



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 6, June 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com

Attendance Tracking System by Facial Recognition

Manasa K M¹, Prof. Md. Irshad Hussain B^{2*}

Student, Department of Master Applications, University B.D.T College of Engineering, Davangere, Karnataka, India¹

Assistant Professor, Department of Master Applications, University B.D.T College of Engineering, Davangere, Karnataka, India²

ABSTRACT: Face is the way people show who they are. So, we've suggested a face-recognition-based automated system for keeping track of who is in class. Face recognition system is really helpful, especially in security control systems. Face recognition is used by the field protection system to identify suspects and by the FBI (Federal Bureau of Investigation) to look into crimes. In the beginning of our proposed method, videotape architecture is done by turning the camera through a stoner-friendly interface. The Viola-Jones algorithm is used to find and separate the face ROI from the videotape frame. In the pre-processing stage, images are shrunk if necessary to keep from losing too much information.

KEYWORDS: Attendance Tracking System, Machine Learning.

I. INTRODUCTION

Facial expression recognition is a key part of robotic vision. Its goal is to directly categorise different facial expressions [1]. This technology is used a lot in many real-world tasks, like finding abnormalities, making games, and making movies and TV shows [2, 3]. Experimenters in utmost workshop focus on six types of facial expressions, including "Wrathfulness," "Nausea," "Fear," "Happiness," "Sadness," and "Surprise."

A typical system for recognising facial expressions has four parts: face discovery, face alignment, facial point birth, and bracket [4, 5]. In this process, the most important things for bracket performance are both face alignment and point birth. Especially in a complex terrain, changing disguises and different points of view make it harder to recognise the expressions that have been collected. Every school, council, and university keeps track of how many times each student shows up. There is a strong link between how well students do in school and how often they go to school, according to empirical evidence. There was also a claim that students who don't show up to class often won't remember what they learned. So, the faculty has to keep accurate records of who is there. The system for keeping track of attendance in the first grade isn't good, and it takes more time to set up records and figure out how often each student usually shows up. So, there is a need for a system that will solve the problem of keeping track of student records and figuring out how many students usually show up to school. The most important thing to keep in mind is that even though these face images look three-dimensional, they actually measure very low-dimensional space.

II. RELATED WORK

1. Design and evaluation of a real time face recognition system using CNN[6],

Depending on the operation, face recognition systems can use either offline data or data that is sent in real time. In this paper, the Convolutional Neural Network (CNN) is used to design and test a real-time face recognition system. Depending on the application, face recognition systems can use either offline data or data that is sent in real time. In this paper, Convolutional Neural Network (CNN) is used to design and test a real-time face recognition system. Standard AT&T datasets are used to evaluate the proposed design at first, and the same methods are then used to design a real-time system. Details about how the CNN parameters were set to test and improve the accuracy of the proposed system's recognition are also given.

2. E - Attendance System Using Open cv and CNN[7],

Which automatically recognises the student when he or she walks into the study room and marks the attendance by spotting him or her. This device was made better by taking pictures of real people's faces in the classroom. Lastly, the lists of people who aren't there are shown on android software for confirmation.

3. Large-pose face alignment via CNN-based dense 3D model fitting[8],

We came up with a way to fit a 3D dense shape to a picture of a face in a big pose by combining cascade CNN regressors and the 3D Morph Able Model (3DMM). We came up with ways to improve the accuracy of face alignment by using pose-invariant capabilities. Large-pose face alignment is a very hard problem in computer vision. It is a prerequisite for many important vision tasks, like face recognition and 3D face reconstruction. There have been a few attempts to solve this problem recently, but more research is still needed to get results that are very accurate. In this paper, we propose a face alignment method for large-pose face images by combining the powerful cascaded CNN regressor method and the 3DMM. We think of face alignment as a 3DMM fitting problem, where the camera projection matrix and 3D shape parameters are estimated by a chain of CNN-based regressors.

