

Face Detection Automated Attendance Marking System

Ruchika Department of Computer
Science & Engineering
Lovely Professional University
Phagwara, Punjab, India.
Ruchika.24905@lpu.co.in

Bhupinder Kaur Department of
Computer Science & Engineering
Lovely Professional University
Phagwara, Punjab, India.
Bhupinder.23611@lpu.co.in

Abstract

The face acknowledgment is the framework which is the utilization of the AI. The face acknowledgment framework is the framework which is utilized for the participation framework. The test and preparing set is set up in which division is done, highlight extraction can be applied and dataset is planned. The test set is the picture which needs to perceive by contrasting and the preparation set. The KNN classifier is applied which can order test picture into perceived or non-perceived. The straight KNN classifier has least exactness since it groups information into two classes. In this research, for the analysis of the textual features they applied the GLCM algorithm used for the face detection. When the face detected then the attendance is marked of the query image. As per simulation result sit is shown that proposed strategy has better exactness when contrasted with existing system.

Keywords: *KNN (K-Nearest Neighbour), DWT (Discrete Wavelet Transform), GLCM (Gray-Level Co-Occurrence Matrix)*

I. Introduction

It is broad terms that described the operations that can be apply on 2D, 3D or 4D waves form image data. The fitting examination devices are given even in those situations where information has nothing to do with the pictures. The got pictures from the satellites, space tests and flying machines are acquired by lacing cameras or sensor over it, after which continuously pictures are taken from it. With the help of image processing technique the quality of taken picture is enhanced [1]. During last few years number of techniques in the image processing has been developed so far. Most of the developed techniques have been utilized for the enhancement of obtained images. These images are obtained from the unmanned spacecraft's, space probes and military investigation flights. Image processing technique is popular due to its vast advantages such as powerful personnel computers, memory devices size, software graphics and many more. Image processing is a technique in which operations are performed on an image, in order to enhance the features of an image and to extract useful information from it. It is a branch of signal processing in which image is used as input and features associated with that image are the output. Image processing is among quickly growing technologies. In field of engineeringand computer science, it plays very essential role and form a research area. Images used as input is the kind of signal dispensation like video frame or photograph and features or characteristics associated with that image are considered as the output of the image [2]. In the two dimensional signals, image processing includes the images and apply different set of signal processing methods on them effectively.Feature detection is known as the extraction of the images contents

for the description. This extraction of features involves the associated matching for the detected content from the image [3]. The extraction of image content description is called feature detection. Feature extraction also involves their associated matching of the content detected from the image. Memory consuming and redundant raw images are the main step in this method. The physiological and/or behavioral characteristics are individually examined instead of allowing certifying people to access physical and virtual domains. The passwords, PINs, smart cards, plastic cards, tokens and keys are factors that come under physical and virtual domains. It is difficult to carry or protect the data such as cards, tokens, keys as its losing possibility is more. Also, it is difficult to remember Passwords and PINs as they can be cracked by hackers. The used magnetic cards are corrupted due to which individual's identity can be stolen or misused. Maintaining the attendance is essential in every one of the foundations for checking the performance of students. Each organization is using their own techniques and in most of the cases traditional method for taking attendance is physically utilizing participation sheet [4].

