INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

DNN Based Smart Attendance Management System

Dr.S.Gandhimathi @ Usha[1], L.D.Dinesh Kumar[2], M.Narendran[3], S.Surya[4], D.Prem Armstrong[5]

Associate Professor, Department of ECE, Velammal College of Engineering and Technology, Madurai, India[1]

UG Students, Department of ECE, Velammal College of Engineering and Technology, Madurai, India[2,3,4,5]

ABSTRACT: To keep up the participation record with everyday exercises is a difficult undertaking. The accompanying framework depends on face acknowledgment to keep up the participation record of understudies. The everyday participation of understudies is recorded subject astute which is put away as of now by the head. As the ideal opportunity for relating subject shows up the framework naturally begins taking snaps and afterward apply face location and acknowledgment procedure to the given picture and the perceive understudies are set apart as present and their participation update with comparing time and subject id. We have utilized Deep learning strategies to build up this framework, Histogram of Oriented Gradients strategy, Harris Corner Locator is utilized to distinguish faces in pictures and Profound learning technique is utilized to process and contrast include facial of understudies with remember them. Our framework is competent to distinguish different appearances progressively

KEYWORDS:Facial Recognition, Deep Learning, HOG, Harris Corner

I. INTRODUCTION

Mobile You Face Each association requires a hearty and stable framework to record the participation of their understudies. what's more, every association have their own strategy to do as such, some are gauging participation physically with a piece of paper by calling their names during address hours and some have received biometrics framework like unique mark, RFID card per user, Iris framework to stamp the participation. The ordinary technique for calling the names of understudies physically is a tedious occasion. The RFID card framework, every understudy allots a card with their comparing personality however there is possibility of card misfortune or unapproved individual may abuse the card for counterfeit participation. While in other biometrics, for example, unique finger impression, iris or voice acknowledgment, they all remain imperfect and additionally they are not 100% exact [1] [19]. Utilization of face acknowledgment with the end goal of participation stamping is the keen method of participation in the executives framework. Face acknowledgment is a more precise and quicker method among different procedures and lessens possibility of intermediary participation. Face acknowledgment gives a detached ID that an individual which is to be recognized doesn't have to make any move for its personality [2]. Face acknowledgment includes two stages, the initial step includes the recognition of countenances and the second step consists of distinguishing proof of those recognized face pictures with the existing data set. There are a number of face identification and acknowledgment techniques presented. Face acknowledgment works either in type of appearance based which covers the highlights of entire face or highlight based which covers the mathematical element like eyes, nose, eye foreheads, and cheeks to perceive the face [3].Our framework utilizes face acknowledgment way to deal with lessen the blemishes of existing framework with the assistance of machine learning, it requires a decent quality camera to catch the pictures of understudies, the identification cycle is finished by histogram of arranged slope. What's more, perceiving performs through profound learning. The frontend side (customer side) which comprise of GUI which depends on electron JS and backend side comprise of rationale and MATLAB (worker side), an IPC (Bury Individual Correspondence) connect is created to convey these two stacks. The pictures caught by the camera are shipped off framework for additional investigation, the information picture is then contrasted and a bunch of reference pictures of every one of the under study and imprint their participation.

II. RELATED WORK

Lately, various face acknowledgment based participation the executives framework have presented all together to improve the exhibition of understudies in various association. In [4] Jomon Joseph, K. P. Zacharia proposed a framework utilizing picture preparing, PCA, Eigen faces, Microcontroller, in view of Matlab. Their framework works

just with front face pictures and there is need of a reasonable technique which works with the direction of the framework. Ajinkya Patil with their colleagues in [5] proposed a face acknowledgment approach for participation checking utilizing Viola jones calculation, Haar falls are utilized to recognize faces in pictures and acknowledgment performs through Eigen face technique. Another methodology of making participation framework simple and secure, in [6] the creator proposed a framework with the assistance of counterfeit neural organizations, they utilized PCA to extricate face pictures and testing and preparing were accomplished by neural organizations, their framework performs in different direction. A 3D face acknowledgment approach for participation the executives framework was proposed by Muthu Kalyani.K, VeeraMuthu.A [7] has proposed, they checked participation with month to month progress of every understudy. There is need for an elective calculation which can upgrade the acknowledgment on situated countenances. Proficient Participation The board framework is planned with the assistance of PCA calculation [8], the have accomplished precision up to 83% yet their framework execution diminishes due to somewhat changes in light condition. An eigen face approach alongside PCA calculation for stamping face acknowledgment participation framework have presented by creator in [9], they notice correlation of various face acknowledgment calculation in their paper. Generally speaking it was acceptable way to deal with keep up record of participation.

