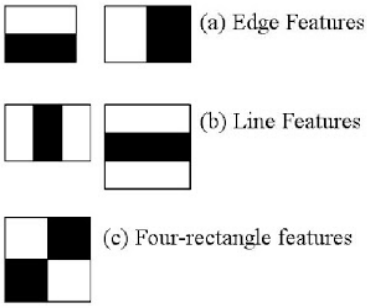

figure 2: haar cascade filters used for face detection

Artificial neural network (ANN) classifier is used for classification of faces. The known identification is based on class number that is detected by ANN. The general ANN system is shown in figure 3.

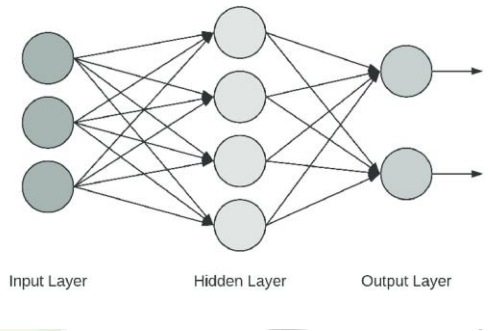

figure 3: artificial neural network

The parameters of configuration during training of artificial neural network are given in table 1.

Table 1: ANN Configuration Parameters

Parameter	Configuration/Value
Number of input neurons	1
Number of output neurons	1
Number of hidden neurons	10
Network type	Feed Forward
Activation Function	Log Sigmoid

IV. RESULTS AND DISCUSSION

The performance of proposed system is evaluated with accuracy estimation as shown in figure 4 and table 2. The faces that are used during training and not used during training are considered for performance evaluation. The correct identified faces and incorrect identified faces are counted for performance evaluation. The training by varying number of faces is performed with respect to which recognition accuracy is estimated.

The accuracy estimated as,

ACC= (Truly identified known faces and truly unidentified unknown faces)/ (All true and false cases) ...(1)

Table 2: Accuracy Analysis

Number of faces during training	Accuracy
10	98%
20	97.3%
50	91%
100	90.1%

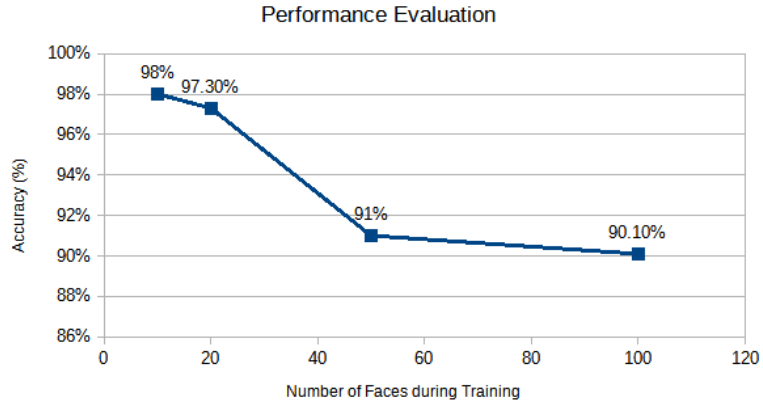

Figure 4: Accuracy Analysis

For less number of people accuracy is very high but as number of people goes on increasing accuracy decreases. The proposed system is applicable in small office based enterprises where attendance system can be automated.

V. CONCLUSION

This paper presents realtime biometric attendance system with face recognition. The face recognition in detection and identification stages shows outstanding performance for over 100 people. The accuracy around 90% is seen with the use of proposed system in this paper. This paper forms the direction for research in the filed to improve the accuracy which may provide usefulness of face recognition systems in attendance recording in large organizations.

VI. REFERENCES

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