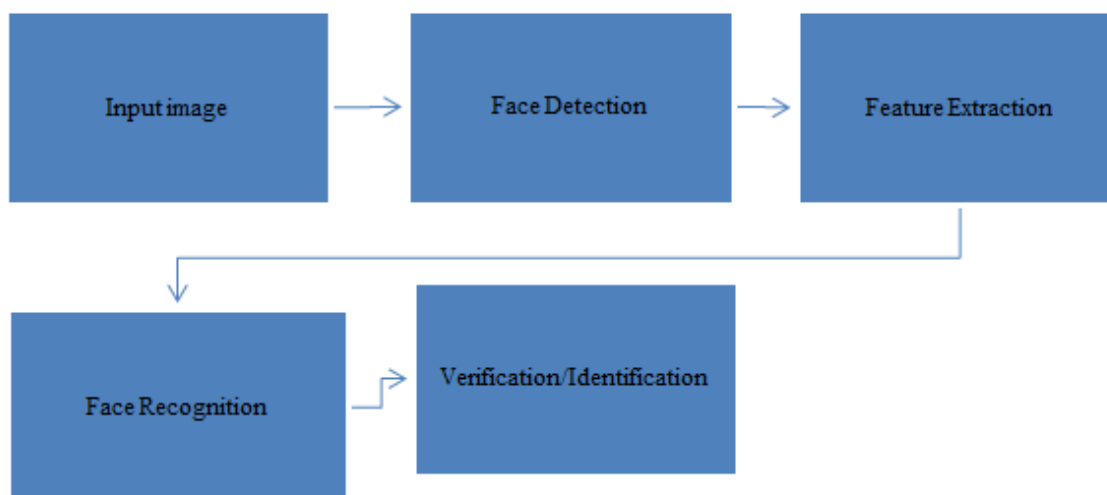


Fig 1. Present work Flow Chart

More time is consumed by the manual, attendance system for recording and arranging data. This is done for the computation of average attendance of each student. Therefore, an optimal system is required that solve and manage all the record of the students and also calculate the student average attendance. Facial recognition method is considered as the method by which student record is managed automatically. The recognition is defined as the discipline, by which all data can be recognized such as speech recognition, recognition of object, analysis of data and face recognition and many more. It is necessary to understand the basic of the pattern recognition before learning the details of techniques and algorithm [5]. The general ideas and general concepts behind the pattern recognition are required to understand before knowing its applications. For the comparison between the test data and each category, it is required to have a data set for building categories, in order to generate a system for recognition. The malicious user

can access the smart phone by launching Spoof biometric attacks that work against authentication of smart framework and consequently prompt the leakage of sensitive private information, for example, bank information by means of applications like GWallet and Phone Pay. Given the pervasiveness of high determination face images collective, (regularly openly) using social media. This help in getting user face image by which it becomes easy to launch a spoof attack against FR systems. This face recognition system is compared with fingerprint, iris or speech recognition systems. Nowadays, due to advent of internet it becomes easy for the attackers to take images from cameras and smart phones due to which they easily took benefit from facial images [6]. A commercial off the-shelf (COTS) study the face recognition with the help of this, it is considered as the best in class face matchers.

II. Literature Review

Adrian Rhesa Septian Siswanto, et.al, (2014), have analyzed that process of face recognition begins with extracting the width of mouth, width of eyes, pupil like features coordinates [9]. The extracted features are compared stored calculation in the database that returns the record. Author in this paper proposed, an optimal method for the facial recognition for which they used the Open CV 2.4.8. This proposed method was further applied in the attendance system and also compared with the Receiver Operating Characteristics curve method. As per simulation results, it is observed that optimal results can be achieved by Eigenface in the ROC curve as compared to Fisherface. The Eigenface is implemented inside the Attendance System and results show that it is prove be 70% to 90% efficient in terms of similarity for genuine face images.

Geetha Baskaran, et.al, (2016), have analyzed that there are concerns of students attendance in Malaysia every higher education. Currently the attendance process is done manually that is very time consuming and also inaccurate. The students overall academic performance get affected by inconsistent attendance in class that results in need of consistent attendance system. In this paper [8], authors have proposed a new attendance system that uses mobile to recognize face and contain GPS locator. The proposed system is a real time system that shows a high potential to replace the current attendance system. In order to reduce the rate of errors in managing students' attendance records and improve the efficiency of the student attendance-taking process they have designed a student attendance system. As per obtained results, it is demonstrated that the proposed algorithm is efficient and effective to use.

Nazare Kanchan Jayant, et.al, (2016), has concluded that in judging the performance of students in an academic organization, important role is played by attendance recording. An automated Attendance Management System was proposed by author. It based on the techniques of face detection and face recognition as more time is consumed by the manual attendance system [10]. It is demonstrated that there is improvement in the existing attendance management systems as compared to existing methods. It improves the performance of various parameters such as records of the students automatically decrease in manual labor also the burden of the lectures for marking accurate attendance. Due to this system, time of teachers is save by which

they can do more effort in studied as compared to marking attendance of students. Hence, it saves the time of teachers as well as of students. It increases the efficiency of the system by minimizing limitations.

Samuel Lukas, et.al, (2016), has recommended that certification is one of the major issues in terms of information systems. There are number of techniques that can be used for user authentication out of which one is human face recognition (HFR). The one of the essential branch of the biometric verification is HFR. This method has been utilized in various fields such as human-computer collaboration, door access control system and network security and monitoring of systems like applications. In this paper [9], a method was proposed by author using which attendance of students can be easily done by recognizing face of every child. The authors have taken 16 students that are present in the classroom and results shows that out of 148, 121 faces are recognized by using proposed system. The recognition process becomes more useful by improving above mentioned solution. On the basis of observation, it is concluded that the proposed method success rate is near 82% in recognizing face of students.