III. PROPOSED ALGORITHM

1.1 INPUT IMAGE:

It is an array, or a matrix, of square pixels (picture elements) arranged in columns and rows. In case of grayscale images, the resultant matrix of the read statement comprises 256×256 or 65,536 elements. The first statement takes grey values of all the pixels in the grayscale image and puts them into a matrix F (256×256 elements), which is now a MATLAB variable on which various matrix operations can be performed. In case of RGB images, pixel values now consist of a list of three values, giving red, green and blue components of the color of the given pixel. Matrix 'G' is a three-dimensional matrix 256x256x3. If there is no semicolon, the result of the command is displayed on the screen.
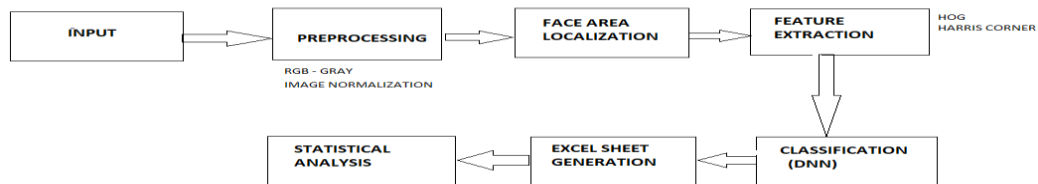

Fig. 1. Block diagram of Attendance Management System

1.2 PREPROCESSING
1.2.1 RGB -GRAYSCALE
An RGB image can be viewed as three images(a red scale image, a green scale image and a blue scale image) stacked on top of each other. In MATLAB, an RGB image is basically a M*N*3 array of colour pixel, where each colour pixel is a triplet which corresponds to red, blue and green colour component of RGB image at a specified spatial location .Similarly, A Gray scale image can be viewed as a single layered image. In MATLAB, a gray scale image is basically M*N array whose values have been scaled to represent intensities.Gray scale images are much easier to work within a variety of task like many morphological operation and image segmentation problem, it is easier to work with single layered image (Grayscale image) than a three-layered image (RGB colour image) It is also easier to distinguish features of an image when we deal with a single layered image .

1.2.2 IMAGE NORMALIZATION

This process, often used in the preparation of data sets for artificial intelligence (AI), in which multiple images are put into a common statistical distribution in terms of size and pixel values; however, a single image can also be normalized within itself. The process usually includes both spatial and intensity normalization. Normalizing overall pixel values in multiple images into the same statistical distribution is called intensity normalization. In terms of single images, artifacts can create in homogeneity in images (especially in terms of MRI intensities) that can be corrected with scan bias normalization, a type of intensity normalization.

1.3 FACE AREA LOCALIZATION

The detection of faces and facial features from an arbitrary uncontrived image is a critical precursor to recognition. A robust scheme is needed to detect the face as well as determine its precise placement to extract the relevant data from an input image. This is necessary to properly prepare the image's 2D intensity description of the face for input to a recognition system. It detects faces with left eye, right eye, mouth, and nose. This code is implemented based on Cascade Object Detector of Frontal Face CART, Left Eye, Right Eye, Mouth, and Nose. The code is easy to use and the face detection performance is better than the default MATLAB face detection We propose a hierarchical detection method which can quickly and reliably converge to a localization of the face amidst a wide range of external visual stimuli and variation.

1.4 FEATURE EXTRACTION

Feature extraction is a type of dimensionality reduction method that competently represents the interesting parts of an image as a compressed feature vector. This approach is useful forreduced image representation when image size is quite large which is required to quickly complete tasks such as image matching and recovery.

1.4.1 HISTOGRAM OF ORIENTED GRADIENTS

The Histogram of Oriented Gradients (HOG) is a Feature descriptor used in image processing and Computer Vision for Object Detection. HOG feature visualization, returned as an object. The function outputs this optional argument to visualize the extracted HOG features. You can use the plot method with the visualization output.

1.4.2 HARRIS CORNER

Harris Corner Detector is a corner detection operator that is commonly used in computer vision algorithms to extract corners and infer features of an image. It was first introduced by Chris Harris and Mike Stephens in 1988 upon the improvement of Moravec's corner detector. Compared to the previous one, Harris' corner detector takes the differential of the corner score into account with reference to direction directly, instead of using shifting patches for every 45-degree.