4. Face Recognition using Principle Component Analysis, Eigen face and Neural Network[9],

Using PCA and Neural Network techniques, the paper describes a way to figure out how popular a face is. The result is that Fuzzy Ant with fuzzy C-approach and the proposed method offer a higher popularity fee than the other two approaches:

- The Eigen face method can be very sensitive to changes in orientation, and most mismatches happen with pictures of people with big heads.
- By selecting PCA as a characteristic choice method (for the set of photographs from the ORL Database of Faces), one could lessen the gap measurement from 2576 to 50 (identical to no. of decided on Eigen faces of maximum eigenvalue).

5. Online Attendance using Facial Recognition[10],

There are many ways to use biometrics, but face recognition is the best. In this method, the camera is set up in the classroom and takes a picture. The faces in the picture are then found and matched with the database to find out who is in the room. The camera is set up in the classroom and will take a picture. The faces will be found and matched with the database, and then attendance will be taken. It also suggests a single image-based method for telling the difference between 2-D paper masks and real faces.

6. Automated Attendance Systems Using Face Recognition by K-Means Algorithms [11],

A system is set up that marks the presence of students or workers by feting their faces and making the attending distance automatically. The facial expression is analysed using a K-means clustering algorithmic rule. Attendance is very important in schools, many other places of work, and many other ways of life. At the moment, it's taken using the standard method, which is to say that attendance is taken by hand. This system takes a lot of time and there could be a mistake.

7. Student Attendance Monitoring System Using Image Processing [12],

The student attendance observation system is an automatic way to tell who is a good student from a picture or videotape frame. It has some advanced features, such as real-time information, fast computing with low hardware costs, and high provident. Attendance is a required part of every organisation. Marking attendance at home can be stressful and take a lot of time. It's easy to make mistakes and take advantage of. This system gives a good way to keep track of who was there and when. Face recognition is a way to tell people apart based on the unique features of their faces. It works with the most obvious way to identify a person's face. The Pupil Attendance Observation System is a way to automatically pick out good students from a picture or video frame.

8. Real Time Face Identification for Capturing the Class Attendance Using Convolutional Neural Networks [13],

A system is set up to automatically record the attendance of students by reducing the load on the teachers. It does this by using a convolutional neural network algorithm that reads data from a hidden camera in the classroom or from a videotape. Face recognition is becoming a hot topic for research these days. Attendance is a really important thing for speakers in seminars and universities because it lets them know who is in the room. So, a system is set up to automatically record the attendance of the students by reducing the load on the teachers.

9. Student attendance system in classroom using face recognition technique [14],

A system for keeping track of students' attendance in the classroom that uses face recognition by combining Discrete Wavelet Transforms and Discrete Cosine Transfigure to pick out the features of each student's face. Then, Radial Base Function (RBF) is used to classify the facial objects. In the age of information systems, authentication is one of the most important issues. Mortal face recognition (HFR) is one of the effects that can be used to prove that a stoner is who they say they are. As an important part of biometric verification, HFR has been used in a wide range of operations, such as videotape monitoring/surveillance systems, human-computer commerce, door access control systems, and network security.

III. METHODOLOGY

The camera used in the face-recognition process is based on Viola-Jones from the OpenCV package, which is used for face-recognition. Face discovery is done by taking pictures of faces on things with a camera. The picture from the camera lens is a "raw" picture that shows both the background and the face. In this face discovery process, facial features in the image from the camera are found and searched for. At this point, the system can tell if the patterns are faces or not. The position of the region of interest (RoI) coordinate point of the face image, which is the position point and the size of the RoI face image produced, is marked on the face image found in the background image made by each camera lens. Normalization or pre-processing is a step that changes an image of a face that was found during the face discovery process. During this normalisation phase, most landing facial images show a chapeau [12].

In this study, a 2D-to-3D image reconstruction process is used to change a face database that is used in the face recognition process. The 2D to 3D image reconstruction system is expected to make a big contribution to finding and recognising faces, making it possible to find faces with high precision and quickly. This study uses the Convolutional Neural Network to develop a method for turning a 2D image into a 3D one (CNN). The CNN system is used to turn 2D images of faces into 3D images of faces. The next step is to put the vector shape and texture together to make a point on the new face image that is similar to the point on the original image. Face recognition also uses a database to reuse the results of the process of combining vector shapes and textures from 3D face images [12]. Figure 2 shows how CNN is used to turn a 2D image into a 3D one.