Marko Arsenovic, et.al, (2017), has proposed a new deep learning based face recognition attendance system. This system is planned to accomplish the recent development of deep convolutional neural networks (CNNs). They have described a detail procedure of developing a face recognition model. This model consist several essential steps like cascading of CNN for the detection of face and for the generation of face embedding's which is utilized for the development of various advanced techniques. In this paper [7], author's main objective was to deploy practical implementation of the proposed method for the recognition of face. As per simulation results it is inferred that proposed technique has better productivity i.e. 95.02% as compared to other existing methods in the real time environment. In this paper, proposed method is integrated to other method without changing anything in existing which is utilized for the purpose of monitoring.

Priyanka Wagh, et.al, (2015), have analyzed that the attendance system can be prove to be difficult process to maintain when it handle manually [10]. The issues in the existing system can be minimizing using Viola and Jones algorithm and its methods. There is no need of any specialized hardware in order to implement this system. The smart attendance system can be constructed using camera and computer system, database servers. The main aim of this system is to detect the faces and perform recognition task on them. Detected faces are compared with the data present in the database for the purpose of checking whether identified face is correct or not. The simulation results show that proposed method provides the effective and efficient results in maintaining records of the students as compared to other methods.

III. Research Methodology

It is the work in which classification of face is done by using KNN classifier. In the mentioned classifier different training and testing samples sets are described using different n dimensional numeric elements. A small point is signified by model in the n-dimensional space. After which, the part larger in size is stored in an n-dimensional pattern space among the training samples. In case, there is an unknown sample then the k-nearest neighbor classifier identify whether this sample is close training samples or not and also look for the pattern space. Euclidean distance is the term that defines whether this unknown sample is similar to training sample or not. To the every attribute a break and weight is assigned by the nearest neighbor classifier unlike, back propagation and decision tree. In the presence of large number of useless attributes, it leads to confusion. For the process of prediction this above mentioned classifier has been utilized for the unknown sample as it provides the accurate prediction. Average value is given back by the classifier for this situation. This value of the unknown sample is associated with the k nearest neighbors. Therefore, among the machine learning algorithms, this discussed algorithm considered as the simpler method in comparison to others. The features of the test image will be analyzed with the DWT algorithm and on the detected features KNN classifier will be applied which will classify the face into detected or non-detected.

GLCM Algorithm

1. The number of pixels present in the matrix is counted as it stores the data.
2. The counted pixels are stored in the matrix $S[i,j]$.
3. The closeness between pixels is checked in the framework utilizing histogram system.
4. Formula for calculating the CF (contrast factor) from the matrix:

$$g = \exp\left[\frac{\text{mean}(I) - \text{minimum}(I)}{\text{maximum}(I) - \text{mean}(I)}\right]$$

5. The data elements of g need to be stabilized by dividing the pixels.

$$g = \begin{cases} 0.8 & \text{if } g < 0.8 \\ 1.2 & \text{if } g > 1.2 \\ g & \text{otherwise} \end{cases}$$