1.5 DNN CLASSIFICATION

Deep learning is a branch of machine learning that teaches computers to do what comes naturally to humans: learn from experience. Machine learning algorithms use computational methods to "learn" information directly from data without relying on a predetermined equation as a model. Deep learning is especially suited for image recognition, which is important for solving problems such as facial recognition, motion detection, and many advanced driver assistance technologies such as autonomous driving, lane detection, pedestrian detection, and autonomous parking.

1.6 ATTENDANCE MARKING

When the face is relate to the picture put away in JSON document, python create move quantities of present understudies and return that, when information is returned, the framework produces participation table which incorporates the name, move number, date, day and time with comparing subject id. And afterward passes the information to python to store the table into a dominate sheet consequently. Each sheet is saved by the subjects which previously entered by the chairman, for instance when framework produces dominate sheet by sending the arranged sheet in an exhibit to python, the python first checks whether there leave any dominate sheet of that date, assuming indeed, it make separate worksheet by subject id, so participation is separated for various subjects.

IV. EXPERIMENTATION AND RESULT ANALYSIS

Smart Attendance Management System is simple and works efficiently. The board Framework is basic and works effectiveness. The framework works naturally once the enlistment of individual understudy made by the organization. It comprises of the accompanying modules,
•   Student Enrolment

-      Face Acknowledgment
-      Addition of subject with their relating time.
-      Attendance sheet age and import to Excel (xlsx) format.

To instate this framework, the manager first registers their understudy information alongside their name move number and office. We have made a preparation dataset of 6 understudies (absolute of 120 pictures for each) for testing reason. This is the subject envelope, subjects are to be occupied by time table once the time shows up for the relating subject, the framework begins catching pictures, distinguishes the faces, contrasts the countenances and existing data set, mark participation and create dominate sheet for the perceive understudies On the confusion matrix plot, the rows correspond to the predicted class (Output Class) and the columns correspond to the true class (Target Class). The diagonal cells correspond to observations that are correctly classified. The off-diagonal cells correspond to incorrectly classified observations. The results obtained by this method are shown in Fig. 2 to 8. Table .1 shows the performance measures i.e detection rate and recognition rate with respect to different orientation angles. From the tables, it is observed that the proposed method outperforms the traditional methods.
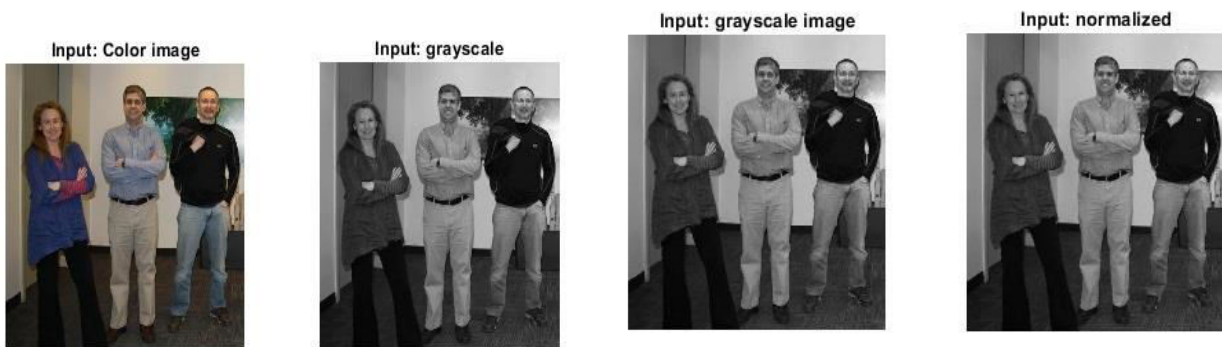

Fig 2. Input Image, and Grayscale Image   **Fig 3**Rgb-Grayscale Image, Normalized Image

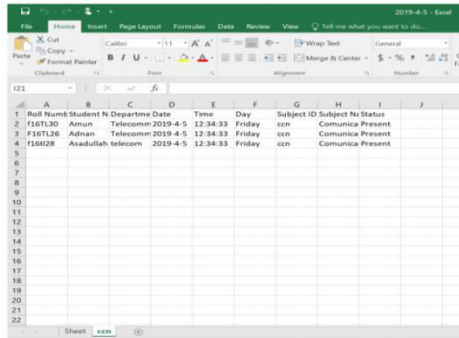**Fig 4** Detected Faces   **Fig 5** Feature Extraction

Fig 6 Attendance sheet in Excel

V. SIMULATION RESULTS

The proposed energy efficient algorithm is implemented with MATLAB. We transmitted same size of data packets through source node 1 to destination node 5. Proposed algorithm is compared between two metrics Total Transmission Energy and Maximum Number of Hops on the basis of total number of packets transmitted, network lifetime and energy consumed by each node. We considered the simulation time as a network lifetime and network lifetime is a timewhen no route is available to transmit the packet. Simulation time is calculated through the MATLAB. Our results shows that there is faster recognition rates of the faces and hence proved to be effective than th previous existing methodology.

