

Dynamic Attendance Using Machine Learning

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Abstract- now a days educational institutions are concerned about regularity of student attendance. This is mainly due to overall academic performance is affected by his or her attendance in the institute. Mainly there are two conventional Nowadays Educational institutions are concerned about regularity of student attendance. This is mainly due to students' overall academic performance is affected by his or her attendance in the institute. Mainly there are two conventional methods of marking attendance which are calling out the roll call or by taking student sign on paper. They both were more time consuming and difficult. Hence, there is a requirement of computer-based student attendance management system which will assist the faculty for maintaining attendance record automatically. but if we do using mobile phone or not attend class mentally means mark will be reduced. In this project we have implemented the automated attendance system using Machine Learning. We have projected our ideas to implement "Automated Attendance System Based on Facial Recognition", in which it imbibes large applications. The application includes face identification, which saves time and eliminates chances of proxy attendance because of the face authorization. Hence, this system can be implemented in a field where attendance plays an important role. The proposed system uses Haar Cascade algorithm which is based on Eigen face approach. This algorithm compares the test image and training image and determines students who are present and absent. The attendance record is maintained in an excel sheet which is updated automatically in the system.

Keywords- Automated Attendance, facial recognition, Eigen face, face authorization

I. INTRODUCTION

Attendance is of prime importance for both the teacher and student of an educational organization. The problem arises when we think about the traditional process of taking attendance in the classroom. Calling name or roll number of the student for attendance not only wastes time, but also it requires energy. So an installation of an automatic attendance system will solve all these problems. There are some automatic attendance taking systems which are currently being used by multiple institutions. Example of one such

system is the use of biometric technique. Although it is automatic and a step ahead of the traditional method, it fails to meet the time constraint. The student has to wait in queue for giving attendance, which is time taking. This project introduces an involuntary attendance marking system, devoid of any kind of interference with the normal teaching procedure. An automatic attendance system by facial recognition using machine learning is a smart and organized way for any organization which demands the regular maintenance of the attendance of the employees, worker or students.

This approach will save the money of organization, save time and spare you with the frustration of the manual input of attendance, which is being followed since ages. The automatic approach of attendance will increase efficiency, by the implementation of the electronic, integrated time and attendance system resulting in profit in every aspect. This project is being carried out due to the concerns that have been highlighted on the methods which lectures use to take attendance during lectures. The use of clickers, ID cards swiping and manually writing down names on a sheet of paper as a method to track student attendants has prompted this project to be carried out. This is not in any way to criticize the various methods used for student attendance, but to build a system that will detect the number of faces present in a classroom as well as recognizing them. Also, a teacher will be able to tell if a student was honest as these methods mentioned can be used by anyone for attendance records, but with the face detection and recognition system in place, it will be easy to tell if a student is actually present in the classroom or not. This system will not only improve classroom control during lectures, it will also possibly detect faces for student attendance purposes.

II. LITERATURE SURVEY

Chintalapati, S., & Raghunadh, M. V. (2013), "Automated attendance management system based on face recognition algorithms" 2013 IEEE International Conference on Computational Intelligence and Computing *Research*. doi:10.1109/iccic.2013.6724266.

Optimal energy management in smart spaces requires intelligent and reliable energy-aware-based context sensing and technologies that are capable of recognizing and analyzing the power consumption. In this system, we propose an efficient and reliable power management system with inclusion of automated attendance. The main objective is to automatically control the fan and lights inside any space involving a number of people. The next objective is automated attendance. ID cards containing barcode data are sufficient for their identity, show their real-time data, their usage, and a fine system for being late. Priority of this work is made to ensure that this system is affordable to all with assurance of data integrity and authority.

Jaturawat, P., & Phankokkrud, M. (2016), "An evaluation of face recognition algorithms and accuracy based on video in unconstrained factors" 2016 6th IEEE International Conference on Control System, Computing and Engineering (ICCSCE). doi:10.1109/iccsce.2016.7893578.

