IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 12, May 2023

Review Paper on Web Application of Student Attendance System using Facial Recognition.

Christy Johnson[1] and Priya Sekhar S.[2]
MTech student, Computer Science & Engineering[1]
Associate Professor, Computer Science & Engineering[2]
Lourdes Matha College of Science &Technology, Trivandrum, Kerala, India

Abstract: *Uniqueness or individuality of the individual face is the representation of once identity. In present times, face recognition has played a major role in numerous fields like schools, colleges, healthcare industries and many more. Face Recognition technology helps to identify objects in an image. This is done by identifying and measuring facial features in an image. People collect the face images, and the recognition equipment automatically processes the images. The paper introduces the related researches of face recognition from different perspectives. Face recognition has many potential applications in near future.*

Keywords: Face recognition, facial feature, uniqueness

I. INTRODUCTION

The face is the most acceptable biometric feature to identify the individual and is the most common method for identification. Face recognition are generally used for the purpose of identification and verification procedures. **Face Verification** is a machine learning task in computer vision which determines whether two facial images belong to the same person or not. The task involves extracting features from the facial images, such as the shape and texture of the face, and then using these features to compare and verify the similarity between the images.Face identification is the task of matching a given face image to one in an existing database of faces and is one-to-many mapping.

Maintaining and recording the student attendance system using conventional method is unattractive. The attendance management system using face recognition swapping the traditional method of attendance marking. Machine learning is one of the finest domains and it provides dataset only once as an input and provide a desirable output by applying a different machine learning algorithm. By using the face recognition-based method of attendance management helps to save time, avoid fake attendance and also helps in security purpose.

II. LITERATURE SURVEY

Face recognition has been an active research area over last 40 years. The face recognition research has several disciplines such as image processing, machine learning approach, pattern recognition, computer vision, and neural networks. Face recognition has many applications in the fields of biometrics, security system, surveillance systems, and access control and law enforcement. The primary purpose of this paper review is to find and analyse the solutions provided by other authors.

In [2]develops a software application using image processing applied in facial recognition. This is an automatic attendance monitoring system which identifies and record the presence of the individual in the classroom. The major members present in the system are teachers and students. For the proper working of the system, capture the students faces using the camera which is placed in each classroom. The algorithm used in the system is Haar Cascading and Local Binary Pattern. In the development of attendance application, during the time of registration students' image will be captured and the captured image is converted to machine language and there after store in the data ware house for further use. After successful logs in, the faculty can perform the following operations such as insert, update and delete student and can also view the students record. The development of application is used to generates reports to monitor student attendance.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 12, May 2023

Other paper proposed by [5], introduces the RF-ID technology for attendance management. This technology consists of a reader and tag that can be either barcode or smartcard. RFID technology is superior to other identification technologies, because in reading or rewriting data on the RFID tag it does not require direct contact between the RFID tag and the reader. It has the ability to send clean and reliable data needed as input for software on the attendance system and its design cost is low. The system consist of a Personal Computer (PC) in each lecture hall and each PC is connected to one network. When the student enters to the class, the RFID reader automatically reads the students ID and web – camera simultaneously takes pictures of student who are registered and sends data to the PC. The system then compares the ID with the information in the database and generate statistical results.

In 2017 Owandkar [6], the group image of the class is captured and faces is detected. The detected face is segmented and the obtained image is then compared with known data in the database. Attendance will be marked through this and a message is sent to parents of student who are absent in the class through a GSM 900 module. The hardware component used in the system are micro – controller, camera and display unit. Micro – controller act as an interface between GSM module and LCD display.

In [3],the objective of this project is to develop face recognition and temperature detecting attendance system. The main components used in the implementation is open-source computer vision library (OpenCV). The overall working of the system is user need to stand in front of the camera keeping a minimum distance of 50cm and his/her image is taken as an input. The frontal face is extracted from the image which is then converted to gray scale and stored in the database. The principal component analysis (PCA) algorithm is used on the images and the eigen values are calculated and stored in an xml file. When the user requests for recognition, the frontal face is extracted from the captured image through the camera. The eigen value is re-calculated for the test face during recognition and if it is matched with the stored data for finding the closest neighbour. The camera and infrared contactless temperature are used to detect the user andtheir temperature calculation, if the face match is 60% and their calculated temperature is between 30 – 35 degrees Celsius, then attendance for that particular individual is updated in the system. The PiCamera ribbon is connected to the camera port to capture the image and the module PyMLX90614is used to import functions to connect to theinfrared contactless temperature sensor which can be included in the code to get the object temperature.

In [4]PCA based Facial Recognition for Attendance System, his/her image will be recorded using camera at the entrance and the attendance shall be recorded upon recognizing the face. When the student's face is recognized, it will post-process so, that students can view their attendance status instantly. The different process involved in the system are pre – process the image, face detection, feature extraction and face recognition.