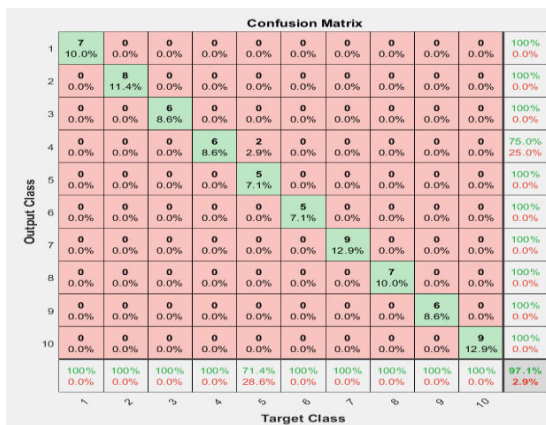| Face Orientations	Detection Rate	Recognition Rate
O^0 (Frontal face)	98.7 %	95%
18°	80.0 %	78%
54°	59.2 %	58%
72°	0.00 %	0.00%
90°(Profile face)	0.00 %	0.00%

.

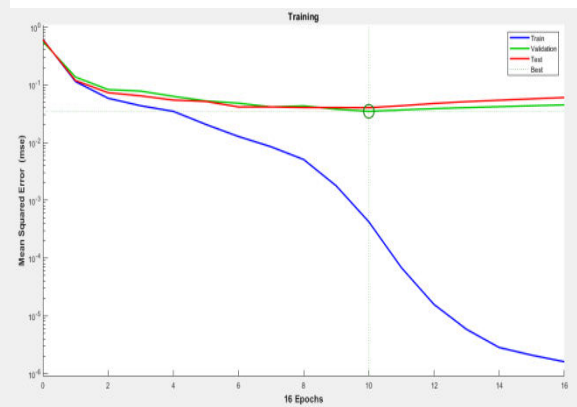Fig.7.Plot Classification Confusion Matrix   Fig.8Training Deep Learning Neural Network
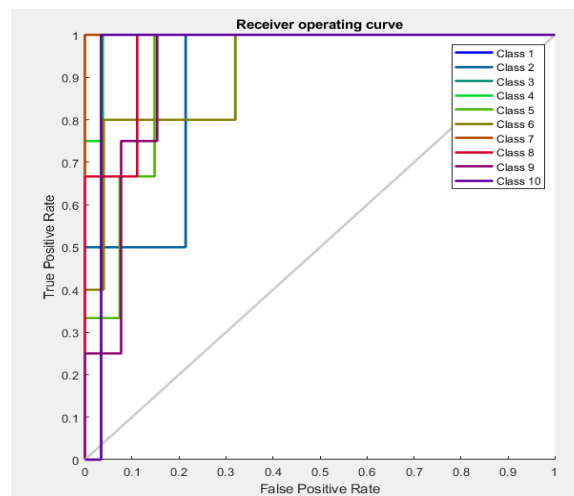
Fig.9.Receiver Operating Curve

VI. CONCLUSION AND FUTURE WORK

The Smart attendance management system is intended to address the issues of existing manual frameworks. We have utilized face acknowledgment idea to check the participation of understudy and improve the framework. The framework performs palatable in various stances and varieties. In future this framework need be improved in light of the fact that these framework at times neglects to perceive understudies from some distance, likewise we make them measure impediment, working with an arrangement of high preparing may result

To acquire the participation of people and to record their season of passage and leave, the creators proposed theparticipation the executives framework dependent on face acknowledgment innovation in the foundations/associations. The framework gauges participation of every understudy by constant perception at the passage and leave focuses. The consequence of our starter analyze shows improved execution in the assessment of the participation contrasted with the customary high contrast participation frameworks. Current work is centered around the face discovery calculations from pictures or video outlines.

In additional work, creators plan to improve face acknowledgment viability by utilizing the communication among our framework, the clients and the heads. Then again, our framework can be utilized in a totally new element of face acknowledgment application, versatile based face acknowledgment, which can be a guide for everyday citizens to think about any individual being shot by cell camera including legitimate approval for getting to a unified information base.

REFERENCES

[1] Kar, Nirmalya, et al. "Study of implementing automated attendance system using face recognition technique." *International Journal of computer and communication engineering* 1.2 (2012): 100.