A Face recognition system is an application of computer vision and image processing which is capable of performing two major tasks of identifying and verifying a person from an image or a video database. The objective of this paper is to automate the attendance system by integrating the face recognition technology using Eigen Face database and PCA algorithm with Matlab GUI. In conventional attendance systems there are several issues like fake attendance, lot of time consumption, manipulation of attendance, information cannot be secure. There are many limitations in implementing face recognition technologies like Image Quality, Image Size, Face angle, varying intensity of light. In order to overcome these issues various techniques like Illumination Invariant, Histogram equalization, PCA are used. By using this system attendance is updated automatically after comparing the detected face with original Eigen database in Excel sheet integrated with Matlab GUI.

Abhishek Jha (2013), "Class Room Attendance System Using Facial Recognition System" The International Journal of Mathematics, Science, Technology and Management (ISSN : 2319-8125) Vol. 2 Issue 3.2013.

In proposed system an automated attendance marking and management system is proposed by using face detection and recognition algorithms. Identification of human faces by the unique characteristics or features of their face is known as Face recognition. Currently, Face recognition technology is the fastest growing technology. Instead of using the traditional methods, this proposed system aims to develop an automated system that records the student's attendance by using facial

recognition technology for those who are present during lecture hours. The main objective of this work is to make the attendance marking and management system fully automatic, simple and easy. In this work the facial recognition of face is done by image processing techniques. The processed image is used to match with the existing stored record and then attendance is marked in the database correspondingly. Compared to existing system traditional attendance marking system, this system reduces the workload of people and also saves time. This proposed system is implemented with 4 modules such as Image Capturing, Segmentation of group photo and Face Detection, Face comparison and Recognition, Updating of Attendance in database.

S. Sayeed, J. Hossen, S.M.A. Kalaiarasi, V. Jayakumar, I. Yusof, A. Samraj (2017), "Real-time Face Recognition For Attendance Monitoring System" Journal of Theoretical and Applied Information Technology 15th January 2017. Vol.95. No.1.

Efficient employee attendance management leads any organizations to increase overall corporate performance and accomplish specific goals. Accurate employee attendance records are importantly used to control working discipline and increase worker's productivity. Manual attendance-time checking makes increasingly the expense of time-consuming and paper work of the companies. Human actions i.e. mistake at work, and fraudulent time keeping are additional hidden expenses which affect the productivity of the organization. Variation of the attendance policies set up in different companies make more complicated in evaluation of employee working hours. Hence, automated time-attendance management system is the key operational variables for enhancing the performance, and profitability. The attendance management system captures time-attendance data and serves the management of the employee working hour records. However, some existing time attendance systems have limitations in terms of identification speed, cost of system devices, real-time attendance monitoring, and flexibility of database storage size. In this paper, we introduce a cloud-based employee attendance management system using NFC technology. The proposed application provides several important operations such as captured attendance records using NFC, automatic time calculation, leave and overtime checking, working hours evaluation, real-time updated information access, and generating reports. The proposed system also offers online portal which allows multiple company user accounts, requires no special software to install, and provides more flexible data storage. The evaluation of user satisfaction shows that our proposed system is practically used and satisfied.

N.Sudhakar Reddy, M.V.Sumanth, S.Suresh Babu (2018), “A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques” 2018 JETIR December 2018, Volume 5, Issue 12 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org (ISSN-2349-5162).

The management of the attendance can be a great burden on the teachers if it is done by hand. To resolve this problem, smart and auto attendance management system is being utilized. But authentication is an important issue in this system. The smart attendance system is generally executed with the help of biometrics. Face recognition is one of the biometric methods to improve this system. Being a prime feature of biometric verification, facial recognition is being used enormously in several such applications, like video monitoring and CCTV footage system, an interaction between computer & humans and access systems present indoors and network security.

By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. The main implementation steps used in this type of system are face detection and recognizing the detected face. This paper proposes a model for implementing an automated attendance management system for students of a class by making use of face recognition technique, by using Eigenface values, Principle Component Analysis (PCA) and Convolutional Neural Network (CNN). After these, the connection of recognized faces ought to be conceivable by comparing with the database containing student's faces. This model will be a successful technique to manage the attendance and records of students.

Ali Akbar Punjani, Chowdhary Obaid, Choudhary Yasir (2017), “Automated Attendance Management System Using Face Recognition” International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 6, Issue 8, August 2017, ISSN: 2278 – 7798.