III. FACE RECOGNITION PROCESS

Face recognition can identify human faces in animages or videosby identifying and measuring facial features in an image. A face recognition system generally consists of four modules:face detection, face alignment, feature extraction and feature matching.

Face detection segment the face areafrom the background. The face alignment is a computer vision technology for identifying the geometric structure of human faces in digital images. Given the location and size of a face, it automatically determines the shape of the face components such as eyes and nose. A face alignment program typically operates by iteratively adjusting a deformable models, which encodes the prior knowledge of face shape or appearance, to take into account the low-level image evidences and find the face that is present in the image.The feature extraction is then performed to provide effective information that is useful for distinguishing between faces of different persons and stable with respect to the geometrical and photometrical variations. For face matching, the extracted feature vector of the input face is matched against those of enrolled faces in the database; it outputs the identity of the face when a match is found with sufficient confidence or indicates an unknown face otherwise.

IV. COMPARISON OF FACE RECOGNITION TECHNIQUE

Various technical paper uses different algorithms and techniques for the implementation of the student's attendance management system. The table given below shows the merits and demerits found in each system.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 12, May 2023

Sl. No.	Title name	Technology or algorithm used	Advantages	Disadvantages
1	Real-time Class Attendance Monitoring using Smart Face Recognition	The algorithm used is Haar Cascading and Local Binary pattern	The system reduces teachers' effort in marking students' attendance manually.	For efficiently recognizing the faces, there must be a gap between each face.
2	A Review Paper on 'Smart Attendance Management System'	Image processing and body temperature detection method.	Student registration and enrolment procedure is user friendly.	1. If the bearded person removes the beard or vice versa it will not be recognized. 2. If the face gets highly injured it will not get recognized.
3	PCA based Facial Recognition for Attendance System	The algorithm used is PCA	1.The use of PCA reduces training time. 2. PCA helps reduce overfitting.	1.Can cause information loss. 2. Students cannot view attendance report.
4	A New Model of The Student Attendance Monitoring System Using RFID Technology	RFID Methodology	Is used to reduce the manual effort in marking attendance in the campus.	1.A PC should be needed in each class room for recording attendance. 2.RFID is not reliable.
5	Attendance Monitoring System using Face Recognition	Uses PCA algorithm.	The SMS notification will send to parents of students who absent in the classes.	The system requires many numbers of hardware components.

The best attendance management system, is designed in such a way each user can access and monitor the data remotely. The students can submit the duty leave request through the system and when the privileged faculty give approval to the request then attendance for that particular individual is updated into the system. A message can be sent to the parent's phone number who are absent in the class. The system can be designed in such a way thatan alert is received by the student while logged in to the system when their attendance percentage is less than 75%. This helps the student aware about the attendance percentage since this is an essential for writing the final exams in colleges.

V. CONCLUSION

After analysing various method, this paper aims to determine the overall system capacity, throughput as well as accuracy of each method. Attendance Management system using face acknowledgments is very simple to use and works proficiently with less time condition. Face as a biometric modality is widely acceptable for the general public, and face detection tools is able to meet the accurateness demands of a wide range of applications. Future work will be paying attention on verifying the algorithm performance against general images and studying the required modification to make the algorithm strong with any image. These thoughts will be implemented in future.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 12, May 2023

REFERENCES

[1]. Yang, H. and Han, X., 2020. Face recognition attendance system based on real-time video processing. IEEE Access, 8, pp.159143-159150.

[2]. Trinos, M.I.P.D., Rios, J.H., Portades, K.G.O., Portades, P.R.O., Langreo, R.M.P. and Abisado, M.B., 2019, November. Real-time Class Attendance Monitoring using Smart Face Recognition. In 2019 IEEE 11th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management (HNICEM) (pp. 1-6). IEEE.

[3]. Bharath N. Parashar, Alex Abraham Mathews, Ashwin S.A., 2021, May. A Review Paper on 'Smart Attendance Management System'. In International Research Journal of Engineering and Technology (IRJET) Volume: 08 Issue: 05 | May 2021.

[4]. Kiran, T.A., Reddy, N.D.K., Ninan, A.I., Krishnan, P., Aravindhar, D.J. and Geetha, A., 2020, September. PCA based Facial Recognition for Attendance System. In 2020 International Conference on Smart Electronics and Communication (ICOSEC) (pp. 248-252). IEEE.

[5]. Ula, M., Pratama, A., Asbar, Y., Fuadi, W., Fajri, R. and Hardi, R., 2021, April. A New Model of The Student Attendance Monitoring System Using RFID Technology. In Journal of Physics: Conference Series (Vol. 1807, No. 1, p. 012026). IOP Publishing.

[6]. Owandkar, M., Kolte, A., Peshave, D. and Jadhav, M.S., 2017. Attendance monitoring system using face recognition. International Research Journal of Engineering and Technology, 4(5).