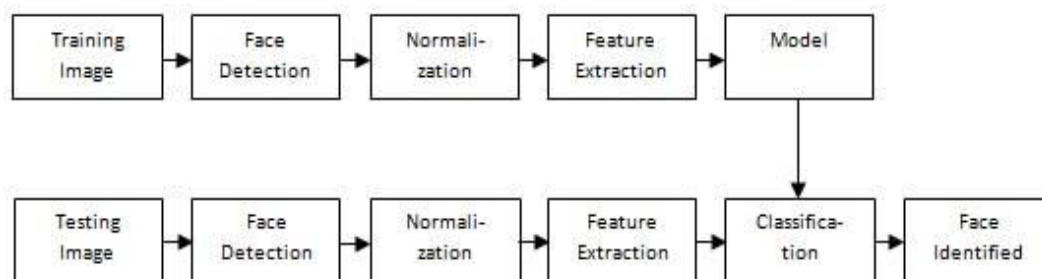


Fig: Stages of the process of facial recognition [12]

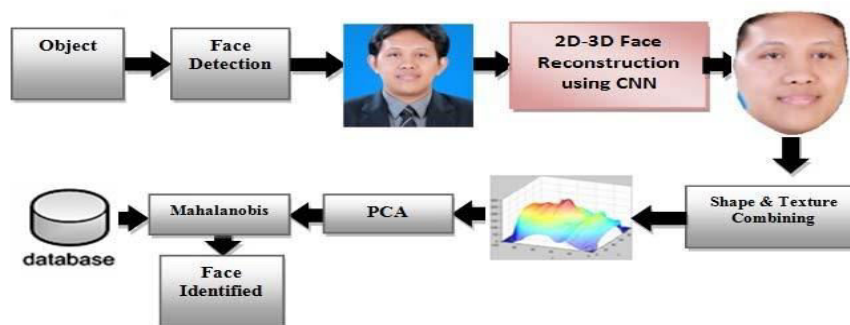


Fig:2D-3D image reconstruction process using CNN [12]

2D-3D image reconstruction using CNN can be generated using equation (1) [13],[14],[15].

$$S = \hat{S} + U_d.ad + U_e.ae \quad (1)$$

S is the 3D face output, $\hat{S}$ is the average face size, U_d is the main component of the 3D face image, ad is the identification vector, U_e is the main component of training in 3D images and ae is the parameter vector.

In this study, we use feature extraction method namely principal component analysis (PCA). PCA is used to reduce dimensional of face image resolution. The principal component analysis is used to convert a large variable data into a form of representation of other smaller variables.

IV. DATASETS DESCRIPTION

The data set used here consists of images of the our own students. Below figure depicts the sample images available in the dataset. Efficiency of this training model depends on the number of images present in the dataset [15].



Fig: Different types of Datasets [15]

Technology/Tools

Here, we can use different Python libraries and modules for face recognition, face identification, saving a customer's picture, and other things. We use the OPEN-CV (Open Source Computer Vision) library for face recognition and identification. We use the pandas package to store student information in a local database. Numpy is used to do the best job. Pymysql is used to connect to a MySQL database. Tkinter helps us make a GUI so that the programme is easier to use. In this project, we keep track of the scholars' attendance with a MySQL database. We used HTML to put together our Web page's front end. As far as back-end time is concerned, we've used PHP for that.

V. EXPERIMENTAL RESULTS

With feature extraction and PCA, the face recognition system on the proposed attendance machine can be accurate between 90% and 96% of the time. If CNN-PCA is used in the proposed research, it can lead to an accuracy of between 90% and 98%. A face-recognition-based attendance system that uses CNN-PCA can work better than one that only uses PCA.

In this study, an approach to developing 2D-to-3D image reconstruction models using Convolutional Neural Network (CNN) and PCA as a feature extraction method was used to study facial recognition. Using the CNN method, a 2D face image can be turned into a 3D face image. The proposed face recognition-based attendance system can work well if the PCA method is used to get features and the Mahalanobis method is used to sort them. The proposed method can make face recognition that is up to 98 percent accurate [12].