Tracking of attendance is a ubiquitous task in many institutions and during organised events. This, along with subsequent management of collected data can be a cumbersome activity that requires significant time and effort, from all involved parties. Tracking and managing student attendance during lectures and exams is an especially important instance of that task. Automated attendance.

The management systems devised in the literature differ in applied technological solutions and features.

However, many of these lack some features that would make them particularly useful for the task of student attendance management. This paper proposes the design of an automatic system tailored for the tracking and management of student attendance data. The design incorporates three main components that interact to deliver a seamless user experience. The key element is the utilisation of simple beacons, which make the system cost-effective and easy to use. Combining them with a mobile platform and a web service enables versatile attendance tracking. Periodic detection of the nearby beacons with authenticated server-side logic makes the proposed design unique in terms of addressing common attendance tracking issues. Also, the design is open for future integration of sophisticated data analysis modules.

III. EXISTING SYSTEM

In most universities, teachers take attendance by calling out the names and surnames of students, and the marking them, while, in others, teachers pass around a sheet of paper, asking students to sign in attendance sheet just next to their surnames. Both practices have the drawbacks. In the first case, if numerous groups attend the lesson, checking all of these students by name and surname might take about 10 minutes out of each lesson; in the second case, friends of absent students may write down their names and surnames. These practices plan university teachers and their institutions at considerable disadvantages when it comes to taking attendance.

IV. PROPOSED SYSTEM

This uses machine learning techniques to get a high degree of accuracy from what is called “training data”. Haar Cascades use the Adaboost learning algorithm which selects a small number of important features from a large set to give an efficient result of classifiers. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. For this, haar features shown in below image are used. They are just like our convolutional kernel. Each feature is a single value obtained by subtracting sum of pixels under white rectangle from sum of pixels under black rectangle.

V. ARCHITECTURE OF DYNAMIC ATTENDANCE

SYSTEM ARCHITECTURE

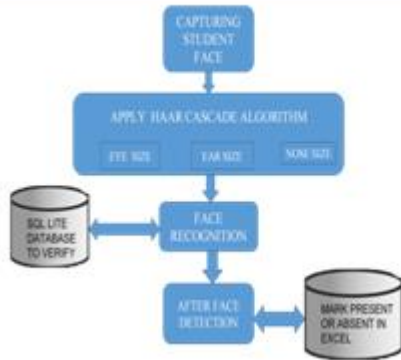


Figure 1: Architecture Diagr

VI. MODULES IN THE SYSTEM

The working of the model is partitioned into modules which gives a detailed view on the working of the model

1. Capturing face
2. Feature Extraction
3. Face Recogniton

1.Capturing face



Figure 3: capturing face

- The user prepares to present a face image to face recognition module.
- It can request a face image from several different environments:
- the face can be image file from files or captured by video.
- the face has been captured using the camera from that the students image has been captured.
- The students captured image will be saved in the database.
- The database used to save the students face and there details where SQL lite database from that the later the face recognized.

- In this the current high quality camera is used to take image as it takes pics accurately.

From this the image can be recognized and marks attendance.

2.Feature Extraction module

- It is face normalized and desires, they are enhanced to improve the performance of recognition system.
- Feature Extraction Module: After performing some pre-processing (if- necessary), the normalized face image is presented to the feature extraction module
- In this module one image is extracted to many frames as in ths it uses the Haar Cascade algorithm for extracting the single face.
- The single face is divided into 72 frames based on the eye size , nose size , ear size ,mouth size and so on.
- It is analyzing each part thouroughly and in each frame one part size is measured.
- In this using Eigenfaces a single image is at first trained so that it can easily been extracted to that trained format which we already given as an input.
- In this the latest algorithm whicvh we used to capture and extract is Haar cascade algorithm.
- In this the face is clearly extracted in a way if half of the face is recognized also then the student can be identified easily.

