Automated Attendance System using Machine Learning Approach

Amey Shirke[1] Omkar Wagh [2] Soham Dunakhe[3] Vivek Shrivastav[4] Bhushan Mahajan[5]
[5]Professor
[1,2,3,4,5]Department of Computer Science & Engineering
[1,2,3,4,5]SRTTC College of Engineering, Kamshet, Pune, India

Abstract— Limited functionality of face detection algorithm are still facing problems in real environment. This problem is marked as Sparse Fingerprint Classification Algorithm (SFCA). There are two phases training and testing. Parts of images are obtained in training phase and in testing phase every part of image is converted into binary sparse format. The binary representation marks for their respective categories and maximum marked category decides the identity of the image. SFCA works efficient when the size of data file is limited.

Key words: Face Recognition, Principal Component Analysis, Voice Conversion, SIFT

I. INTRODUCTION

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references. Nowadays, biometrics traits has become very popular in playing a vital role in security related aspects from lower to higher grade such as, attendance system, physical and digital data entry access, login control, passport, national identity card, border line, etc. Biometric is a physiological or behavioral feature of an individual used to identity or verify his/her identity in an efficient manner. With regard to this existence and development of this research field, every manual system is taking an evolution converting into an automated digital world to reduce the manual errors and obtaining the work effortlessly. In such case, in reducing manual entry and hard resources, with less time consumption, attendance system is transforming into an biometric application for an efficient task of teacher to mark attendance for the students of class using fingerprint or face recognition methods. Various research works had been attempted in developing an automated attendance system using biometric traits in recent years . Hence, our proposed system aims to mark attendance automatically by means of face recognition. The teacher can mark the attendance of the students with just the click of a button. The names of the absentees are called out by voice conversion using speech technology. Hence the teacher can easily mark the attendance of the absentees.

II. LITERATURE SURVEY

A. Paper name: Extended SRC:Undersampled Face Recognition via Intraclass Variant Dictionary

Author: Weihong Deng, Jiani Hu, and Jun Guo

Sparse Representation-Based Classification (SRC) is a face recognition breakthrough in recent years which has successfully addressed the recognition problem with sufficient training images of each gallery subject. In this paper, we extend SRC to applications where there are very few, or even a single, training images per subject. Assuming that the intra class variations of one subject can be approximated by a sparse linear combination of those of other subjects, Extended Sparse Representation-Based Classifier (ESRC) applies an auxiliary intra class variant dictionary to represent the possible variation between the training and testing images. The dictionary atoms typically represent intra class sample differences computed from either the gallery faces themselves or the generic faces that are outside the gallery. Experimental results on the AR and FERET databases show that ESRC has better generalization ability than SRC for under sampled face recognition under variable expressions, illuminations, disguises, and ages. The superior results of ESRC suggest that if the dictionary is properly constructed, SRC algorithms can generalize well to the large-scale face recognition problem, even with a single training image per class.

B. Paper name: IMPLEMENTATION OF CLASSROOM ATTENDANCE SYSTEM BASED ON FACE RECOGNITION IN CLASS

Author: Ajinkya Patil, Mrudang Shukla

The face is the identity of a person. The methods to exploit this physical feature have seen a great change since the advent of image processing techniques. The attendance is taken in every schools, colleges and library. Traditional approach for attendance is professor calls student name record attendance. It takes some time to record attendance. Suppose duration of class of one subject is about 50 minutes to record attendance takes 5 to 10 minute s. For each lecture this is wastage of time. To avoid these losses, we are about use automatic process which is based on image processing. In this novel approach, we are using face detection face recognition system. It identifies difference between face and non face for better results. The other strategy involves face recognition for marking the students attendance. The Raspberry pi module is used for face detection recognition. The camera will be connected to the Raspberry pi module.The student database is collected. The database includes name of the students, there images roll number. This raspberry pi module will be installed at the front side of class in such a way that we can capture entire class. This system is convenient to carry out attendance within less time. We can take attendance on any time.

1) Paper name: Robust Face Recognition via Adaptive Sparse Representation

Author: Jing Wang, Canyi Lu, Meng Wang, Member, IEEE, Peipei Li,

Sparse Representation (or coding) based Classification (SRC) has gained great success in face recognition in recent years. However, SRC highlights the deficiency too much and overlooks the correlation information which has been demonstrated to be critical in

real-world face recognition problems. Besides, some work considers the interconnection but overlooks the discriminative ability of deficiency. In this paper, we propose a unique framework called Adaptive Sparse Representation based Classification (ASRC) in which sparsity and correlation are jointly considered. Specifically, when the samples are of low correlation, ASRC selects the most discriminative samples for representation, like SRC; when the training samples are highly correlated, ASRC selects most of the correlated and discriminative samples for representation, rather than choosing some related samples randomly. In general, the representation model is adaptive to the correlation structure, which benefits from bothnorm and norm. Extensive experiments conducted on publicly available data sets verify the effectiveness and robustness of the proposed algorithm by comparing it with state-of-the-art methods.