Object	Accuracy (%)	
	PCA	CNN-PCA
10	90.00	90.00
20	90.00	95.00
30	93.33	96.67
40	95.00	97.50
50	96.00	98.00

TABLE I. THE ACCURACY OF FACIAL RECOGNITION IN THE PROPOSED FACIAL ATTENDANCE SYSTEM [12]

2. Mostly, the efficiency of any face recognition algorithm is measured by the accuracy of match. Accuracy is calculated by the ability of the algorithm to recognize the facial input and display the percentage of match. It is important that the algorithm should display the closest percentage of match. The proposed SVM-based face recognition system achieves a matching accuracy of about 61% with 50 real-time images in the dataset. Accuracy can further be improved by increasing the number of images in the dataset. The important parameters for evaluation are facial vectors, light intensity, pixel quality etc. This method is faster and less time consuming, hence can be easily implemented for student monitoring during examinations. The efficiency of this method increases with the increase in the number of faces (i.e. dataset) [21].

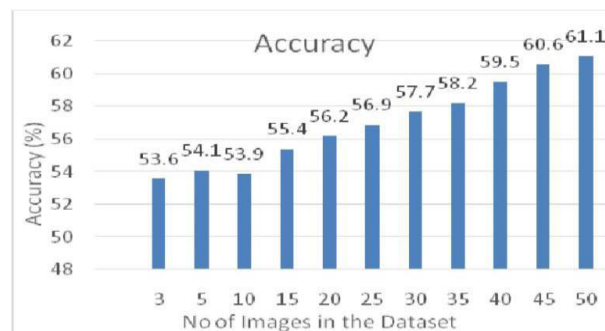


Fig: Number of Images vs Accuracy [21]

VI. CONCLUSION

Several studies on face recognition have shown that there are still a lot of methods and algorithms that have not been looked into. For example, the use of algorithms to convert 2D images to 3D forms that are used as a database in face recognition has not been looked into. A face detection and recognition system based on machine learning and the SVM model is proposed to find students' faces and keep track of what they do during online exams. The proposed system helps find faces faster by getting feature vectors from the images that are sent in. Different algorithms, like LBPH and Still Better Optimal Values, can also be used to get optimal values. Convolutional neural networks can help get more accurate results. In this system, we have set up a way for a lecturer or a teaching assistant to keep track of which students are there.