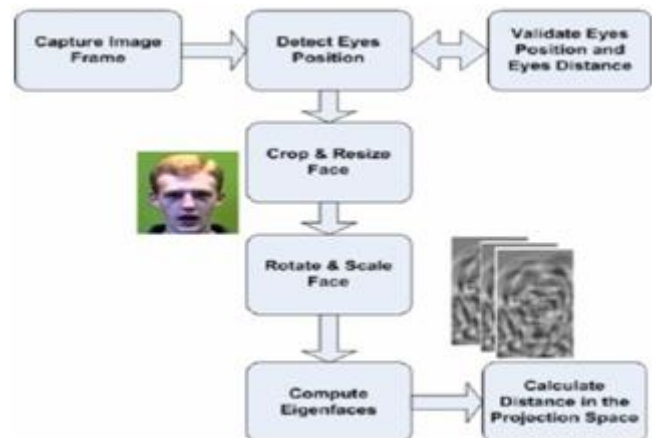


Figure 4: Feature Extraction algorithm



Figure 5: Feature Extraction module

3.Face recognition module :

- In this module, with the help of pattern classifier, extracted features of the face image is compared with the ones stored in a face library or face database.
- After doing this comparison, face image is classified as either known or unknown.
- Training Set: Training sets are used during the "learning phase" of the face recognition process in supervised face classifiers.
- The feature extraction and the classification modules make direct use of the face library.
- In this module the face of the student is detected and analyzed with the SQL lite database
- If it matches the database then the student detail is analyzed after that in the ms excel database the student has been marked present
- If the student face is not detected then the student is marked as absent

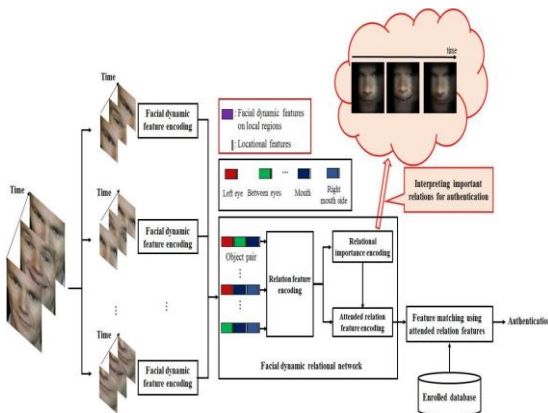


Figure 2:. Overall procedure of the proposed facial authentication method using attended relation features of facial dynamics.

- In this we can set time interval to take attendance then once again it will check and mark absent or present
- Then using this identification we can avoid the proxy attendance
- In this the face can be recognized accurately and it is one of the important real time application

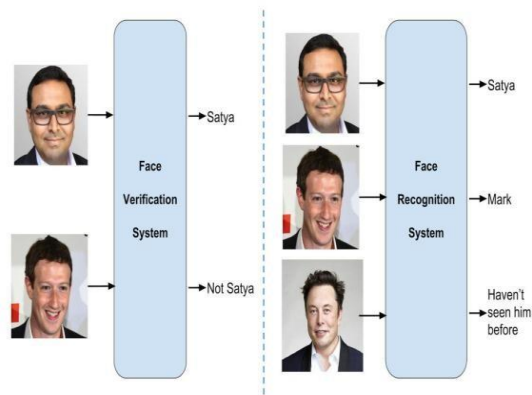


Figure 6: Face Recognition module

Abbreviations and Acronyms

- ML – Machine Learning
- PCA: Principal Component Analysis
- LBPH:Local Binary Pattern Histogram

VII. FUTURE WORK

For future work, the plan is to use cloud- based face recognition in order to speed up the face recognition process.in this using the cloud means the storage of data is safe and it consists of vast memory so it doesn't slow the performance of the software. In future enhancement the database can be done more privacy as only the certains staffs can only view it. This project can also be used in other companies also other than the schoolmand colleges.

VIII. CONCLUSION

In this system we have implemented an attendance system for a lecture, section or laboratory by which lecturer or teaching assistant can record students' attendance. It saves time and effort, especially if it is a lecture with huge number of students. Automated Attendance System has been envisioned for the purpose of reducing the drawbacks in the traditional (manual) system.

This attendance system demonstrates the use of machine learning techniques in classroom. This system can not only merely help in the attendance system, but also improve the goodwill of an institution. Students using mobile phone or not attend class mentally means mark will be Reduced..

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