C. Paper name: DeepFace: Closing the Gap to Human-Level Performance in Face Verification

Author: Yaniv Taigman, Ming Yang, MarcAurelio Ranzato, Lior Wolf

In modern face recognition, the conventional pipeline consists of four stages: detect Align represent classify. We revisit both the order step and the representation step by employing explicit 3D face modeling in order to apply a piecewise affine transformation, and derive a face representation from a nine-layer deep neural network. This deep network involves more than 120 million parameters using several locally connected layers without weight sharing, rather than the standard convolutional layers. We trained it in such a way that of four million facial images belonging to more than 4,000 identities. The learned representations coupling the accurate model-based alignment with the large facial database generalize remarkably well to faces in unconstrained environments, even with a simple classifier. This method attains an accuracy of 97.35% on the Labeled Faces in the Wild (LFW) dataset, minimizing the error of the current state of the art by more than 27%, closely approaching human-level performance.

D. Paper name: Dynamic Image-to-Class Warping for Occluded Face Recognition

Author: Xingjie Wei, Chang-Tsun Li, Senior Member, IEEE, ZhenLei, Member, IEEE

Face recognition (FR) systems in real-world applications need to deal with a wide range of interferences, such as occlusions and disguises in face images. Difference with other forms of interferences such as nonuniform illumination and pose changes, face with Obstacle 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 FR. The face consists of the forehead, eyes, nose, mouth, and chin in a natural order and this order does not change despite occlusions. Thus, a face image is partitioned into patches, which are then concatenated in the raster scan order to form an ordered sequence. Considering this order information, DICW computes the image-to-class distance between a query face and those of an enrolled subject by finding the optimal alignment between the query sequence and all sequences of that subject along both the time dimension and within-class dimension. Unlike most existing methods, our method is able to deal with occlusions which exist in both gallery and probe images. Extensive experiments on public face databases with various types of occlusions have confirmed the effectiveness of the proposed method.

E. Statements and scope

In order to reduce the frauds of ATM it is recommended to prepare the database of all the ATM customers with the banks and deployment of high resolutions camera and face recognition software at all. To avoid the duplicate voters, a database of all voters of all constituencies is recommended to be prepared. Then at the time of voting resolution camera and the face recognition equipments at the voting site could help in identifications of the voters. In defense ministry and all other important places the face recognition technology can be deployed for better security.

F. Problem definition OR statement

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references.

1) Advantages of Proposed system :

- We perform a detailed security study and capability assessment of the proposed data
- latency is reduced
- more ordered
- improves correctness

G. Existing System

Traditional way of marking attendance involves a typical situation of students sitting in a classroom and the teacher calling out the names of the students individually to mark their attendance. The attendance is usually marked using hard resources - pen and paper. The huge attendance records that maintained are then used for later references.

1) Disadvantages 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.

H. Algorithms

There are mainly four steps involved in SIFT algorithm. We will see them one-by-one.

1) Scale-space Extrema Detection:

From the image above, it is obvious that we cant use the same window to detect keypoints with different scale. It is OK with small corner. But to detect larger corners we need larger windows. For this, scale-space filtering is used.

2) Key point Localization:

Once main idea is found, they have to be refined to get more accurate results. They used Taylor series expansion of scale space to get more accurate location of extrema, and if the intensity at this extrema is less than a threshold value it is rejected. This threshold is called contrast Thresholdin

OpenCV If this ratio is greater than a threshold, called edge Thresholdin OpenCV, that keypoint is discarded.

3) Orientation Assignment:

Now an alignment is assigned to each keypoint to achieve invariance to image rotation. A part is taken near the keypoint position depending on the scale, and the value of slope degree and direction is calculated in that region. It creates keypoints with same position and scale, but different directions. It contribute to stability of matching.

4) Keypoint Descriptor:

Now keypoint descriptor is created. A 16x16 neighbourhood around the keypoint is taken. It is devided into 16 sub-blocks of 4x4 size. For each sub-block, 8 bin orientation histogram is created. So a total of 128 bin costs are available. It is represented as a vector to form basis.

III. CONCLUSION

This paper focuses on developing an automated attendance system It saves 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 faces having similar facial features. The system can be extended to respond to 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.

IV. FUTURE SCOPE

The result of our preliminary experiment shows improved performance in the estimation of the attendance compared to the traditional black and white attendance systems. Current work is focused on the face detection algorithms from images or video frames.In further work, authors intend to improve face recognition effectiveness by using the interaction among our system, the users and the administrators. On the other hand, our system can be used in a completely new dimension of face recognition application, mobile based face recognition, which can be an aid for common people to know about any person being photographed by cell phone camera including proper authorization for accessing a centralized database.

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