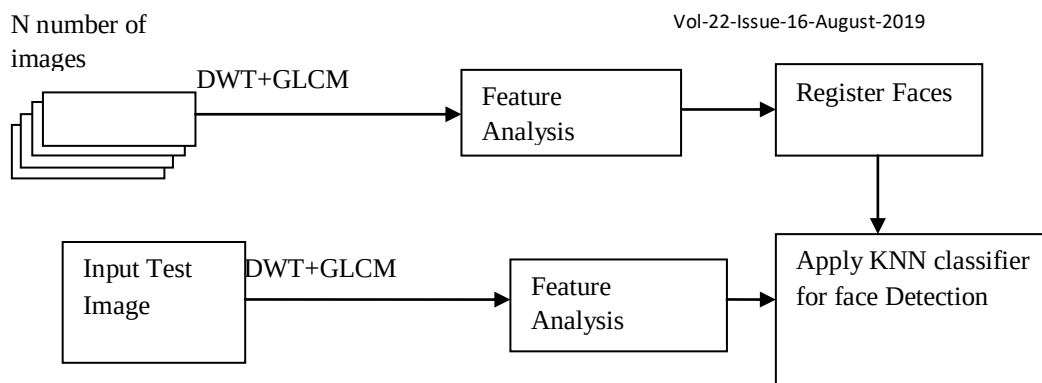


Fig 2: Proposed Flowchart

IV. Experimental Results

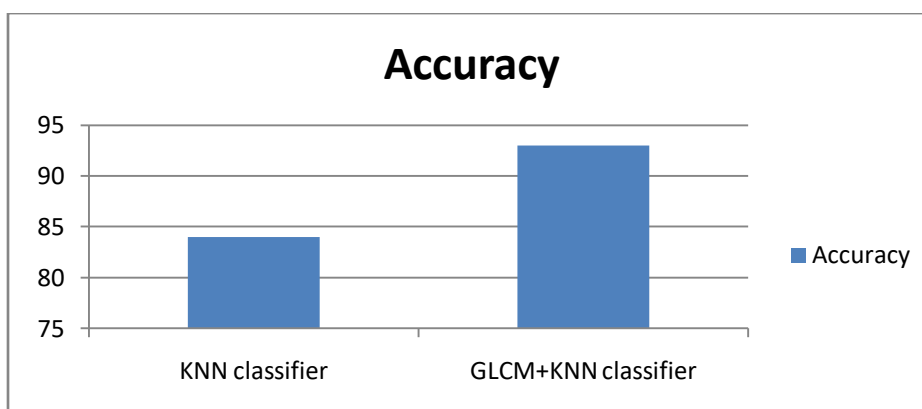


Fig 3: Accuracy Comparison

As shown in figure 2, the accuracy of KNN classifier is compared with the proposed GLCM+KNN classifier. It is analyzed that proposed technique performs well due to textural feature analysis.

V. Conclusion

In this research, it has been concluded that face recognition is the application of the machine learning. In the machine learning system, the new values will be derived from the previous experiences. The training set is prepared in which process of segmentation, feature analyzes and classification is implemented. The test set is the image which needs to recognize for the attendance system. In this research work, KNN classifier is applied which can classify the detected and non-detected faces. To classify the faces, textural features are analyzed using GLCM algorithm. The proposed simulation results shows 10 percent improvement in the results.

VI. References

[1] CHEN HaiYan and LUJunHong, "The Image Process Technologies in Face Recognition," 2010, IEEE

- [2] Niveditha G V and Sharmila B P, “DWT-based Face Recognition using Fast Walsh Hadamard Transform and Chiral Image Superimposition as pre-processing techniques,” 2015, IEEE
- [3] Ramandeep Kaur and P. S. Mann, “Techniques of Face Spoof Detection: A Review,” International Journal of Computer Applications (0975 – 8887), Volume 164 – No 1, April 2017
- [4] Shuang Wang, Guanyu Wen and Hua Cai, “Research on Face Detection based on fast Haar feature,” 2017 10th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics, IEEE, 2017
- [5] Nischal K N, Praveen Nayak M, K Manikantan, “Face Recognition using Entropy-augmented face isolation and Image folding as pre-processing techniques,” 2013, IEEE
- [6] Geetha Baskaran and Ahmad Farhan Aznan, “Attendance system using a mobile device: face Recognition, gps or both?,” vol. 3, pp. 26-33, 2016.
- [7] Samuel Lukas, Aditya Rama Mitra, Ririn Ikana Desanti and Dion Krisnadi, “Student Attendance System in Classroom Using Face Recognition Technique,” IEEE Information and Communication Technology Convergence (ICTC), 2016 International Conference , vol. 3, pp. 1032-1035, 2016.
- [8] Nazare Kanchan Jayant, Surekha Borra, “Attendance Management System Using Hybrid Face Recognition Techniques”, IEEE 2016 Conference on Advances in Signal Processing (CASP), vol. 6, pp. 412-417, 2016.
- [9] Priyanka Wagh, Jagruti Chaudhari, “Attendance System based on Face Recognition using Eigen face and peA Algorithms”, IEEE 2015 International Conference on Green Computing and Internet of Things (ICGCIoT), vol. 4, pp. 303-308, 2015.
- [10] A.R.S Siswanto, A.S Nugroho, Maulahikmah Galinium, “Implementation of Face Recognition Algorithm for Biometrics Based Time Attendance System”, IEEE ICT For Smart Society (ICISS), 2014 International Conference, vol. 3, pp. 23-29, 2014
- .