REFERENCES

- [1] M. O. Oloyede and G. P. Hancke, "Unimodal and multimodal biometric sensing systems: A review," IEEE Access, vol. 4, pp. 7532–7555, 2016.
- [2] N. Dagnes, E. Vezzetti, F. Marcolin, and S. Tornincasa, "Occlusion detection and /restoration techniques for 3D face recognition: A literature review," Mach. Vis. Appl., vol. 29, no. 5, pp. 789–813, Jul.2018.
- [3] A. Sargano, P. Angelov, and Z. Habib, "A comprehensive review on hand- crafted and learning-based action representation approaches for human activity recognition," Appl. Sci., vol. 7, no. 1, p. 110, Jan. 2017.
- [4] C. Ding and D. Tao, "A comprehensive survey on pose-invariant face recognition," ACM Trans. Intell. Syst. Technol., vol. 7, no. 3, pp. 1–42, Apr. 2016.
- [5] I. Masi, Y. Wu, T. Hassner, and P. Natarajan, "Deep face recognition: A survey," in Proc. 31st SIBGRAPI Conf. Graph., Patterns Images (SIBGRAPI), Oct. 2018, pp. 471–478.
- [6] Pranav K. B, Year, "Attendance system based on face recognition system real-time camera with message passing" 2020
- [7] Mr. Omkar Sawant¹, Mr. Yash Jain², Year, "Attendance system based on face recognition system real-time camera with message passing" 2019
- [8] A. Jourabloo and X. Liu, Year, "Attendance system based on face recognition system real-time camera with message passing" 2016
- [9] Agrawal M and Agrawal H, Year, "Attendance system based on face recognition system real-time camera with message passing" 2010
- [10] Sharanya T, Year, "Attendance system based on face recognition system real-time camera with message passing" 2020
- [11] N. Palanivel, S. Aswinkumar, J. Balaji Computer Science 2019 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN)2019
- [12] S. Matilda, K. Shahin Computer Science 2019 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN) 2019
- [13] Praveen Ankam, V. Shankar, P. Harshini, Avadutha Akash, Akshitha Valusa Computer Science, Education International Conference on Intelligent Computing and Control Systems (ICICCS) 2021
- [14] Samuel Lukas, A. R. Mitra, Ririn Ikana Desanti, D. Krisnadi Computer Science 2016 International Conference on Information and Communication Technology Convergence (ICTC) 2016
- [15] W. Deng, J. Hu, and J. Guo, "Compressive binary patterns: Designing a robust binary face descriptor with random-field eigenfilters," IEEE Trans. Pattern Anal. Mach. Intell., vol. 41, no. 3, pp. 758–767, Mar. 2019.
- [16] Edy Winarno, Imam Husni Al Amin, Herny Februariyanti, Prajanto Wahyu Adi, Wiwien Hadikurnjawati, Muchamad Taufiq Anwar, "Attendance System Based on Face Recognition System Using CNN-PCA Method and Real-Time Camera.
- [17] J. Lu, V. E. Liong, and J. Zhou, "Simultaneous local binary feature learning and encoding for homogeneous and heterogeneous face recognition," IEEE Trans. Pattern Anal. Mach. Intell., vol. 40, no. 8, pp. 1979–1993, Aug. 2018.
- [18] M. Demirkus, D. Precup, J. J. Clark, and T. Arbel, "Multi-layer temporal graphical model for head pose estimation in real-world videos," in Proc. IEEE Int. Conf. Image Process. (ICIP), Oct. 2014, pp. 3392–3396.
- [19] Sung-Kwun Oh, Sung-Hoon Yoo, Witold Pedrycz, "Design of face recognition algorithm using PCA-LDA combined for hybrid data pre-processing and polynomial-based RBF neural networks: Design and its application.
- [20] Kashem, Mohammad Abul, Md Nasim Akhter, Shamim Ahmed, and Md Mahbub Alam. "Face recognition system based on principal component analysis (PCA) with back propagation neural networks (BPNN)", Canadian Journal on Image Processing and Computer Vision, Vol. 2, No. 4, 2011, pp. 36-45.



- [21] M. Geetha, R.S Latha, S.K Nivetha, S Hariprasath, S Gowtham, C.S Deepak, "Design of face detection and recognition system to monitor students during online examinations using Machine Learning algorithms.
- [22] I. Goodfellow, Y. Bengio, A. Courville, and Y. Bengio, Deep learning, vol. 1, no. 2. Cambridge, MA, USA: MIT Press, 2016.
- [23] L. Song, D. Gong, Z. Li, C. Liu, and W. Liu, "Occlusion robust face recognition based on mask learning with pairwise differential Siamese network," in Proc. IEEE/CVF Int. Conf. Comput. Vis. (ICCV), Oct. 2019, pp. 773–782.
- [24] S. Jia, G. Guo, and Z. Xu, "A survey on 3D mask presentation attack detection and countermeasures," Pattern Recognit., vol. 98, Feb. 2020, Art. no. 107032.
- [25] S.-Q. Liu, X. Lan, and P. C. Yuen, "Temporal similarity analysis of remote photoplethysmography for fast 3D mask face presentation attack detection," in Proc. IEEE Winter Conf. Appl. Comput. Vis. (WACV), Mar. 2020, pp. 2608–2616.
- [26] Z. Wang, G. Wang, B. Huang, Z. Xiong, Q. Hong, H. Wu, P. Yi, K. Jiang, N. Wang, Y. Pei, H. Chen, Y. Miao, Z. Huang, and J. Liang, "Masked face recognition dataset and application," 2020, arXiv:2003.09093. [Online]. Available: <http://arxiv.org/abs/2003.09093>
- [27] M. Loey, G. Manogaran, M. H. N. Taha, and N. E. M. Khalifa, "A hybrid deep transfer learning model with machine learning methods for face mask detection in the era of the COVID-19 pandemic," Measurement, vol. 167, Jan. 2021, Art. no. 108288.
- [28] S. Kim, J. Lee, S. Kang, J. Lee, and H.-J. Yoo, "A power-efficient CNN accelerator with similar feature skipping for face recognition.



INNO  SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



ISSN  INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details