[2] RoshanTharanga, J. G., et al. "Smart attendance using real time face recognition (smart-fr)." *Department of Electronic and Computer Engineering, Sri Lanka Institute of Information Technology (SLIIT), Malabe, Sri Lanka* (2013)

[3] Selvi, K. Senthamil, P. Chitrakala, and A. Antony Jenitha. "Face recognition based attendance marking system." *Corresponding Author: S. Rajkumar*, Email: rajkumarsrajkumar@ gamil. com* (2014).

[4] Joseph, Jomon, and K. P. Zacharia. "Automatic attendance management system using face recognition." *International Journal of Science and Research (IJSR)* 2.11 (2013): 327- 330.

[5] Patil, Ajinkya, and Mrudang Shukla. "Implementation of classroom attendance system based on face recognition in class." *International Journal of Advances in Engineering & Technology* 7.3 (2014): 974.

[6] Kanti, Jyotshana, and Shubha Sharm. "Automated Attendance using Face Recognition based on PCA with Artificial Neural Network." *International journal of science and research IJSR*(2012).

[7] MuthuKalyani, K., and A. VeeraMuthu. "Smart application for AMS using face recognition." *Computer Science & Engineering* 3.5 (2013): 13.

[8] Deshmukh, Badal J., and Sudhir M. Kharad. "Efficient Attendance Management: A Face Recognition

Approach." (2014).

[9] Wagh, Priyanka, et al. "Attendance system based on face recognition using eigen face and PCA algorithms." *2015 International Conference on Green Computing and Internet of Things (ICGCIoT)*. IEEE, 2015.

[10] Bhattacharya, Shubhobrata, et al. "Smart Attendance Monitoring System (SAMS): A Face Recognition Based Attendance System for Classroom Environment." *2018 IEEE 18th International Conference on Advanced Learning Technologies (ICALT)*. IEEE, 2018.

[11] Samet, Refik, and Muhammed Tanriverdi. "Face recognition-based mobile automatic classroom attendance management system." *2017 International Conference on Cyberworlds (CW)*. IEEE, 2017.

[12] Li, Xiang-Yu, and Zhen-Xian Lin. "Face recognition based on HOG and fast PCA algorithm." *The Euro-China Conference on Intelligent Data Analysis and Applications*. Springer, Cham, 2017.

[13] Arsenovic, Marko, et al. "FaceTime—Deep learning based face recognition attendance system." *2017 IEEE 15th International Symposium on Intelligent Systems and Informatics (SISY)*. IEEE, 2017.

[14] Rekha, N., and M. Z. Kurian. "Face detection in real time based on HOG." *International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)* 3.4 (2014): 1345-1352.

[15] Kwolek, Bogdan. "Face detection using convolutional neural networks and Gabor filters." *International Conference on Artificial Neural Networks*. Springer, Berlin, Heidelberg, 2005.

[16] Ashwini, C., et al. "An Efficient Attendance System Using Local Binary Pattern and Local Directional Pattern." *Journal of Network Communications and Emerging Technologies (JNCET) www.jncet. org* 8.4 (2018).

[17] Karnalim, Oscar, et al. "Face-face at classroom environment: Dataset and exploration." *2018 Eighth International Conference on Image Processing Theory, Tools and Applications (IPTA)*. IEEE, 2018.

[18] Mian, Ajmal. "Realtime face detection and tracking using a single pan, tilt, zoom camera." *2008 23rd International Conference Image and Vision Computing New Zealand*. IEEE, 2008.

[19] Mehta, Preeti, and Pankaj Tomar. "An Efficient Attendance Management Sytem based on Face Recognition using Matlab and Raspberry Pi 2." *International Journal of Engineering Technology Science and Research IJETSR* 3.5 (2016): 71-78.

BIOGRAPHY

Dr. S.Gandhimathi Alias Usha is an Associate Professor, with the Department of Electronics and Communication Engineering, Velammal College of Engineering and Technology, Madurai, India. She received her Bachelor degree in Electronics and Communication Engineering from Madurai Kamaraj University in 2001 and her Master's degree from A.C.College of Engineering and Technology, Karaikudi, Tamilnadu, India in 2009 and received Ph.D degree in Image Processing at Anna University, Chennai in 2019. She has published over 40 Technical papers in International Journals, International/ National Conferences. Her current research includes Image Processing and Remote Sensing. She is a Life member of Indian Society for Technical Education (ISTE) and Indian Society of Remote Sensing (ISRS).
.

INTERNATIONAL JOURNAL
OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

Scan to save the contact details